

Heuristic evaluation/usability testing for Touch based virtual keyboard

Introduction

User interacts with software through user interface. This user interface is display in computer screen. User interface must be planned well so the software aims that are made can be achieved. A good software will have high usability level. Good usability has characteristics of effective to use (effectiveness), efficient to use (efficiency), safe to use (safety), having good utility (utility), Easy to learn (learnability) and easy to remember how to use (memorability).

User interface nowadays is based on GUI (Graphical User Interface) and the way to interact in system now uses touchscreen, so that keyboard is one of the tools to input data has no longer in physical form, but is fused in the normal screen often called as virtual keyboard.

In this research Samsung pocket model number GT-S5300 based on android version 2.3.6 smartphone will be used. Software that is used is text memo to show virtual keyboard from this smartphone. The initial display is like this:



Fig. 1: Initial display of virtual keyboard

Easy to learn (learnability) and easy to remember how to use (memorability) are the characteristics of usability in addition to other characteristics like effective to use (effectiveness), efficient to use (efficiency), safe to use (safety), having good utility (utility). In this research, it is wanted to know easy to learn (learnability) and easy to remember how to use (memorability) level from that virtual keyboard using usability testing way with questionnaire method. Usability testing is one evaluation approach involving user.

Users that are chosen are users who are around 19-21, 45-50 and 60-70 years with the hope the users have ever and often used virtual keyboard. Virtual keyboard generally has alike or same display for all smartphones.

METHOD

Research has yielded us the following evaluation approaches:

Usability testing

Usability testing includes certain types of user in certain types of task. Amount and types of mistake that are made by users are noted similarly with the time that is needed out by users to complete the task.

Field studies

The second approach is field studies. User does activity normally in environment. This approach is to understand how user does activity and how product can help user's activity.

Analytical evaluation

This approach doesn't include user. Evaluation is done by expert who is related with that product.

Identifying level of user expertise according to ref:

Novice (first-time user)

Novice users are professional that understand the concept of task but have concept of low interface knowledge. The suitable program is with limiting the amount of choices, informative feedback, user manual, and effective online tutorial.

Knowledgeable intermittent users

Is professional that has already had stable concept of task and wide concept of interface knowledge but hard to remember or master structure menu or locations of available feature. The suitable program is with providing neat, consistent structure menu, clarity of interface, protection from danger because of feature exploration.

Expert frequent users

Is professional that is used to with concept of task and interface. The suitable program is with providing macro, shortcuts, abbreviation and others.

According to ref [1] usability generally is about certainty level where a product is easy to learn, effective, and delightful using user's point of view. Specially, the aims of usability are:

- Effective to use (effectiveness)
- Efficient to use (efficiency)
- Safe to use (safety)
- Having good utility (utility)
- Easy to learn (learnability)
- Easy to remember how to use (memorability)

Usability is really important because if a product has good function but doesn't have good usability then that product can't be used maximally and there is a possibility that product can't be used and is left by user. High usability will guarantee a product can be used effectively, efficiently, safely has good function, easy to learn and easy to use.

The use from a system with certain function is range and level where system can be used efficiently and adequate to achieve certain aim for certain user. Actual effectiveness from system is achieved if there is proper balance between function and usability from system. Because of that other than easy

to learn (learnability) and easy to remember how to use (memorability) then function in this thing effective to use (effectiveness) is also needed even the balance must be achieved.

Based on several researches handling virtual keyboard performance, majority concludes that typing with virtual keyboard is less comfortable, slow and produces more mistakes than physical keyboard. The first factor is related to size of the buttons. In addition, virtual keyboard doesn't have visual, audio and feedback which is often experienced by user when typing with physical keyboard [4].

RESULTS AND DISCUSSION

The display of virtual keyboard is as follow:



Fig 2: Display of lowercase



Fig 3: Display of uppercase



Fig 4: Display of number and special character










Fig 5: Display of special character



Fig 6: Display of emoticon

Users are given questionnaires to know next screen prediction towards buttons that are touched by user. (in real questionnaire, the display of the screens are shown). The questions are like this:

Table 1: Questionnaire Screen Prediction

No.	Question	Choice
1	Display of Fig 2. If shift button () is pushed then what will be on screen?	(A) Fig 3 (B) Fig 4 (C) Fig 5 (D) Fig 6
2	Display of Fig 3. If shift button () is pushed then what will be on screen?	(A) Fig 2 (B) Fig 4 (C) Fig 5 (D) Fig 6
3	Display of Fig 2. If “?123” button () is pushed then what will be on screen?	(A) Fig 3 (B) Fig 4 (C) Fig 5 (D) Fig 6
4	Display of Fig 4. If “1/3” button () is pushed then what will be on screen?	(A) Fig 2 (B) Fig 3 (C) Fig 5 (D) Fig 6
5	Display of Fig 5. If “2/3” button () is pushed then what will be on screen?	(A) Fig 2 (B) Fig 3 (C) Fig 4 (D) Fig 6
6	Display of Fig 6. If “3/3” button () is pushed then what will be on screen?	(A) Fig 2 (B) Fig 3 (C) Fig 4 (D) Fig 5
7	Display of Fig 4. If “ABC” button () is pushed then what will be on screen?	(A) Fig 2 (B) Fig 3 (C) Fig 5 (D) Fig 6
8	The frequency of using virtual keyboard?	(A) Never (B) Seldom (C) Often
9	What is the meaning of the numbers above the letters?explanation.....

Based on Fig 1. Then the amount of users that often use virtual keyboard is 28 users or 41%, those who are seldom using is 35 or 51%, and those who are never using is 5 or 7% with the total of 68 respondents.

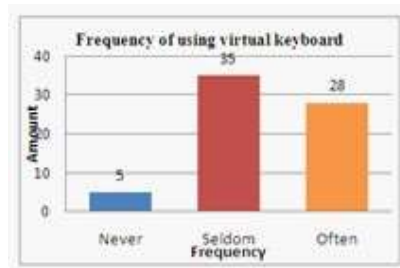


Fig 7: Frequency of using virtual keyboard

Based on ig 2. Then shift button (↕) is known well by users to show uppercase to be lowercase or vice versa to be uppercase. In accordance with question number 1, is which is lowercase display with pressing shift button (↕) then the right ones show next screen (uppercase display) are 63 users or 93%. Vice versa, in accordance with question number 2, that uppercase display with pressing shift button (↕), then the right ones show the next screen (lowercase display) are 64 users or 94% while the wrong ones show about 4 users or 6%. So it can be concluded that shift button (↕) is already known by users to change uppercase to lowercase or vice versa lowercase to uppercase.

Based on ig 2. Then “?123” button (⌂) is known well by users to show numbers. In accordance with question number 3, which is the display of numbers with pressing “?123” (⌂) then the right ones show next screen (numbers display) are as much as 66 users or 97%, while the wrong ones show about 2 users or 3%. So it can be concluded that “?123” (

⌂) is known well by users to change letter display to be number display.

Based on ig 2. Then “1/3” button (1/3) is known well by users that shows special characters. In accordance with question number 4, which is numbers display with pressing “1/3” button (1/3) then the right ones show next screen (special characters display) are 66 users or 97% while the wrong ones show 2 users or 3%. So it can be concluded that “1/3” button (1/3) is known well by users to change numbers display to be special character display.

Based on ig 2. Then “2/3” button (2/3) is known well by users is to show emoticon display. In accordance with question number 5, which is special

characters display with pressing “2/3” button (2/3), then the right ones shows next screen (emoticon display) are 66 users or 97% while the wrong ones show about 2 users or 3%. So it can be concluded that

“2/3” button (2/3) is known well by users to change special characters display to emoticon display.

Based on ig 2. Then “3/3” button (3/3) is not known well by users that this is to show numbers display back. In accordance with question number 6, which is emoticon display by pressing “3/3” button (

3/3) so the right ones show 42 users or 62% while the wrong ones show 26 users or 38%. So it can be concluded that "3/3" button (3/3) is not known well by users to change emoticon display to be numbers display back.

Based on fig 2. Then "ABC" button (ABC) is known so well by users to show letters display back. In accordance with question number 7, which is numbers display by pressing "ABC" button (ABC), then right ones showing the next screen (letters display) are 68 users or 100% and there is no mistakes choosing the next display. So it can be concluded that

"ABC" button (ABC) is known very well by users to change numbers display to letters display.

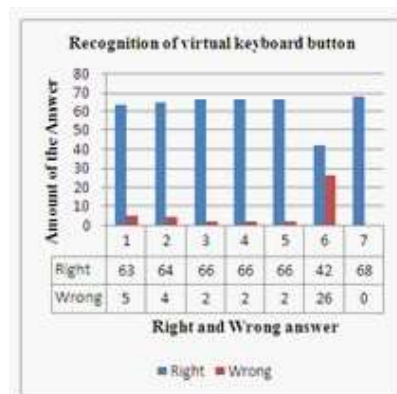











Fig 8: Questionnaire answer

In question number 9, "what is the meaning of numbers above the letter?" is to know whether users understand the meaning of numbers above the letters and especially understand how to use it, which is how to show numbers above those letters. In accordance with question number 9, users who are never using virtual keyboard but know how to use it (showing numbers above those letters) are 3 users or 4%, while for users who are never using virtual keyboard and don't know how to use it (showing numbers above those letters) are about 2 users or 3%. Users who are seldom using virtual keyboard but know how to use it (showing numbers above those letters) are about 11 users or 16%, while users who are seldom using virtual keyboard and don't know how to use it (showing numbers above those letters) are about 24 users or 35%. Users who are often using virtual keyboard and know how to use it (showing numbers above those letters) are 16 users or 24%, while users who are often using virtual keyboard but don't know how to use it (showing numbers above those letters) are 12 users or 18%. Total of all users who know how to use it (showing numbers above those letters) are 30 users or 44% while for those who don't know how to use it (showing numbers above those letters) are 38 users or 56%. So it can be concluded that not all users understand how to show numbers above those numbers, for users who are often using virtual keyboard, it only differs 6% who understand how to show numbers above those letters.

CONCLUSION

Based on the result of questionnaire's answers from users towards use of virtual keyboard, then it can be got several conclusions like these:

- Shift button () is a button that is known well by users who are never, seldom and often using virtual keyboard since shift button () generally is often used by physical keyboard users.
- “?123” button () is a button that is known well by users to change letters display to numbers display, this thing is possible because 123 symbol attached with that button so it gives shadow of that button's function which is to show numbers.
- “1/3” button () is known well by users to change numbers display to special characters display but this thing needs to be inspected more because “2/3” button () gives shadow of possibility of next screen display. That means the possibility of users to find the continuation of “1/3” display to “2/3” display because of that, this thing needs to be inspected more by deleting “2/3” symbol to give certainty in the answers.
- “2/3” button () is known well by users to show emoticon display but this thing needs to be inspected more because “3/3” button () gives shadow of possibility of next screen display. That means the possibility of users to find the continuation of “2/3” display to “3/3” display because of that, this thing needs to be inspected more by deleting “3/3” symbol to give certainty in the answers.
- “3/3” button () is not known well by users to change emoticon display to numbers display back. There is a possibility that users are seldom to use this “3/3” button ().
- “ABC” button is known so well by users to show letter display both to uppercase letters or lowercase letters in accordance with last state of the letters before changing. If before it is uppercase letters then by pressing this button, it will change back to uppercase letters, if before it is lowercase letters then by pressing this button it will change back to lowercase letters.
- Not all users understand how to show numbers above those letters, for users who are often using virtual keyboard it only differs 6% for those who understand how to show numbers above those letters.
 - Buttons in virtual keyboard are often used in physical keyboard which don't complicate users in using that like shift button , “?123” button , and “ABC” button , while “1/3” button , “2/3” button , and “3/3” button () still complicate users to understand its use because it doesn't mirror screen which will be shown if pressing that button. So it can be said that “1/3” button , “2/3” button , and “3/3” button aren't good easy to learn (learnability) and easy to remember how to use (memorability). While for shift button , “?123” button , and “ABC” button can be said as good easy to learn (learnability), and easy to remember how to use (memorability).

REFERENCES

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