Developer usability testing
A real world example

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Abstract
The iPhone has thanks to its multitouch interface, size and connectivity change the way we communicate. To fully utilize this technology we can involve users in the development process to help make highly usable software applications. One way to do this we somehow need to get the users to use our systems. What techniques are there to do this? And will they fit our product? Are there any way we can involve the users in the development process of an iPhone application, in this thesis I investigate if this can be accomplished by conducting usability tests with users on an iPhone application. The usability testing gives an insight into how the users work with and adapts to the users interface. The questionnaires given to the participants gave insight into how the users considered the usability and usefulness of the application. This data gave the development much needed data on the application to make it better and more usable. Since earlier research into user involvement have shown a strong connection to usable software and usability testing could be integrated successfully into the development by the single programmer, the conclusion can be drawn that single developer that incorporates usability testing into the development process as a form of user involvement makes more usable software. The usability was tested on an iPhone application built for an American online classified ads website.

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1 Introduction

Some of the most exciting development in the consumer electronic industry today, is in the mobile technology department and specifically Smartphone’s. With Fortune 500\(^1\) companies like Apple and Google now entering a market where Nokia, Microsoft and RIM have the biggest market share. But a Smartphone without great applications is nothing more than a normal cell phone.

Apple's mobile applications store, the iTunes app store, is probably one of the biggest with more than 140 000 applications (Apple Insider 2010). Google's equivalent, the Android Marketplace, has closer to 50 000 (Tech Crunch 2010). A number of these applications are made by single or smaller groups of developers and with all this competition developers need to go the extra length to make their application competitive.

1.1 Background

AmericanListed\(^2\) is an internet sell site where corporations or private citizens can post classified ads, for their products and used items. It was started in 2007 and is aimed at the US market. The service is free and supported by online advertisement. But they didn’t yet have an iPhone application.

Since I am myself a single developer and with usability testing something I find is an important part of development, I asked myself how could I as a single developer with small resources, not enough to hire experts, still test the usability of my application. This is why I wanted to research if you can as a single developer or small group of developers conduct usability tests yourself and still see a good return on the time spent by getting higher user satisfaction and usability.

1.2 Purpose

Currently there is a gap in the research into mobile application development and further there is very little research into single person development. As said in the introduction, there are people who develop single handly. And with most development methodologies that work iteratively and involve the user in the development demand the work is carried out by a group, there is little choice for the single developer.

Based on this I want to look at how a single developer could integrate usability testing into the development as a way of integrating user involvement into the development process and thereby getting higher user satisfaction and usability. To test this an iPhone application was developed and then usability tested. Data was collected on the observations made and the expected result is that it is feasible for a single developer to make this integration.

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\(^1\) http://money.cnn.com/magazines/fortune/fortune500/2010/full_list/
\(^2\) www.americanlisted.com
1.3 **Method**

This thesis has used the research method of action research in the way proposed by Jean McNiff (2003). McNiff proposes that you can use a action cycle of identifying an area of practices to be investigated, imagine a solution, implement the solution, evaluate the solution and then change the practices, this can then move in to another action cycle (ibid.). Action research typically takes the form of researchers working with teams in the industry or other areas and working together to solve a problem. This compared to more traditional research such as case study (Yin 1994), where the research for instance takes the form of researching and observing the people or the work they do, but not getting involved with the work in any way.

So to test this premise I found an area to study and proposed a solution, as in this thesis purpose. For the implement an iPhone application was developed using the evolutionary prototyping methodology (Vliet 2002) and during this usability testing was conducted. The usability testing was conducted by using the method of unobtrusive usability testing (Rubin 2008). And the application was developed in three iterations and after one testing was conducted.

Evolutionary prototyping is not strictly an iterative method, but it conducts development in cycles much like iterations. Evolutionary prototyping is based on the sentiment that it is better to build what you know. Because of that you start with raw requirements and create from that a core system. When users have tested the prototype new features or changes to existing features are implemented, this gives a better understanding of the system and the needs of the user (Vliet 2002). This was then evaluated and reflected upon, and possible future research was suggested. Only one action cycle was performed and instead proposed changes were derived from the evaluation.

1.4 **Delimitations**

There are many alternative to usability testing most of these are not covered by this thesis. No comparative testing of other usability techniques was conducted.

1.5 **Outline**

In the second chapter iPhone development will be presented. In chapter three an overview and reasons of usability testing is presented and in chapter four the development and the testing of the application is covered, last in that chapter the results of the testing is presented. Chapter five contains the result and conclusion drawn with respect to the purpose of this thesis.
2 iPhone development

Under this headline I describe some of the tools and concepts involved in iPhone development. This will give a greater understanding of the later parts of the thesis.

2.1 iPhone and development tools

The iPhone was announced in January of 2007 and saw a general release in the United States in June of the same year. When it was released it had no GPS or high speed internet connectivity. It also didn’t have the ability to run third party applications. Instead Apple supplied a template and documentation for making web applications to run in the native browser Safari. But a year later Apple released a Software development kit or SDK that made it possible to create and run native applications on the phone. They also opened the iTunes App Store for the distribution of these applications. Apple has made it possible to release free applications or paid. It is the developer that sets the price and Apple keeps 30 % of the revenue as a fee for the distribution and handling.

The development tool supplied by Apple, named Xcode (Dalrymple & Knaster 2009), only runs on the OS X operating system. Xcode is the integrated development environment or IDE used for the iPhone. Xcode also interacts with the compiler, Gnu compiler collection (GCC 2010) or GCC. GCC is a compiler distributed under the Gnu general public license and is free software.

2.2 Objective-C and Cocoa Touch

In the early 80’s Brad Cox set out give C a smalltalk (Goldberg 1983) like object-orientation. What he created was Objective-C (Dalrymple 2009). Objective-C was then licensed Steve Jobs in his Next venture. Next was the acquired by Apple and Next’s main product NextStep became Cocoa (ibid.) and Xcode. Since then objective-C has become the standard programming language for Macintosh, and now also the iPhone. Not only is objective-C an extension of C it is a strict superset, that means that any program written in C will compile on an Objective-C compiler.

One of the major differences compared to languages like C++, Java and C#, objective-C uses so called message passing. In Java to call a method you would write:

object.methodOne(method parameter)

In objective-C you do:

[object objectMethod:method parameter].

This is also combined with named parameters. In Java parameters sent to methods are separated with a comma in objective-C you have named parameters, so you could write (Dalrymple 2009):

[object methodOne:parameterOne namefor:parameterTwo]

Cocoa touch (Dudney 2009) is the application programming interface or API for the iPhone that gives the developer access to resources and method call for native features on the iPhone.
It is supplied and maintained by Apple (ibid.). The API has so far been released in two versions each with several updates. The release of iPhone OS 2 happened in conjunction with the opening of the iTunes App Store.

2.3 Model-view-controller

Model-view-controller or MVC is an architectural design pattern for applications of all kinds and is the design pattern of Cocoa Touch (Dudney 2009). The pattern describes the responsibilities of three parts of an application. The first part is the model, it represents the data the application uses. This data is described in raw form but with some form of logic on top. The logic is there to describe and convert the data as needed (Pope 1988).

The second part is the view, it is responsible for presenting the model. It is also responsible for taking input from the user and conveys this to the next part of MVC the controller. The controller is the middleman, it request the data from the model and sends it on to the model. It also handles and translates the input the view gets from the user and requests or changes that data instructed (Pope 1988).
3 Usability testing
In this chapter the bulk of the theory that lay the foundation of this thesis is presented, and an argument is formed around the choice of method used for the usability testing.

3.1 Why usability testing
Usability testing is sometimes associated with high cost and long delivery time. But it still gives producers and developer an insight into how the system is used by the consumer. A strong alternative to usability testing is heuristic evaluation (Jeffries & Desurvire 1992). Heuristic evaluation is a process where a usability expert follows a set of guidelines and work through the user interface taking notes on possible problems or obstructions that a user might encounter. The method of heuristic evaluation has been found to be the cost effective way of finding usability problems (ibid.). While it is considered the most cost effective method it is not "cheap" by any means and in 1993 a complete study could cost anywhere from 3200 to 4000 dollar (Nielsen 1993).

The reason to pick usability testing conducted by the developers themselves is that it can keep the cost down, while still detecting usability problems in the user interface. While it may seem like a good idea to use heuristic evaluation instead of usability testing, studies have found that that developers who used this evaluation method find less than half of the usability problems an expert would find (Desurvire 1992). Heuristic evaluation also tends to find a big number of potential problems (Jeffries et al 1991), knowing which ones are severe is something that should to be left to the experts. Usability testing also tends to find more global problems, these are problems that affect the entire user interface, where as heuristic evaluation finds more local problems, these are problems that only affect one part of the system (ibid.).

In usability testing we also have the advantage of comparable results. We can simply time the user or count the number of obstructions the tester meets and the compare this to previous tests or tests or competitors products (Rubin 2008). We can also in advance setup goal we want the application to meet, if they are then met we can be satisfied with our product.

3.2 Working with testers
Working with the tester or testers can be done in a few ways. First the tester can work alone or in pairs (Dumas 1999). When testing in pair the testers are encouraged to discuss what they should do to solve the task. This method has the benefit that the discussions between testers often yield more information than a person that works alone and is asked to “think out loud”.

Another way to work with the user is when the tester has no interactions with the moderator and is only observed, so called unobtrusive testing. The tester can also be accompanied by a member of the testing team and asked questions as the testing progresses, so called active intervention (Dumas 1999). Active intervention is typically used early on in development and especially with prototypes, since it gives more useful data regarding the usage and clarity of the system as the moderator of the test can ask probing questions. Unobtrusive testing has more benefits where measurements like time to complete a task and number of obstructions the testers meets is considered important, this can't be measured with certainty if there are interactions with the tester (Rubin 2008).
Observing the tester can be done in two ways. Either the tester is left alone and observed with camcorders or a one-way mirror, this method of observations is very formal and used when the presence of a moderator might distort the results. The tester can also be observed by a moderator sitting next to the tester, which is more common (Dumas 1999).

### 3.3 Testers

Choosing test persons can be done in essentially three ways either they are chosen at random, whoever is available or specifically targeted testers. Picking randomly or the people who are available is called hallway testing (Dumas 1999), the name comes from the usage, you simply grab people who are walking by you office. Targeted testers are often advertised for in papers and bulletin board, some use incentives like cash or movie tickets (ibid.).

It is important in usability testing that the right testers are in the test group. According to the Dumas (1999) just testing the current users or new users of the new system is not always enough. There is also a need to test other potential users, new employees that get hired on later might have a different knowledge profile than current employees. When transferring this to testing of mobile application that are for the open market we have to ask ourselves who the potential users or consumers are. We also have to be careful not to pick a user base that is too wide since this might give a skewed result (Dumas 1999). This kind of results can make the product ineffective for more advanced users.

An issue that can arise is if there’s a lack of testers, you simply have to take what you get. In that case it is very important that the tester still get classified otherwise you won’t understand discrepancies in the testing and the positive or negative results that one can get because of the test groups difference in knowledge (Dumas 1999).

The number of participants in the test according to Nielsen should be no less than three and doesn't have to be more than five per iteration (Nielsen 1993). The reason for using no more than five testers is that Nielsen found that using more testers aren't as cost effective, each additional tester. The reason to use no less than three is to avoid extreme cases and to ensure that issues found are real and not specific to one person This is only when testing iteratively.

### 3.4 Testing environment

Usability test labs are expensive and not even recommended if it won't be used on a regular basis (Dumas 1999). But we still need to look at what possible disadvantages there are when not using a testing lab. One of their main benefits of a usability test lab is the ability to record the actual usage of whatever is being tested, this is done with the use of multiple camcorders and data logging software. A replacement for this could be the usage of screen recording software available on certain systems like Windows or OS X, but in the case of the iPhone, at the time of writing, there aren't any and the only option would be to use a camcorder. There is a possibility that there exist solutions for other mobile phone systems. A test lab also provides a controlled and interruption free zone, but I think a office with a “do not disturb” sign would work just as well.
3.5 **Performance goals and objectives**
Without defining objectives and goals for your usability testing, there is no point of the test. And you should probably rethink your reasons for testing (Rubin 2008). The performance goal set for your application should reflect your wishes for the application. These goals should never be set arbitrarily and need to be clearly stated (Rubin 2008).

3.6 **Data collection**
Before, during and after the usability testing, data needs to be collected for later analysis (Rubin 2008). The data collected before usability testing is often done by either interviewing or asking the tester to fill out a questionnaire. The pretest questionnaire is designed to find out about the background of the tester, typical questions asked are about gender and age. This is usually followed by questions about the person's experience with the type of application the person is about to use. It can also contain questions about the tester’s opinion of the kind of application about to be tested. All this information is used to characterize the tester to better understand the application when used by this category (Rubin 2008).

During the usability test data needs to be collected, as previously stated, for measures like time, number of obstacles met, navigational errors and if the task is successfully completed. But here we can also collect observational data on how the testers used the application, it can be done with data logging software or a simple pre-made form (Rubin 2008).

After the test the tester may be interviewed or asked to fill out another questionnaire. The posttest questionnaire is designed to find out what the tester thought about the application. Subjective questions are used and they explore what the tester's opinions of the application tested, typical questions asked are if the application was easy to use and if the tester had any suggestions on features that are missing (Rubin 2008).

3.7 **Test plan**
The test plan is an important document when conducting a usability test. The test plan stands as a central document for everyone to understand the why, the how and the when for the testing. The test plan serves as the testing outline, it describes what is to be tested and how it will be done. It is also an important document for all involved, anyone can expect the document to bring them up to speed. Because of that everyone can contribute with feedback and new ideas. The test also communicates resources needed for testing. A good test plan should contain the following (Rubins 2008):

- The objectives and goals of the test
- The tester's characteristics
- The method for the testing
- The place and equipment needed for test
- What the observer is expected to do
- What measures are to be collected and how they are evaluated
- What a potential report should contain
3.8 Usability test tasks and task goals
Testers that are recruited have to perform some form of work with the application that is being tested, this is where the test tasks come in. A test task is a description of what the tester should do with the application. It is usually in the form of a typical task a user of the application would perform (Rubin 2008). The test task also comes with a set goal or a success criterion, which has to be met for the task to be completed. As a part of the goal a maximum time is decided by the moderators, this time is just a maximum that a user should have to work before the task is done, otherwise something might be wrong.

3.9 User involvement
User involvement can be described as a process of taking the future users of the planned system into the development process. This is done to get a deeper knowledge of the product the user expects and to make sure it will covers their needs. A number of studies have been made on the effect of user involvement e.g. Baronas (1988) and Damodaran (1996). And their findings show that user involvement results in higher user satisfaction and better usability. The studies show that this kind of involvement has in some cases shown that some planned features was not something the users wanted or needed. Consequently the users got what they needed and the cost of the development of the feature was saved.
4 Development and testing of the application
This chapter describes the usability testing method for the iPhone application. It also describes the development and the testing and the results of the testing is presented.

4.1 Testing method for Americanlisted iPhone application
Here the testing method is described that was used when testing the Americanlisted iPhone application.

4.1.1 Tester profile
A tester profile was developed based on Jeffrey Rubin and Dana Chisnell’s book Handbook of Usability Testing: How to plan, Design and Conduct Effective Tests. The conclusion was that the typical person should have the following. The person should already have a Smartphone or be experienced using one, the reason for this is that the users who might be users of this application would need one and just to download the application from the iTunes App Store a number of the navigational feature of the iPhone would be met. These features are present in the application itself. No age group or gender was targeted as long as they met the previous requirement.

4.1.2 Test plan
The test plan for the iPhone application was based on Jeffrey Rubin and Dana Chisnell’s book Handbook of Usability Testing: How to plan, Design and Conduct Effective Tests. The test plan describes how the testing would proceed, the method, the characteristics, number of participants and also the outline of each test session. Also the location setup, the measures that will be taken and how data was collected is also described.

The overall objective for the usability testing of the iPhone application was in the usage of application is the most common case, identifying usability problems and gather measurable test data for comparison in later iterations.

The location for the testing was varied but they were conducted in a quiet environment where there would be the least number of distractions. All participants used an iPhone with the application installed. The recruitment of testers was done with the hallway testing method, meaning that the participants were chosen in a random fashion of whoever was available. Each participant was still screened with the pretest questionnaire, any one that didn't fit the profile would not have continued the test. The number of testers used was nine, three for each iteration. Three persons per iteration were chosen based on the research conducted by Nielsen (1993), since the size of the application is to be considered small.

The method used was unobtrusive usability testing (Rubins 2008). During the testing data was collected using a predesigned form, it had entries for observations about navigation, understandability, if the user succeeded and how many seconds it took to complete. The form also had the possibility of writing down where the tester went wrong when navigating and if there was something the testers seem to have trouble understanding. The data collection form was created with the help of Jeffrey Rubin and Dana Chisnell's book.

After the actual testing was done the participants were asked to fill out a post test
questionnaire designed to find out what the person thought of the application. If the tester thought the application was easy-to-use, if it could do everything they would want.

4.1.3 Forms and questionnaires
The pretest questionnaire was designed to get the background of the tester, this is done to ensure that the tester fit the profile we were looking for.

4.1.4 Test outline
The tester was greeted and the introduced to how the testing would proceed and then asked to fill out the pretest questionnaire. After a short introduction to what the application would be used for, they were given tasks to perform. During the tasks the moderator observed and filled in the data collection forms and intervened when the tester got stuck and couldn't get back. After all task where done the tester was asked to fill out a post test questionnaire The tester was thanked for his/her participation.

4.1.5 Tasks and goals
Task where created as a part of each iteration and where based on the scenarios and what the iteration contained. To leave room for more accurate times some data came already fill in, otherwise some of the tasks would be dependent on how fast a tester writes on the iPhones built in keyboard and that is not what I set out to test. The times set where set with the notion that this is the longest time a new user should have to spend with the system before accomplishing the task.

4.2 Overview of the application and development
The application can be divided up in 4 of part:

1. Browsing the classified ads
2. See individual classifieds in more detail
3. Define a search for browsing the classifieds
4. Post a classified to the main website

The first part of the application is responsible for downloading a number of classifieds with a limited amount of information for the each classified ads and display this so a user can pick out ones to view in more detail. The more detail view of a classified ad is the second part of the system. In this part some special features of the iPhone will be use, for instance the possibility to directly from the application call the person who posted the classified ad. These two parts are the focus of the first iteration.

Part three of the application is the search function. Since the website supplies a number of parameter to search on and this feature is very important for the usability of the application, search had its own iteration. This last iteration consisted of posting classified ads to the company’s website.
4.3 First iteration – “Presentation”
The first features that will be implemented are the “Browsing” and “Viewing” features. This formed a good foundation for the rest of the system to be implemented on.

4.3.1 Specification
This contains the specification for this iteration.

4.3.1.1 The browsing view
This is what the user is first met by when launching the application. It shows a number of classified ads for the entire United States of America. The top of the view, the header, shows which state, if one is chosen, the classified ads are from. It also shows what category the classified ads are from if specified and any keywords use for a refined search. The classified ads are shown in a list and each item shows the classified ads name, price, location and a small image. By taping an item the user is sent to the classified details view.

4.3.1.2 Classified details view
Show details for the classified ad selected in the browse classifieds view as seen in figure 4.1. From this view the user will also be able to call the poster, add the poster as a contact in the phones address book or go on to the send a message view, where you can send a message.

Figure 4.1 – Details for a classified ad
4.3.1.3  **Send a message view**
In this view the user can send a message to the poster. The user enters a name, email address and a message that is then sent to the poster via the server. The application and server will validate the data, if the data is wrong the application prompts the user to change it.

4.3.2  **Scenarios**
These are the scenarios developed for the different views.

**Scenario: Launching application**
1. Find Americanlisteds application icon.
2. Press icon
3. Application starts

**Scenario: Fetching more classifieds**
1. Scroll down to bottom of classified list
2. Press “More” button
3. The application downloads and displays more classified ads

**Scenario: Details for classified**
1. Find classified in list
2. Press classified ad list item
3. The application displays the detail view screen with details for the classified ad

**Scenario: Call classified ad poster**
1. In detail classified view find button marked call
2. Press button
3. The application calls the poster

**Scenario: Send a message to poster**
1. In detail classified view find button marked message
2. Press button
3. Send a message view appears
4. Enter personnel information and message
5. Press send
6. The application sends the message

**Error conditions for send a message to poster**
Data is missing
1. Send is pressed
2. Application asks for missing data
3. Press send
4. The application sends the message

Not a correctly entered email address
1. Send is pressed
2. Application asks for a correct email address
3. Press send
4. The application sends the message

Scenario: Save as contact in phonebook
1. In detail classified view find button marked same as contact
2. Press button
3. Application saves the contact in the phonebook

4.3.3 Usability testing for part one

4.3.3.1 Test group
The first group consisted of two men and one woman. They were all in the age group 20 to 29. All but one had an iPhone, but the other one had a Smartphone of another brand and noted on the questionnaire that he had a number of times used the iPhone. Two had purchased used items thought an online classified ad service. None had sold anything though an online classified ad service. All fit the tester profile.

4.3.3.2 Usability test task 1
Task one was aimed at finding out if the classified ad list was easy to navigate and understand. It was also there to see if it was easy to see the title and price of the classified ad in the list. The tasks maximum completion time should be under 2 minutes, the reason for this is that it will be the first time the tester works with the application.

Task instructions
You are doing some market research find the prices of 3 trucks.

Success criteria
The tester finds the prices of three trucks.

Maximum completion time
Less than 120 seconds

Result for task 1
All testers complete the task on time and with no problems. The completion times of the testers were 25 seconds, 28 seconds, 37 seconds.

4.3.3.3 Usability test task 2
Task two was aimed at finding if the location label in the classified ad list was easily understood and seen. There was some expectation that this task could be problematic, depending on how the tester went about looking of the ad, since there is three possible ways to look for one. The tester could look at the title then the position label, look at the position label and then the title or try to find a desk in the pictures. Because of this a hint was added to the instructions. Further the tester needed to find the details for the classified ad to find out if the
desk was for sale by a corporation or other. The time goal of this task is less than two minutes.

Task instructions
You have just bought a house in Appleton Wisconsin and you don't have a desk for your computer. Find a suitable one and check if it is offered by a corporation or a private citizen.

Hint: There is at least one desk in the first 60 classified ads.

Success criteria
User finds a table and correctly finds the information on who offered the desk in the detail view.

Maximum completion time
Less than 120 seconds

Result for task 2
All the testers completed the test, but two of the testers had trouble with the size of the buttons in the user interface. This caused them to accidentally hit other buttons, thought both did recover from the problem without help from the moderator. The completion times for the testers were 65 seconds, 96 seconds, 112 seconds.

4.3.3.4 Usability test task 3
Task three aimed to test the call functionality, by asking the tester to make a call though the application. The application was programmed to only call a preselected phone, so that it didn't matter what ad the user picked. The time goal of this task is less than a minute and a half.

Task instructions
You need a car, call the seller of the first one you like, and ask if you can buy it.

Success criteria
The tester finds a car and calls the seller.

Maximum completion time
90 seconds

Result for task 3
All the testers completed this task with two of the tester not encountering any problems. One of the testers did accidentally hit another nearby button again in this task, this happed to this tester in task two also. As a result the tester ended up wrong but found a way back. The completion times for the testers were 32 seconds, 45 seconds, 59 seconds.

4.3.3.5 Usability test task 4
Task four tested the send message feature of the application, the tester also had to find how this would be done, but they had probably noted it during task three. The tester was given a email to use and the application was programmed to divert the message to a preselected email. The time goal of this task is under two minutes. Since the tester needed to enter a email.
Task instructions
You want to buy a dog, find one you like and send the owner a message, saying you are interested in the dog. Your email is getadog@dog.org.

Success criteria
The tester finds a dog and sends the owner a message.

Maximum completion time
120 seconds

Result for task 4
In the message view one tester complained that the text box for entering the message didn't have the same appearance as the other text boxes used to enter name and e-mail address. The moderator also notes that the keyboard which shows up when entering text did not disappear when clicking outside of the text box, there were no button to remove the keyboard. The completion times for the testers were 72 seconds, 83 seconds, 90 seconds.

4.3.3.6 Usability test task 5
Task five tested the “add the classified ad poster to the phones address book”.

Task instructions
If the first car doesn't pan out find another one and add the poster as a contact on the phone.

Success criteria
The tester successfully adds the poster as a contact on the phone.

Maximum completion time
90 seconds

Results for task 5
All of the tester successfully perform this task and within time. But the testers were perplexed since there was no feedback from the application when adding a contact to the phone book. The completion times for the testers were 29 seconds, 33 seconds, 53 seconds.

4.3.3.7 Posttest questionnaire
In the posttest questionnaire the tester on the question if the application was easy to use had two had a neutral position and one agreed, it pretty clear why with two of the testers having problem hitting he right buttons.

4.3.3.8 Summary of iteration ones testing
Iteration one tested the main browsing of classified ads functionality and it found a number of problems with the user interface. Some of the buttons were too small and positioned to close to one another that tester hit the wrong button and ended up wrong, this was considered a severe problem and the whole interface should be looked over to make sure there aren’t similar occurrences in other places. The message view also presented an inconsistency in the user interface where input boxes didn’t look the same, this was considered a less severe
problem but still needed fixing. In the same view the keyboard used for entering text into text
boxes. A severe problem was also found when the testers tried to add a posters phone number
to the address book of phone, since there was no feedback from the application they didn’t
know if it was actually added. These problems were analyzed and corrected in the second
iteration. Also task two, four and five where tested again with the next test group.

4.3.3.9 Observations
In this the first usability test testers were clearly not satisfied with the product. The small
interface made navigation hard and I think to a degree the lack of a search function made it
seem incomplete. The form reflected this and but no one gave any suggestions for a new
feature, this could be entered in the posttest questionnaire under the can you do everything
you would expect question. The search feature had been explained to the testers would come
in a later iteration.
4.4 Second iteration – “Search”
In the second iteration a search feature was implemented this will help the user select state, city, zip code, search word or category.

4.4.1 Specification
This is the specification for the second iteration.

4.4.1.1 Search view
The search view is reached by a button from the classified ads browsing view, the search view gives the user a number of options for searching. The user can select state, after the state is selected an option to select zip code and city appears. All three of these when selected will prompt the user to input a number of letters or numbers the application then presents the user with matching alternatives, as seen in figure 4.2. There's also possibility to enter a keyword and select a category. The category selection will be a separate view. A search button when pressed brings the user back to the browsing view and the application loads a new list of classifieds matching the search.

Figure 4.2 – State selection, the user has entered “New” and the application has shown matching states
4.4.1.2 Category selection view
The category selection view presents the user with a selectable list of categories, when a category is pressed the application checks if there's any subcategories, if there is these are presented otherwise the category is selected and the user is sent back to the search view.

4.4.1.3 Mending problem found in usability testing
All the buttons in the user interface were looked over and some were made bigger. In the browsing view the sizes of the button in the clickable list were made larger, the result can be seen in figure 4.3. In send a message view the keyboard need to be fixed so that it disappears if the user clicks another area outside the text boxes and a button was added so that it could be dismissed. Also the inconsistency found in the view where corrected. Lastly when a user adds a contact to the address book it is the presented with a message if the contact was added or an error otherwise.

Figure 4.3 – Browsing view after the list buttons where looked over.

4.4.2 Scenarios
Scenario: Start search
1. In browsing view find button marked search
2. Press button
3. The application presents a search interface

**Scenario: Select a state**
1. In the search view find a button marked state
2. Press button
3. The application presents a text area and a list
4. Enter letters
5. The applications shown states matching letters
6. Select a state
7. The application goes back to search view

**Scenario: Select a city**
1. First select a state
2. The application shows city selection button
3. Press button
4. The application presents a text area and a list
5. Enter letters
6. The applications shown cities matching letters
7. Select a city
8. The application goes back to search view

**Scenario: Select a zip code**
1. First select a state
2. The application shows steep selection button
3. Press button
4. Application presents a text area and the list
5. Enter letters
6. Application shows steep codes matching letters
7. Select a zip code
8. Application goes back to search you

**Scenario: Select a category**
1. Find the category selection button
2. Press button
3. Select category
4. The application goes back to search you

4.4.3 Usability testing
The testing tasks for this iterations usability testing aimed to test the search feature in steps, one part at a time, and then conclude by taking most of the steps in one. Test tasks two, four and five were also again done with this test group, to test if the changes made from last iteration had fixed the problems.

4.4.3.1 Test group
The second test group consisted of three men. One was between the age of 20 to 29, one was between 30 to 39 and the last was between 40 to 49. All had iPhones, and one person had sold
an item though an online classified ad service, the rest had neither bought nor sold though one.

4.4.3.2 Usability test task 6
Task six was aimed at testing the category selection feature. The user was asked to find a specific category and then conduct a search on that.

Task instructions
You are looking for a office chair, do a search for one in the For Home/Furniture category.

Success criteria
The tester clicks the search button and then finds the category selection view and selects the right category.

Result for task 6
This test task was completed successfully by all testers and on time by two of the testers, but one tester had to redo the task. The problem found was when the second tester accidentally hit the state selection button, the tester recovered, and came back to the search view but when taping the category button afterwards the application exited with an error. The tester redid the task without taping the state button and successfully completed the task. The tester had uncovered a fault in the application code. The completion times for the testers were 65 seconds, 96 seconds, no time could be taken for the last tester since the application exited with an error.

4.4.3.3 Usability test task 7
Task seven was aimed at testing the state and city selection feature and also tests if the user could clear the category selection, since a category would be selected from the previous test.

Task instructions
You want to browse all classified ads for all categories in Miami, Florida.

Success criteria
The tester selects the right state, city and also changes the category to “All categories”.

Maximum completion time
120 seconds

Result for task 7
This test task was completed successfully and on time by all testers and no problems was found. The completion times for the testers were 30 seconds, 33 seconds, 47 seconds.

4.4.3.4 Usability test task 8
Task eight was aimed at testing the keyword feature. This was done by having the user search for iPhones in the state of New York.

Task instructions
Do a search for iPhone’s in the state of New York.
Success criteria
The tester types in a fitting keyword and selects the state of New York.

Maximum completion time
120 seconds

Results for task 8
This test task was completed successfully and on time by all testers and no problems was found. The completion times for the testers were 29 seconds, 36 seconds, 41 seconds.

4.4.3.5 Usability test task 9
Task nine tested the whole search feature and the tester was asked to make a very specific search.

Task instructions
You are looking for a car and specifically a Corvette in Los Angeles, California.

Success criteria
Does the search with the right parameter.

Maximum completion time
120 seconds

Results for task 9
This test task was completed successfully and on time by all testers and no problems was found. The completion times for the testers were 29 seconds, 33 seconds, 42 seconds.

4.4.3.6 Usability tests from iteration one
The results from iteration ones testing showed a number of problems, they were analyzed and a number of changes were made. Because of this usability test task two, four and five were redone with this testing group. Task two which had shown a problem with the size of buttons seemed to be corrected, since none of the testers encountered the problem this time around. In task four there were some inconsistencies in the user interface that had been corrected and some problems with the on screen keyboard, the redone test showed the tester easily removing the keyboard from the screen. Task five had shown in previous testing that the lack of a confirmation that a contact had been saved to the address book confused the tester, with a confirmation now shown none of the tester reacted like last time. The completion times from the previous testing were also improved on task two since the testers didn’t have to navigate back after the error.

4.4.3.7 Posttest questionnaire
The posttest questionnaire for iteration two had one who agreed and the other two fully agreed with the statement “Overall this application was easy to use”.

4.4.3.8 Summary of iteration two’s testing
Iteration two testing didn’t show any usability problems, but one of the testers uncovered a bug in the application code. The completion times for the task stayed pretty much the same
even though the testers were asked to do more, this was attributed to the testers learning and understanding the user interface.

4.4.3.9 Observations
In the second iteration the search feature was added and the satisfaction with the application seemed to get better. In this iteration no suggestions for new features were given.

4.5 Third iteration
In the third iteration the place an ad functionality was implemented. This part of the application will make it possible for the user to send in an ad to the company website.

4.5.1 Specification
Place an ad was designed as a three part guide. The first part is where a poster can enter personnel information, such as name, address etc. The second part is where the poster selects a category that the item to be sold fits into. And the last part is description of the item and an optional photo.

4.5.1.1 Personnel information view
The first thing the user meets when placing an ad. The user enters name, email, phone number and a password that can be used to make changes to the classified ad on the website. The user also enters the state, city and zip code, the selection of a state trigger the application to show city and zip code selection. In figure 4.4 no state is set and the city and zip code buttons are hidden. When the user is done, he/she presses the continue button and the system may prompt the user for changes if information is missing or an incorrect email address is entered.
4.5.1.2 Category selection view
The category selection view shows the user with a selectable list of categories, when a category is selected the application checks for subcategories, if any exist they are displayed.

4.5.1.3 Item description view
In the item description view the user is ask to fill in information about the item and an optional image that can be taken with the iPhones built in camera.

4.5.1.4 Mending problem found in usability testing
The bug found in test task six was recreated and the cause of it was located and corrected. No reason was found for redoing any of the test tasks from previous iteration.

4.5.2 Scenarios
Scenario: Place an ad

1. Tap “place an ad” button
2. Fill in personnel information
3. Tap “continue”
4. Select category
5. Select category options
6. Tap “continue”
7. Fill in item information
8. Tap “place ad”

Scenario: Missing personnel information

4.5.3 Usability testing
For the usability testing of the place an ad the testers was each given their own version of a
pre made up object to sell. This was to make the testing varied and to test a bigger part of the
functionality.

4.5.3.1 Test group
The second test group consisted of three men. All three was in the age group 20 to 29, and
two of the tester had bought used items through an online service.

4.5.3.2 Usability test task 10
In this task the tester was asked to sell a car. To be in the same type of environment the
previous test had been in the object was a toy car but was imagined as a real car. The reasons
of using a toy car instead of a real one outside in a more real world situation, was to keep the
test in a controlled environment. Outside there could have been distractions, variables like the
sun could make the interface difficult to see. All this could be great as a real world simulation
but the decision was to keep it the same as the other tester to make sure the measures taken
wouldn't be affected by these and other unknown variables. Since the placing an ad feature
has the option of taking a picture for the classified ad, this would be encourage, this was also
one of the reasons for having a toy car in the room.

Task instructions
Sell this ford thunderbird from 1956, it has a manual transmission and a petrol engine and has
done 93 500 miles. It is in mint condition. It is located in Miami, Florida, zip code 33255.

Maximum completion time
300 seconds (5 minutes)

Success criteria
Successfully post the ad.

Maximum completion time
300 seconds (5 minutes)

Results for task 10
The tester posted the ad successfully in 175 second, just under three minutes. The tester took a
picture of the car.

4.5.3.3 Usability test task 11
In task eleven the tester was asked to sell a chair as a corporation.

Task instructions
You are representing a corporation an want to sell this chair. It is located in Montgomery,
New York, with zip code 12549.

Success criteria
Successfully post the ad

Maximum completion time
300 seconds (5 minutes)

Results for task 11
The tester posted the ad in 132 seconds, just over two minutes. The tester took a picture of the chair.

4.5.3.4 Usability test task 12
In task 12 the tester was asked to create a wanted ad for a stereo.

Task instructions
You want to post a wanted ad for a stereo, it should have two separate speakers and a cd player. You are located in La Jolla, California, with zip code 92092.

Success criteria
Successfully post the ad.

Maximum completion time
300 seconds (5 minutes)

Results for task 12
The task was completed by the tester in 109 seconds and was completed successfully.

4.5.3.5 Posttest questionnaire
The posttest questionnaire had the tester more or less agree that the interface was easy to use.

4.5.3.6 Summary of iteration three's testing
No problems were found in iterations three’s testing and no observations of problems were made.

4.5.3.7 Observations

4.6 Results
The results for the testing showed a number of usability problems. In iteration one the sizes of buttons and their proximity made the navigation difficult and inconsistencies in the user interface got commented on by a tester. Testers were also confused when no confirmation was given for adding a classified ad poster as a contact on the phones address book. These problems were categorized in order of severity and were corrected in the next iteration. In iteration two a bug caused the application to crash when a tester was working on a task, but the bug had little to do with usability.
One aspect of this testing has yet to be taken up and that is how time consuming it actually is. Conducting usability testing entails the following:

- Creating a test plan
- Creating one or several tester profiles
- Recruiting testers
- Creating materials for the testing
- Setting up an environment for testing
- Conducting the test
- Analyzing the results

That does not include reading up on usability testing. Time wise it took me roughly forty to seventy minutes per tester and that includes some of the prep time before the tester arrives. It’s not easy to say how long it would take to read up on how to conduct the test, but the book the testing in this thesis was based on, Handbook of usability testing by Jeffrey Rubin and Dana Chisnell (2008), is enough to get started.
5 Conclusion and Discussion

Under this headline the conclusion is presented and a discussion is formed around the work that has been made in this thesis and also further work is suggested.

5.1 Conclusion

In this thesis I have investigated if single developers can integrate usability testing into the development. I have done this by implementing a software project and on it conducted my own usability testing. The current research into having developers conduct their own usability testing has been scarce as discussed in chapter three. With only a one study that conducted tests on the difference in results when comparing expert to developers using heuristic evaluation, not usability testing. That study showed that heuristic evaluation did not work for non experts. At the same time developers have a multitude of development methodologies that take usability into account but do not provide a way to test it, unless you have your own experts or get outside consultants.

The results of this thesis show that it is possible for a single developer to read up on usability testing, conduct them and as an effect of this user involvement get higher satisfaction and usability. It also fit well into the development cycle since the testing was done by the developer, there was no need to wait for the results from consultant or experts. This also has the benefit of not forcing the developers to stop implementing features into the application while waiting for the usability test results. And the feedback from the user can help invent new features that had not yet been thought up. Or avoid features the user does not want or need.

5.2 Discussion

While there is little doubt in the research community that user involvement makes the applications better we still need to discuss if usability testing is a good way for single developers to get this involvement. In the context of this thesis, development of mobile applications, you might not have a set user group per se. As opposed to the development of a corporate internal system where the worker is the user, we wouldn’t know ours. This kind of development also typically starts with an idea for a product that does not exist. Think of finding users for twitter\(^3\), the micro blogging platform, to interview to get requirements and features before it was created. Would this lack of users mean that we could not have user involvement? But with usability testing we can, since there are no requirements on the testers, we can create the specification and have the users test the validity. We only need for the tester to fit a set profile and have the technical knowledge of a potential user.

Using unobtrusive usability testing might not have been the best choice, since with user involvement the tester's thoughts during testing would be of more interest. In such a case think out loud or pair testing as introduces earlier might be more beneficial. Also the method of active intervention would have given even more insight, but would need more preparation.

\(^3\) www.twitter.com, 20/5-2010
The results does showed some merit so if we look back at the purpose of this thesis is it viable or practical for single developers to conduct their own usability tests. Well working usability testing into the development was easy, mainly since I used an iterative approach. This approach presented a perfect point in the development cycle to conduct the testing. It also meant that development had stopped so the results could be analyzed and problems found could be fixed before further additions were made to the application. Also features the testers suggested could be analyzed and specifications could be made, if the new feature was considered necessary.

On the practicality side we have to consider time, just to conduct the testing an entire work day, 8 hours, would be needed. You also have to add time for preparation and reading up on how to conduct usability testing. But will it be used more than once it is time well invested.

Lastly I would say that making the application was very time consuming. This wasn’t only because any software development is, but also since it was for me a new programming language, platform and tools. But it has been a rewarding experience and I have learned a lot, this new knowledge will probably serve me well in the future.

5.3 Future research
I have just scratched the surface of this area but I think it warrants further study. Except for a study on heuristic evaluation not much seems to have been done to investigate non expert conducting usability testing. And it would be interesting if someone would.
6 References


Bill Dudney & Chris Adamson 2009, *iPhone SDK Development*, The pragmatic programmers, United States of America


Jeffries, R & Desurvire, H 1992, *'Usability testing vs. heuristic evaluation: was there a contest?'*, *ACM SIGCHI Bulletin*, vol 24, no. 4, pp. 39-41.


Nielsen, J 1993, *'Iterative user-interface design'*, *Computer*, vol 26, no. 11, pp. 32-41.


7 Electronic resources

Apple insider 2010,
http://www.appleinsider.com/articles/10/01/27/apple_now_largest_mobile_device_company_in_the_world.html, 20/5 - 2010

GCC, http://gcc.gnu.org/, 20/5 - 2010

Tech crunch 2010, http://techcrunch.com/2010/05/20/android-numbers/, 20/5 - 2010
Appendix 1 - Pre-test questionnaire

TesterID: ____

Name(optional)

How old are you?
- 20-29
- 30-39
- 40-49
- 50-59

What is your gender?
- Female
- Male

Have you ever bought any used items through an online service?
- Yes
- No

Have you ever sold anything through an online service?
- Yes
- No

Do you own any of the following?
- IPhone
- Smartphone
- android-based phone
- PDA
- cell phone without Internet
- other_________________

Answer only the following question if you have an Internet enabled mobile phone

Do you use any of these features on your phone?

<table>
<thead>
<tr>
<th>Feature</th>
<th>Yes</th>
<th>No</th>
<th>Doesn’t have it</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Downloadable</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Camera</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Music</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>
Do you have experience with any of the following?

- IPhone
- Smartphone
- android-based phone
- PDA
- cell phone without Internet
- other_________________

If yes, how much?

___________________________________________________________________________

___________________________________________________________________________
Appendix 2 - Data collection form

Task ___

TesterID ___

Moderator ________________

How easily did the tester navigate the application?

- No problem
- Went wrong, but found a way back
- Needed hints
- Needed help

Where did the tester go wrong?

________________________________________________________________________
________________________________________________________________________

What help did the tester receive?

________________________________________________________________________
________________________________________________________________________

How well did the tester understand the information in the application?

- No problem
- Had questions
- Needed hints
- Needed help

What did the tester have trouble understanding with?

________________________________________________________________________
________________________________________________________________________

What help did the tester receive?

________________________________________________________________________
________________________________________________________________________
Did the user succeed with the task?

- Yes
- No

Time to complete: _____ seconds

Other observations

_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
10 Appendix 3 - Posttest questionnaire
TesterID ________

Overall this application was easy to use

<table>
<thead>
<tr>
<th>Agree fully</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I can do everything I would expect from this application.

<table>
<thead>
<tr>
<th>Agree fully</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
</table>

What is missing from application?

___________________________________________________________________________

___________________________________________________________________________
11 Appendix 4 - Test plan for AmericanListed’s iPhone application

Overall objectives
The overall objective of this study is to test the usability of AmericanListed’s iPhone application. The goal of the study is to:

- Test how effective the usage of the application is for the most common tasks.
- Identify any usability problems.
- Gather measurable test data for comparison when needed in later iterations

Location and setup
The testing will be conducted in a quiet environment with as few distractions as possible. The participants will use an iPhone with the Americanlisted application installed. The testing will be audio recorded. If the tester wishes not to be recorded the test will still be conducted but without the recoding.

Recruiting participants
The study will be conducted with the hallway testing method of recruiting participants. Each participant will still be categorized though a pre testing questionnaire. No compensation will be offered to the testers.

Methodology
This usability study will be conducted with the unobtrusive. When the tester arrives he/she will be given a short description of the proceedings followed by a pre test questionnaire. Each participant will then conduct predefined tasks, these will be measured for time and also observed. After the tester has done all tasks the tester will be ask to fill out a post questionnaire.

Testing session outline
The following is an outline of how the tests are conducted.

Pre-test
The tester is greeted and described the outline of the testing and is then asked to fill in the pre-test questionnaire.
Tasks
Participant will do the task one at a time, a moderator will observe and fill in a data collection form.

Post-test
The tester is then asked to fill in a post-test questionnaire. And is then thanked for his or her participation.

Measures
The following measures will be taken during testing:

Time
Each task done by the tester will be timed.

Obstacles meet
Number of obstacles meet by each participant will be noted along with an obstacle description, and how they were solved and if intervention was needed.