

Assignment 1 Study Report

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Course: EECS 3461

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10/24/2017

Empirical Question

Typing is an essential skill that is undertaken by everyone who uses a computer. Those who use a computer on a frequent basis are usually very familiar with the layout of the keyboard. This results in developing strategies that allow them to type faster and get a particular job done quicker than someone who just started using a computer very recently. The question this report will try to answer is as follows: does having a time constraint affect the way experienced users type on a standard QWERTY keyboard? In particular, does having a limited amount of time increase the amount of incorrect input? Furthermore, does time have an effect on the number of times a user presses the Backspace button of the keyboard? It is well documented observation that people do not perform up to their full potential when they are in a stressful situation. The designed experiment puts experienced users in such a situation and gauges their typing performance.

Description of Data Collection Protocol

To gauge user performance, the study was divided into three cases. In all three cases, ten words of varying length (6-12 character) were used. A Graphical User Interface (GUI) was designed so that the users could enter whatever word they saw on the screen at the time while a timer decreased. If the user entered the correct word within the given time, the word "correct" would be output to an external text file along with whatever they had input into the textbox. If the user input the incorrect word or ran out of time, the word "incorrect" would be outputted to the same file, along with whatever they entered into the textbox at the time. The number of Backspaces a user pressed on a particular word was also recorded in the text file.

As mentioned above, the study was divided into three cases: Cases 1, 2, and 3. The only thing differentiating each case was the amount of time a user got to input words on the screen. For example, Case 1 was the easiest and the time allotted was proportional to the length of the word, i.e. a user was given six seconds to type a word that was six characters long (1 character/second). In Case 2, a user was given half the time as in Case 1, i.e. a user was given three seconds to type a word that was six characters long (2 characters/second). Case 3 was the hardest because, a user was given a third of the time as in Case 1, i.e. a user was given two seconds to type a word that was six characters long (3 characters/second). Each case simulated a particular level of stress; Case 1 was the least stressful, whereas Case 3 was the most stressful. In total, seven people participated in the study and their results are posted in the consequent sections.

Concise Summary of Findings

As mentioned in the previous section, seven people participated in the study. As expected, they performed extremely well on Case 1. The lowest score was 7/10 and there were 4 people who got a perfect 10, which was expected. The average number of correct answers for Case 1 was 9.286. This shows that the participants had a typing speed of more than 1 character/second and they found this case to be least stressful. Furthermore, they only pressed 3 backspaces per person on average showing that their accuracy as well as their typing speeds were better when given more time. However, the data varied to a considerable degree with the highest number of backspaces was 6 and the lowest was a 0. More research would need to be done to determine the root cause of this phenomenon. In summary it was concluded that they did not feel rushed in completing the task because of a high average number of correct answers, which resulted in a low use of the Backspace key.

Case 2 produced similar results to Case 1. The average number of correct answers was 8.5 and only two people got a perfect 10. The lowest score-which also happened to be the mode-occurred 3 times in the dataset. The average number of incorrect typed words more than doubled, from 0.714 in Case 1 to

1.571 in Case 2. This was expected as people are more likely to make mistakes when asked to complete a task on a short notice. The outcome of this case was that the average number of backspaces per person decreased from 3 in Case 1 to 2 in Case 2. Furthermore, the data associated with the number of backspaces was more compact; 4 participants pressed 2 backspaces for the entire test. One explanation for such an outcome is that the participants felt very comfortable when completing this task. Completing Case 1 could have prepared them for Case 2. More research would need to be undertaken to determine the exact cause of this phenomenon. One thing that did match the initial intuition was that the number of incorrect answers increased significantly as mentioned above.

Finally, Case 3 produced results that were close to the expectation. First of all, the average number of correct answers was 5.286, a significant drop from that generated from the previous test case. This was expected because the time allotted was a third of that in Case 1. The data did vary significantly, with the lowest being 0 correct answers and the highest being a 9. These two participants were the outliers of this dataset since most of the data was between 4 and 7 correct answers. Consequently, the average number of incorrect answers tripled from Case 2 with 4.71. This can be attributed to multiple factors; the most dominant one being the person's actual typing speed. Most participants were unable to keep pace with the timer and as such, rushed to compensate for lost time and spelled the word incorrectly. The number of backspace presses increased for every participant, with the average being 4 backspaces/person. The dataset was very condensed, with the lowest number of backspace presses being a 1 and the highest being a 6. While an increase in the average was expected, theoretically a larger increase would have made more sense. However, there are a limited number of backspaces that a person can enter within the allotted time. By the time the participants realized they made a mistake, it was already too late to fix it because they have already run out of time. So, given the nature of the study, it makes sense that the number of backspace presses went up, but only slightly. Maybe, if more time was allotted for every word the study participants would have had more time to correct their mistakes by pressing the backspace key. Thus leading to a higher average of correct words typed for Case 3.

Hence, the answer to the original empirical question-based strictly on the data collected-is that having a time constraint does affect a person's ability to type correctly. Furthermore, there is an upper bound on how many backspaces a user can press once they realize that they have made a mistake. However, the number of backspace keys pressed increases as time to complete a typing task decreases.

Participant's Reactions and Feedback

After the study was completed, a user was prompted to complete a short survey reflecting on their experience. The general consensus was that the GUI was implemented effectively. However, some participants wanted it to be more visually pleasing. Furthermore, others wanted to know how well they were doing while attempting the tasks (output the word "correct" on the GUI to let them know that they have entered the word correctly, otherwise display the word "incorrect"). Apart from two people, the general consensus was that more time was needed for Case 3. Furthermore, most participants found Case 3 very hard to complete. Furthermore, everyone knew that they made a mistake on at least one word in Case 3. Overall though, the participants were very pleased with the GUI and gave it an average of 88% satisfaction rating.

Data Analysis