Evaluation for an Application for iPhone and iPad: NCT Buses App

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Abstract

NctBuses is a real time system that compute how long your bus will take to arrive for your bus stop in Nottingham city, the United Kingdom. It enables users to know when the next bus will arrive. The app counts down the minutes till your buss arrives at a particular bus stop. This paper aims to evaluate the usability and the collaboration aspects for users when they are using the app. It focuses on the main issues that facing users while utilizing this app in order to suggest recommendations to develop the usability of nctBuses in the future. The "Field study" technique has been employed to evaluate the nctBuses Application as it is an effective method to assess the usability of such interactive systems. It helps researchers to observe the performance of users when they make use of the app. Moreover, this methodology enables researchers to have deep understanding by providing participants with a user satisfaction questionnaire. The participants that have been involved in the study are novice and expert in using the nctBuses Application. After that, the notes collected during the observation sessions have been analysed and the responses to the questionnaire have been compared. The results are analysed according to the "Eight Golden Rules of Interface Design"; theory of Shneiderman and the "Ten Usability Heuristics"; theory of Nielsen. The evaluation and the analysing processes has declared the facilities of using the application. Moreover, the processes illustrate the issues in the usability of nctBuses Application. The result of the field study declares some issues that need to address in the nctbusees app to assist and enhance the software interface and performance.

Keywords: Real-time System, Evaluation, Usability, Cooperation, Field Study.

1. Introduction

The nctBuses(Nottingham City Transport Buses) application is designed for iPhone and iPad devices. It provides users with buses schedule. Therefore, the app enables users to plan their journey in Nottingham city in the United Kingdom. The user can download it on their devices by using apple-store for free. It is designed in 2011 in order to give users the real-time for bus departure fora specific bus stop. The aim of this study is to evaluated the nctbuses application in order to identify whether users have a difficulty with the usability of the application and the collaboration aspects. The evaluation for the usability of the application will involve the opinions of the participants about the effectivity of the system to use, the efficiency of use it, the memorability (i.e. easy to remember how to use it), the learnability, the user satisfaction and free from errors.

The methodology that will be applied in the paper is called field study, which it is a Human-computer interaction methodology. It is one of the effective method to clarify usability aspect of existing Softwares. Usability of a product can be evaluated by users. Thus, by using field study, researchers will observe the performance of participant depending upon pre-planed tasks in order to evaluate a current software [1].The number of participants involving in the evaluation process are three to ten[1]. The evaluations session for an existing software led by a facilitator ora researcher. The session achieved by download the nctBuses app on the participant devices. The researchers observed them when they did a particular task to highlight the usability of the software. In addition, the researchers

supported their understanding by providing them with the user satisfaction questionnaire. The answers of the questionnaire aid the researcher to get deep understanding for her observation to the participant while they are using the app[1]. The prions of selecting field study methodology are that the researcher can observe the actual performance of the nctBuses app in the real environment (i.e. on iPad or iPhone. Thus, the result of the evaluation will highlight the real problems and issues that need to addressed in the application interface. The usability aspect might be an inexpensive and invaluable resource to help improve the interface and would be recommended.

The paper is structured as: the following paragraphs demonstrates the methodologies followed to achieve the goals of this research. Then, discussion and results paragraph which includes the observation for implementing the pre-planed tasks and the results of analyzing the questionnaire. The last section discusses our final conclusions and recommendations.

2. Methodology

It has been evaluated the nctBuses application by using the "Field study" method. It is a sufficient method to evaluate the interactive system by observing the participants and asking them questions during the evaluation sessions [2].In addition, the usability of a working software product can be achieved by including real users to examine and evaluate it [3].The usability aspect is the most important factor that affect on the quality of a software product[4]. Therefore, the collaboration aspect is an important aspect for users to plan a trip and make decision on appropriate line on over traffic applications[5].The number of participants involving in the

evaluation process are three to ten[1]. Thus, five participants have been included in the research. Three participant were novice users and two users are expert in using the nctBuses application. According to[6], the practical session is useful to understand and analyse the interaction of the participants with the system through applying a specific task. Each participant assigned the consent form and was informed that they can withdraw from the participation at any time. The age of the participants is between 25-32 years old.

The evaluation of the application stated with install the nctBuses application on the participant mobile device. The participants have been Observed through using the interfaces of the application to perform the eight tasks of the user guidelines (see appendex2). The evaluation aimed to clarify the usability aspect by applying the working application in the lab[7].It has been depended on the UX Wheel by[8] in order to design the tasks of the user guidelines. The tasks were chosen to perform the most important human interactions which the user may need from applying the application. The participants have been asked for aloud thinking technique in order to take notes for the user comments and problems that they faced during the evaluation process. Each task has been achieved by the expert users which has been assists to deep understanding for the interfaces of the application. On the other hand, the novice users faced problems to complete some tasks and a technical advice has been given when they need it to help them during the session.

It has been design a questionnaire with close questions and open-ended questions (see appendix C). At the end of the session, each participant answered the questions of the questionnaire. The questionnaire is a useful technique to associate between the tasks performance and the participants' satisfaction about the system. It is an effective tool for evaluation purpose. It facilitates the collection of an enormous amount of data for the general participant performance. The design of the questionnaire follows principles such as meet the subject goals, have clear and simple instructions, and the language of the question should be easily understood by the participant[1].

After collecting the notes of the observation sessions and comparing the answers of the questionnaire, it has been analysed the results depending on the "Eight Golden Rules of Interface Design" for Shneiderman and the theory of Jakob Nielsen "Ten usability heuristics"[9].

3. Discussion and Results

The nctBuses application has been evaluated by performing the tasks in the user guideline and asking critical questions during the assessment sessions. Furthermore, each participant fills the questions of the questionnaire in order to obtain a deep understanding for the usability of the system, learnability, efficiency to use the application, easy for user to remember and the user satisfaction. The two steps to assess the application are:

3.1. The observation for implementing the tasks

The participants achieve eight tasks in order to evaluate the application deeply as illustrated in Table (1).

Table 1: Illustrated the pre-planned tasks and needed participants to perform

No	The Task	Comments
1	You want to go to Victoria Centre from your location	
2	You need to know the destination and the location to the nearest bus stop.	
3	You want to find another route to got to the nearest Tesco shop.	
4	You want to go back to the main page.	
5	You want to know the information about the new offers fro Nottingham city buses.	
6	You want to add your favourite bus stop to the stop list in the main interface.	
7	You added your favourite bus stop and your want to delete it.	
8	You want to know the number of the buses which go to the Victoria centre.	

The first task was plan journey from the user location to the Victoria centre. Most of the novice players perform the task but after facing some problems. For example, the application does not have autocomplete facility which helps users during their typing to the name of the rout in order to prevent spelling mistake. The application does not have the principle of Error prevention which is one of the ten usability heuristics[9].
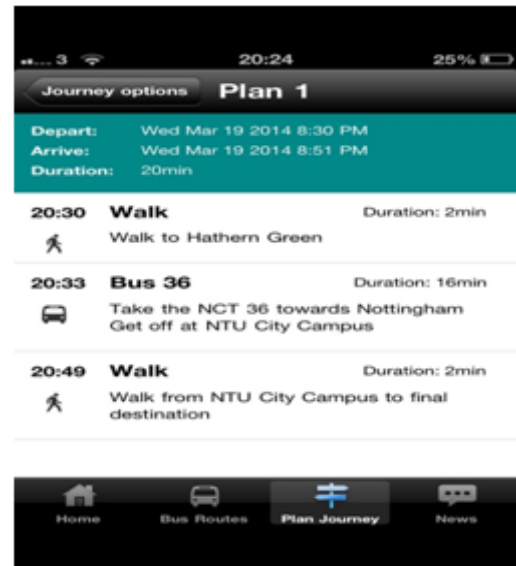

Fig. 1: Shows the result to find a specific rout from plan journey icon

Furthermore, for the second task, the novice user does not know the location of the suggested bus stop. In the application, there is not a visible map to assist users to identify the nearest bus stop after the results of the planned journey appears (see figure 1).

In contrast, the expert users know the tips to appear the map of the nearest bus stop. It is a complex process in order to find the map of the nearest bus stop. The option and action for finding a map for the nearest bus stop are not visible for the novice user while the expert user can identify the actions in order to specify the nearest bus stop. It needs complex steps to access to an essential task [6]. The users need to select the bus rout icon and choose the bus line (e.g. Bus number 32) which go to the Victoria centre (see figure 2). After that, they need to select the bus line and then see the map of the bus stops (see figure 3).

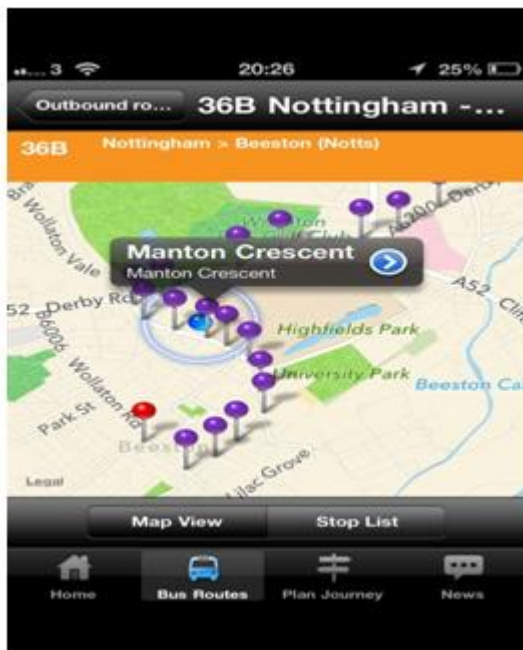**Fig. 2:** Shows the screen of bus rout icon

Fig. 3: Illustrate the map of the bus stops

One of the comments of the participants was that "the user needs to know either the name of the nearest bus stops or know the tips to find the map within the application". According to the theory of Nielsen, the nctbuses interface design does not have the principle of "recognition rather than recall"[9]. The application does not have option for helping users to remember how to find the map since the action to find the map is invisible.

In the third task, the participants have been asked to find the route to the nearest Tesco shop. It has been observed that the search result does not appear the efficient result for the nearest shop. The application has a specific data and does not have flexibility with the location of the user. The application displayed the same result, although the locations of each participant has varied.

In addition, the forth task was about the return to the main page. All the participants achieved it since the icons of the application has a clear and universal terminology. The principle of Match between the system and real word [9]has been applied to the design of the application.

Subsequently, the fifth task was to determine the new information about the nctBuses news. Although It was performed easily by both the expert and the novice users, there was not information included in it. The news icon does not have any data which led the participants to wondering about the benefit behind applying it within the application.

The sixth task is to add the preferable bus stop to the favourite. It was a complex task for the novice users because it need complex process to achieve it and the favourite icon is not visible on the home interface. The novice user was need assist from the expert to perform it. It needs to select the bus route icon, choose the bus number that go through the favourite bus stop and add the bus stop to the favourite by select the star icon. This process does not reduce short-term memory load in order to add a preferable bus stop to the favourite stops list in main interface of the application [10]. One of the novice user comment is "There is not an icon in the home page of the application that I can use it to add my favourite bus stop to it".

On the other hand, the next task was to delete the undesirable bus stop from the Favourite list. It was easy and clear to perform this task for both the Novice and expert user. The user can enter to the list of the favourite bus stop from the home interface of the system and delete it directly (see figure 5).

The last task was about find the number of the bus that go to the Victoria centre. Although all the participants performed it, there is two ways to achieve it. The Novice users achieve it by using the Bus Route icon and scrolling the screen to identify the bus number and its rout(see figure 2).

While the expert user executed it by selecting Plan Journey icon which shows the route to the destination and the number of the bus (see figure 1). The expert user identified the number of the bus by using the principle of flexibility and efficiency of use by Nielsen's theory in [9] to specify the bus number that go to specific route. In addition, the application has enable frequent users to use shortcuts after they have experience to deal with it (Shneiderman's Eight Golden Rules)[9].

3.2. The Results of Questionnaire

The analysis of the questionnaire shows the opinions of the participants about the design of the nctbuses application. A Sample of the questionnaire illustrated in Figure(4). The first two questions were about whether the application is well design with appropriate colours. Most of the users appear that the application is neutral in its design and colours. They have neutral views about whether they may use the application frequently. Most of the participants agree that the application is complex in its usability and disagree with the application is easy to use. They agree with they need expert when they use the application since the application does not have help facility to guide them during the tasks implementation. Furthermore, three of the participant believe that the system is neutral in its function while two of the participants disagree, i.e. the efficiency to use the system. They think that the system has a difficulty when they deal with it. Most of the participants disagree with the view that most of the people can quickly use and learn it (i.e. learnability of the system).

For the user satisfaction question, three of five of the participants believe that the system is inconvenience to use. According to[1], the interactive application need to be easy to learn and the user are enjoyable with using it.
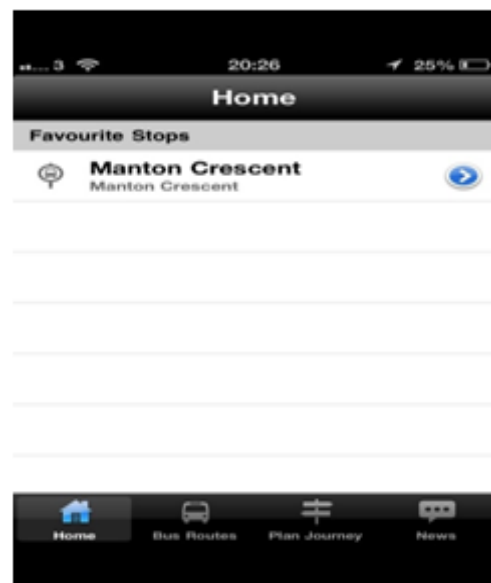

Fig. 5: Illustrates the Home page which include the list of favourite bus stops added by a user

In addition, the opinion of the participants is neutral for feeling confident when they use the application. They mention that they need to learn about the system before they can use it. Three of the participants will advice other people to use the nctbuses application in order to know the bus schedule time. One of the participants' reasons to advice other people to use the application was "the nctbuses application is useful to know the timetable of the desired bus ". In addition, for the collaboration aspect, the application does not have the share facilities which is quite sufficient to share information between users. For example, sharing the information about the timetable of a specific bus. The results of the third question in the questionnaire illustrated in Figure (6).

4. Conclusions

This study aimed to evaluate the nctBuses app, which it is a real-time system application for smart devices, such as iPad and iPhone. It focused on the issues that facing users when they use the nctBuses app. On the other hand, it highlighted the facilities for using this app. It applied the field study methodology which is one of the Human-Computer Interaction methodology. This methodology performed by observing the performance of participants when they achieve a pre-planed tasks. Therefore, the participant fulfilled a user satisfaction questionnaire to support our understanding. Then, the collected data has been analysed. The evaluation and the data analysis depended on the user satisfaction, usability, and collaboration aspects which are discussed in detail in the discussion and result section.

Generally, the results demonstrated the facilities of using the app. For example, the app enables users to plan a journey. it enables user to identifier the number of bus for their destination in many ways. It involves the principle of Nielson theory "Flexibility and efficiency of use" in this point. Moreover, it has the principle of Neilson theory, "Mach between the system and the real word".

On the other hand, the study has illustrated some of the usability issues that faced the participants in the study. For instance, the app does not have help icon to assist novice user to clarify some ambiguous points. In addition, it does not include the auto spell complete facility to avoid spelling mistakes. Thus, according to Neilsen theory, the app does not have the principle of error prevention. Therefore, the interface of the app does not have a visible map to assist novice users to identify the nearest bus stop to their location. It does not have the principle of "recognition rather than recall", which it is one the principles of Neilson theory.

For the collaboration aspect, the app does not have the facility to share information, such as sharing a timetable between users.

Finally, we recommend applying a help icon, auto-complete facility and the ability to share information for developing a new version of this application.

Fig. 6: Analysis of results for question 3 in questionnaire in appendix C

Fig. 4: Illustrates a sample of the questionnaire

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[10] L. Zeng, "Designing the User Interface: Strategies for Effective Human-Computer Interaction (5th Edition) by B. Shneiderman and C. Plaisant," Int. J. H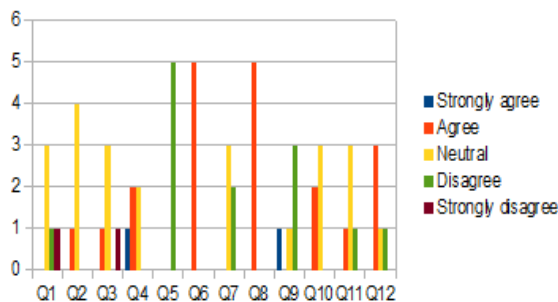um. Comput. Interact., vol. 25, no. 7, pp. 707–708, 2009.