

Guided review: Quasi-Qwerty Soft Keyboard Optimization (Bi et al., CHI 2010)

High-level understanding: Summarizing your understanding about the contribution and benefits of the paper. The final summary is usually put into 3–4 sentences in the actual review.

A. Problem

Between the two keyboard layouts (optimized and Qwerty), there is a trade-off between motor performance and initial visual search time.

B. Method

This paper proposed Quasi-Qwerty layout that limits the optimization by allowing the letters to be only one key away from the original Qwerty layout.

This paper argue that Quasi-Qwerty layout offer a compromise between the high motor performance in optimized layout and low initial visual search time of the Qwerty layout.

To support this argument, regarding the motor performance, the authors derived theoretical movement efficiency of five keyboard layouts.

This paper also presents an experiment comparing initial visual search time in three conditions: Qwerty, Optimized, and Quasi-Qwerty.

C. Results

Both theoretical motor performance and initial visual search time from the experiment reveals that Quasi-Qwerty layout provide a balance between motor performance and initial visual search time.

D. Implications

The results of this paper can lead to a future keyboard layout design that strikes a balance between the motor performance and visual search time.

Writing a review for Evaluation sections: This part of the review focuses on the validity, generalizability, and replicability of the methods used in the evaluation.

B1. Research method:

Theoretical (for motor performance), and experimental (for visual search time).

B2. Variables: *What are they? Operational definition?*

IV: Keyboard layouts ∈ {Qwerty, Quasi-Qwerty, Optimized}

DV: Initial visual search time.

Operational definition: “The time elapsed from the moment a word appeared on the screen until the last letter of this word was tapped.”

Were the definitions described unambiguously? If no, what are other interpretations?

The definitions was clear and unambiguous allowing the experiment to be replicated. For the levels of the independent variable — all three keyboard layouts — were shown in Figure 2. For the dependent variable, the authors made an implicit assumption that the time the user take for entering each character will be constant and comparable among conditions. This assumption is sensible in stylus-typing which is the scope of this paper. However, if this definition would be used elsewhere in other text entry method, one must either make sure that this assumption holds or factor out the motor time that is used to enter each character.

How much does the definitions serves the purpose to answer the research question?

The definition of the variable directly reflects the research question that focuses on the visual search time.

B3. Procedure: *Was the procedure described in detail such that you can replicate this experiment? What are still ambiguous?*

The procedure was described in detail. The author justified the choice of words: to make the result comparable with [7]. The order of conditions were counterbalanced to prevent the order effect in the within-subject design. Finally, the short practice (one word) allows the experimenter to measure the initial visual search time without the effect from learning.

B4. Validity: *How much does the study achieved internal and external validity? What are potential threats to the validity?*

The study used a controlled word list which is representative to English language (detailed discussion in [7]). While this increases internal validity, the short and random words that are not semantically connected with each other may not reflect the real-world use of the keyboard — lowering the external validity.

The fact that all users are right-handed may pose a systematic bias in typing with stylus, especially the occlusion will of the letter will be only from the right hand side. In addition, we also assume that the participants of the two gender were well distributed among the age groups.