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Survey on Variants of QWERTY

Comparison between different types of "soft" keyboards : QWERTY, T9, SWIPE, etc

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Abstract: *Four different types of touchscreen keypads are studied: standard QWERTY, BlackBerry Z10 Keyboard (Predictive Text Input), T9 on QWERTY Layout and SWYPE. A survey was conducted to understand and analyze the people who type, their needs, skill, devices used, the problems faced by the users while typing using any of these keyboards. It was a fantastic response that helped us reach some interesting conclusions.*

Keywords-keyboards; qwerty; t9; swype; Mobile Phones; predictive text entry

1. INTRODUCTION

Mobile phones has become lifeline of each and everyone in todays world, sized to fit in one's hand. The mobile phones are everywhere and with anyone!

A mobile phone is not just a device, which is used to receive and send voice and messages. These days it has become the most essential instrument for communication.

With the advent of smart-phones, mobile phones have now got a new meaning. They are not only means of communication, but are also the sources of information and entertainment. Today, the mobile phones can also be depicted as sources for storing important data. They also act as calendars and alarm clocks, thus, informing us about the set schedule from time to time. Uses for smart phones also extend and include the capability to write and send e-mail and even type out notes and complete documents using a note app or word processor. According to Beilke - HMI, in its simplest terms, includes any device or software that allows to interact with a machine. This can be as simple and ubiquitous as the traditional single-touch display mounted on a machine or as technologically advanced as a multi-touch-enabled control panel or even connected mobile technology such as smart-phones and smart watches. According to Shah: HMI is considered an interface that allows humans to interact with the machine. Examples of HMI physical aspects could be a machine with touch display, a push button, a mobile device, or a computer with a keypad.

What is the learning curve for using HMI?

According to Beilke: Because of the mainstream acceptance of smart devices such as smart phone, tablet, or smart watch, the learning curve is very low for users. Multi-touch functionality is second nature to most people today.

2. LITERATURE SURVEY

This [2] paper reflects on the technological progress has also caused a change in traditional practices. A common trend among many smartphones is the removal of the physical keypad, a feature that was common to all mobile phones just a few years ago. Many smartphones today employ touchscreen technology. The devices use on-screen "soft" keyboards. Many of these soft keyboards resemble the classic and renowned Qwerty keyboard layout. However, new issues arise when using soft keyboards. The fact that there are over 26 on-screen buttons to fit into a limited screen size is a design challenge [7]. Common criticisms relate to the sensitivity of the touchscreen, the button size, the efficiency of the layout, etc.

There are other keyboard layouts besides Qwerty. Physical keyboard variations, such as Dvorak, reduce finger fatigue by placing the most predominantly used letters on the home row of the keyboard. Opti is an optimized soft keyboard layout, with frequent letters positioned in the centre, infrequent letters in the perimeter [5]. It is demonstrably more efficient than a

Qwerty soft keyboard after a succession of learning trials. The original empirical comparison found that the

Opti keyboard surpassed the input speed of the standard Qwerty layout after the tenth session, which was equivalent to about four hours of practice. The reason is that performance with a Qwerty layout tends to level off, suggesting that people's ability to type faster is bounded by the Qwerty letter arrangement. However, designers are hesitant to employ alternate keyboard layouts due to the large social bias favoring Qwerty. Employing alternative layouts requires users to invest time learning a new input style. In today's competitive marketplace, "different" is of limited appeal to consumers. Our research seeks to examine soft keyboards that use the Qwerty letter arrangement while including novel tricks to optimize and enhance input.

To combat the stagnant efficiency of the Qwerty layout on soft keyboards, designers and software engineers have adapted a different strategy. Following the motto, "if it ain't broke, don't fix it," modern keyboard designs often retain the Qwerty letter arrangement while implementing unique interaction techniques. One of these new techniques includes a notion called "Shape Writing," first introduced by an application called "Swype"' on Android devices.

To enter text while "swyping," users draw the word in one continuous motion without lifting the finger. An evaluation found than the Android Swype keyboard performed just as well as a regular tapping and provides a better experience for users [6]. Another common feature to enhance text entry is predictive text. Of predictive text entry is not new; it has been used on mobile phones since the early 1990s with a feature commonly known as "T9" [8]. T9 was designed to reduce the keystrokes required for text entry on a phone keypad (which initially used multi-tap). Using the algorithm behind T9, keyboards can be designed with different letter-to-key mappings [4]. One example is the "reduced Qwerty" keyboard, which positions letters on a single row of keys, while maintaining the Qwerty letter arrangement. There are only nine letters keys. Letters are arranged vertically: QAZ on the first key, WSX on the second key, EDC on the third key, and so on [2]. In an empirical evaluation, users nearly matched the speed of typing on a standard Qwerty keyboard, despite the need to disambiguate key presses (like T9 on a traditional phone keypad).

Blackberry Pearl devices use a Qwerty layout on a physical keyboard, but place two letters on each key: QW, ER, TY, etc. The keyboard is called "SureType," and requires disambiguation, much like T9. Essentially, SureType is T9 disguised in a Qwerty layout.

In soft Qwerty keyboards, predictive text works by autocompleting or autocorrecting a user's input. An example of predictive text in modern smartphones is the Apple iPhone's auto-correct feature. When active, the phone automatically corrects spelling errors to the closest possible word the user is entering. The recently released Blackberry Z10 includes a new keyboard feature which displays predicted words on top of each subsequent key. The idea of using predictive text with different interaction methods is a continuing trend in the smartphone industry [1].

The goal herein is to compare modern tweaks or variations of the Qwerty keyboard. Our evaluation compares Qwerty variants and assesses whether they are faster or less prone to errors. The keyboards included are standard QWERTY, BlackBerry Z10 Keyboard (Predictive Text Input), T9 on QWERTY Layout and SWYPE. These are presented in the next section.

3. QWERTY VARIANTS KEYBOARDS

Qwerty variants maintain the basic Qwerty style, while making some modification from the original (e.g., swipe versus tap). Before presenting our evaluation methodology, the four keyboards are described. The first is the standard Qwerty keyboard on the Android Phones. See Fig. 1.

Figure 1: Standard QWERTY Keyboard

In the second variant of QWERTY Keyboard is one with the functionality of BlackBerry Z10 soft keyboard. In this variant as letter keys are tapped, predictions are shown on top of the next letter. To choose the prediction, the user swipes up on the letter, thus auto completing with the suggested word. See Fig. 2.

Figure 2: Figure 2: BlackBerry Z10 QWERTY Variant

The third variant of QWERTY keyboard is the Swype keyboard. It uses swiping gestures wherein users do not lift their finger until all the letters of a word are traced. The tracing does not have to be precise, as an algorithm is used to determine the word based on the shape of the gesture. See Fig. 3.

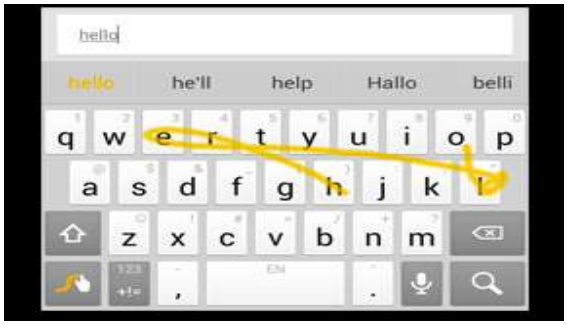

Figure 3: SWYPE QWERTY Variant

The fourth QWERTY Variant is T9 on a Qwerty layout. Each button contains two letters, while maintaining the Qwerty spatial arrangement of letters. In addition, each button requires just a single tap which is accompanied with a predictive algorithm to anticipate the word the user is trying to enter. See Fig. 4.

Figure 4: T9 on QWERTY Variant

4. METHOD

A survey was conducted to find the most preferred keyboard and issues faced with the same. 50 respondents participated in this survey. A questionnaire consisting of 9 questions was prepared via Google Form, a subcomponent of Google Drive. Questions were based on the type of keyboards used and their attributes and problems based with respect to the participant's usage

5. RESULT

1. Age Group

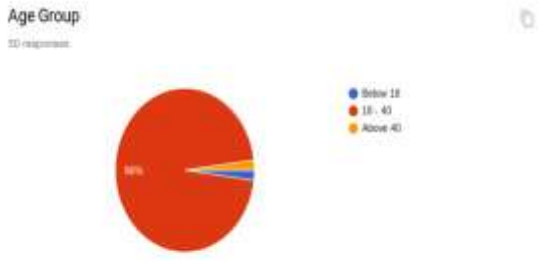

Chart1: Age group

2. Which keyboard do you use

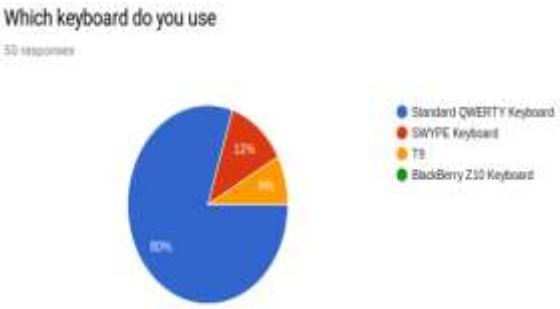

Chart 2 : Type of Keyboard

3. Do you use Predictive Text Input

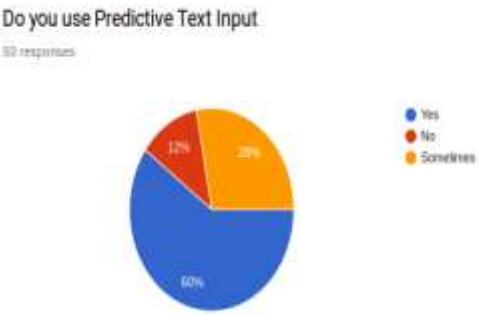

Chart 3 : Predictive Text Input

4. What are the problems faced while typing

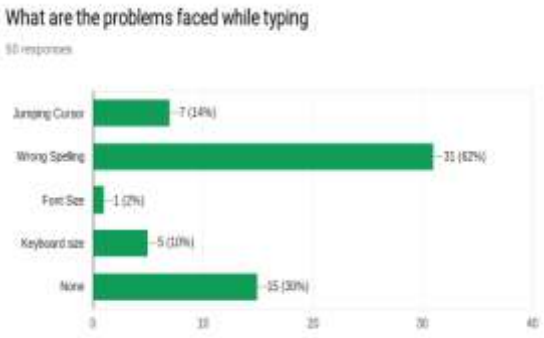

Chart 4 : Problems faced while typing

5. Physical Problem faced while typing

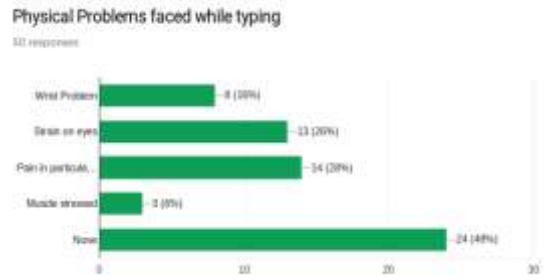

Chart 5 : Physical Problems faced while typing

6. Learning experience of the Keyboard

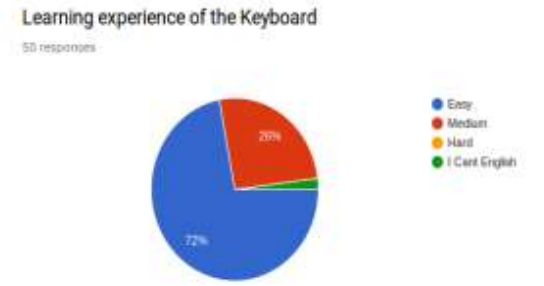

Chart 6 : Learning experience of the Keyboard

7. Size of Keyborad

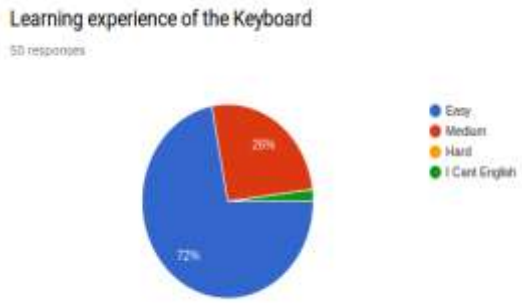

Chart 7 : Size of the Keyboard

8. Responsiveness of the Keyboard

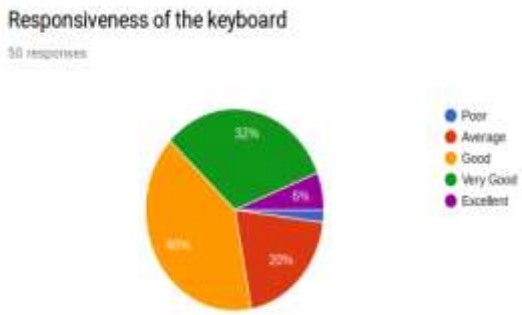

Chart 8 : Responsiveness of the Keyboard

9. Flexibility of the Keyboard

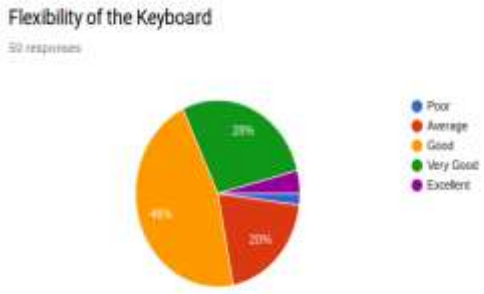

Chart 9 : Flexibility of Keyboard

6. ANALYSIS

We tried to find which type of keyboards are designed in such a way that they have followed the HMI Guidelines.

The design of the QWERTY type of keyboards is simple to understand and use. Due to this it is the most widely used keyboard according to our survey. User preferences are taken into consideration by giving the option to turn Predictive Text Input option ON or OFF. However wrong presentation or cluttered presentation of the keyboard may lead to typing wrong words/spellings. Also the placements of the keys on the keyboard and prolonged use of soft keyboards may lead to some physical problems.

The success of a keyboard depends on the user's experience while using a keyboard. Whether they find the look and feel of the keyboard aesthetically pleasing. If they are enjoying using the keyboard. How relaxed they feel while using the keyboard. Whether they can be relaxed or they need to stay focused while typing any text.

7. CONCLUSION

This survey helps us to conclude that the QWERTY keyboard is considered the world standard at this stage, it is beneficial to have wide variety of designs to choose from if this keyboard is used. Some come with special, ergonomic shapes, others are designed specifically for office, web or gaming use. Because of the popularity of the QWERTY design, it has started to replace the numeric keypad on mobile phones. Almost any device encountered comes standard with a QWERTY keyboard, making it a very familiar layout.

Learning Experience and Muscle Memory: If you are touch typing on a QWERTY keyboard, you are making use of muscle memory, which increases the speed. Thus we can conclude that the learning experience of this type of keyboard was found to be easy by most of the participants. But if we have to learn typing on QWERTY keyboard from scratch it may take a little more time to learn.

Speed and Accuracy: QWERTY places letters that are rarely used in the most optimal positions, while your fingers need to stretch for the keys you use all the time. Words with long sequences need to be typed with the same hand, and it often jumps from the home row, slowing down your typing. For instance, it is a common mistake to type "teh" or "hte" on a QWERTY keyboard instead of "the," because the keys alternate badly and you have to type outward rather than inward. Making mistakes slows down your typing, as you have to go back and correct your work all the time. But with the help of Predictive Text Input we try to curb these errors. Ergonomy: The QWERTY keyboard was not designed to be ergonomic. It has a high same-finger ratio, which increases strain. Also it may increase strain on eyes due to prolonged use.

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