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USABILITY TESTING OF VIRTUAL KEYBOARD IN TOUCH SCREEN WITH QUESTIONNAIRE METHOD

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Abstract: A system consists of input, process, and output. User interface is a place for users to interact in the system where one of the functions is as input facility of the system. One of the input tools is keyboard. With the development of touchscreen, then virtual keyboard is required. A good interface must be able to be used easily especially for novice users. The usability testing is required to know the usability level of the interface. A 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). Usability testing is an evaluation approach involving users. With usability testing, it is expected that it can give positive inputs in designing an interface especially virtual keyboard interface mainly with the characteristics of easy to learn (learnability), and easy to remember how to use (memorability) so that the resulted design can have good usability level

Keywords: Virtual keyboard; usability

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:

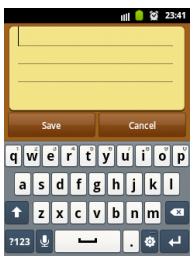

Fig. 1: Initial display of virtual keyboard

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 18-19 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

According to ref. [1], there are three 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. [2]:

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 [3]. 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

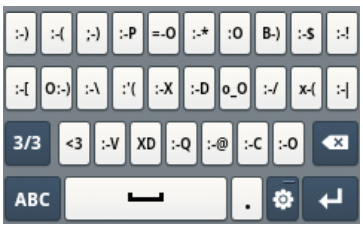

Fig 6: Display of emoticon

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 (?123) 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 (1/3) 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 (2/3) 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 (3/3) 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 (ABC) 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.

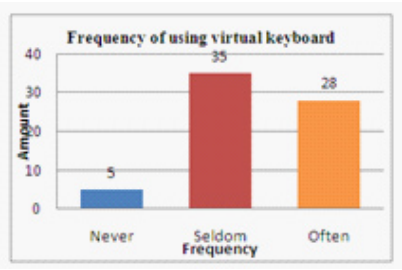

Fig 7: Frequency of using virtual keyboard

Based on fig 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 fig 2. Then "?123" button (?123) is known well by users to show numbers. In accordance with question numeber 3, which is the display of numbers with pressing "?123" (?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" (?123) is known well by users ro change letter display to be number display.

Based on fig 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 fig 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 fig 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 knwon well by users to change emoticon display to be numbers display back.

Based on fig 2. Then ”ABC” button (

) 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 (

), 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 (

) is known very well by users to change numbers display to letters display.

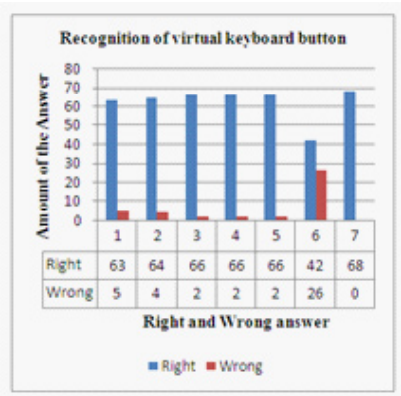

Fig 8: Questionnaire answer

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.

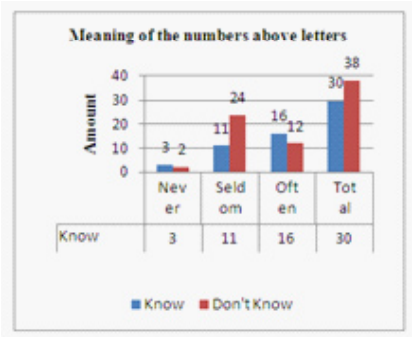

Fig 9: Meaning of the numbers above letters

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 possiibility that users are seldom to use this ”3/3” button (

).

- ”ABC” button () is known so well by users to show letter display both to upercase 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).

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