

RESEARCH NOTE

Has the Smartphone Affected the Typing Speeds of Japanese Students?

Russell Notestine

Hajime Uchikawa

INTRODUCTION

The last ten years have seen a radical change in digital technology. The easy availability of knowledge and information as well as the development and popularity of various social media platforms has dramatically altered for better and/or for worse not only many of the basic ways we get information but also many of the basic ways we deal with each other as human beings. One very small aspect of this change in technology is the possible existence of positive or negative effects of the smartphone's screen-based input technology on the keyboard typing ability of young students. This paper will investigate this question by presenting and then analyzing 14 years of Japanese college student typing-speed data measured at both the beginning and end of a first-year computer skills class to see if the advent of the smartphone beginning in the early 2010s has indeed had any noticeable impact. Since the curriculum of this class also featured a typing speed component, changes in the rate of improvement over the years will also be addressed.

When the authors were in school, typing speed was seen as such an important skill that it was taught as a class of its own. It wasn't unusual for high schools and colleges to have special typing classes often with very strict standards of achievements. Most academic papers and important documents were manually typed using typewriters. Beginning in the 1990s, however, word processors largely replaced typewriters. As we all know today, instead of typing directly onto a paper, word processing involves using keyboard typing to input data into a computer document, but the basic skill of using a keyboard to enter letters, spaces and characters has remained the same and has therefore remained essentially unchanged since Christopher Latham Sholes and his partner James Denmore patented the "QWERTY" keyboard in 1878 (Starr, 2016).

However, for younger people today, keyboard typing is no longer the only way to type or input data into technological devices. The development of touch-screen technology made popular by the smartphone explosion has begun to radically change the method by which

people input text and data into digital devices. The iPhone, iPad and smart phone touch-screen technology exploded onto the scene beginning in 2010. Instead of traditional 10-finger typing onto a keyboard, these new handheld devices have very small screens and sometimes completely different character layouts designed to be used by a single thumb. Many high school graduates have become much more familiar with the skill of using their thumb (or thumbs) to enter data straight into their smartphone.

It would seem intuitive that this radical change in the technology and medium of how people physically transcribe words into technological devices would indeed have some kind of an effect on standard keyboard typing speed. The authors intuitively assumed that the current thumb-centric style of phone-screen input, as well as perhaps the strong trend towards abbreviated terms and emojis, would possibly make the more formal keyboard style of input more difficult for young people today. On the other hand, many others might assume that young people get much more practice than ever entering text into a computer and would likely be better than their contemporaries in past years. Trubek (2011) has noted that the time spent practicing typing in high school is much lower as it is felt that students "already know how to type because they have grown up with computers." With these questions in mind, we took the time to look back at 14 years of typing speed data.

METHOD

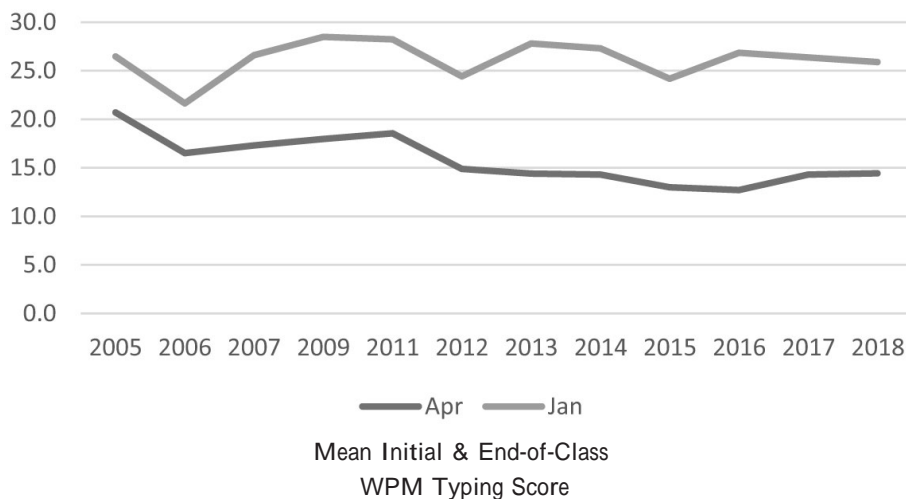
Over the past 14 years, one or both of the authors have taught a first-year computer skills class at Chukyo University in Nagoya, Japan, with an average class size of about 60-65 students. One important component of this class has been a focus on improving students' typing speed by teaching the art of "touch typing" (e.g., no look typing). Every year during this period, a speed typing test has been administered at both the beginning and end of the semester (please note that due to a clerical error, the 2010 data is not available). From the beginning, we wanted not only to measure the improvement in the typing speeds of the students themselves, but also to be able to compare results with students in previous years.

The typing text that has been used is available in this paper's appendix. The total length of the text is 230 words and introduces the basic history of Seattle followed by a description of a tour of the city. The exact same text has been used since 2005 for both the initial test in April and also the end-of-class test administered in January of the next year as we are able to get a more accurate look at the student's improvement during the year as well as being able to accurately compare any trends in typing speeds over the course of multiple years. We especially wanted to analyze the average words per minute (wpm) of students at the beginning of the first semester before any typing instruction has begun. Since Japanese high school students rarely receive any typing instruction in high school, any changes or

trends in this initial speed typing test might intuitively be attributed to smartphone usage in young people.

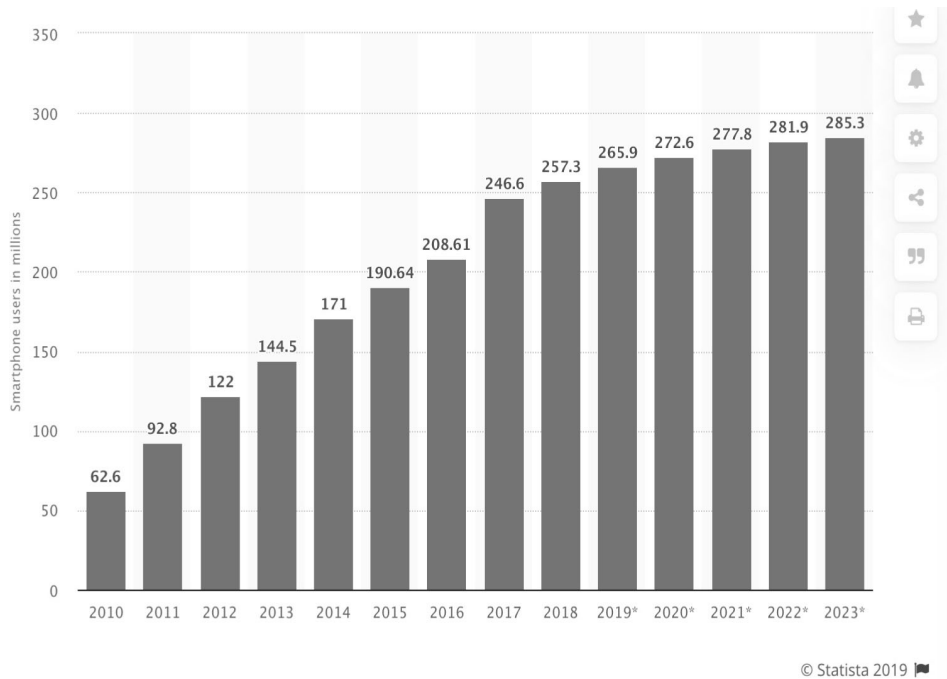
The students are given ten minutes to type as much of the text as possible in both tests. Students who are able to finish the whole document in less than ten minutes are asked to start typing again from the beginning. A one-word deduction was given for each mistake made. Each student's result is based on an immediate evaluation by an instructor in order to insure accuracy. These scores are noted and then compared to the scores achieved at the end of the year in order that both the teacher and student can see their improvement.

We present here both the beginning and end-of-year average wpm scores over the period of time being researched. We will first focus on searching for any trends over the years in the typing skills of Japanese high school graduates that may or may not be attributable to increased smartphone usage. Then we will focus on the improvement in typing skills over the years with a particular focus on any noticeable trends and changes.



RESULTS

Our primary motivation for doing this study was to look at the initial typing speeds over time and look for any trends. As can be seen from the data above, there seems to be a very slight but noticeable trend downward over the 14-year period. It is useful to note here that the early 2010s is when smartphone usage really exploded after the release of the Apple iPhone (see Statista graph below measuring total US smartphone users in millions). Indeed, the early 2010s seem to be exactly when said noticeable decrease in typing scores begins.



Total US Smartphone Users (millions)

Observation #1: High school typing speeds seem to have decreased over the last 15 years.

If we break our data into three approximately equal groups, we get the following:

Initial Typing Scores

2005-2009 = 18.1wpm

2011-2014 = 15.5wpm

2015-2018 = 13.6wpm

The most recent four years are 24.3% lower in wpm scores than the pre-smartphone boom years starting in 2010. This would seem to validate the assumption that smartphones may be having a negative effect on the keyboarding skills of young high school graduates. This is despite any increases in the amount of time given to computer and IT skills that has been added to high school education.

Observation #2: Lower initial average typing speeds did not seem to affect the final typing speeds attained after one year of practice.

Average 1-year Typing Improvement

2005-2009 = 43%

2011-2014 = 75%

2015-2018 = 90%

Very interestingly, the rate of improvement was almost perfectly correlated with lower initial typing scores. That is to say that the lower the initial typing speed, the greater the rate of improvement. Of even greater interest is the fact that the final wpm scores ended up being about the same regardless of the initial score (see data below). No matter the initial aggregate class typing speed, final performance after one year of instruction, practice and training ended up at a total class average of about 26 words per minute.

Average End-of-Class Scores

2005-2009 = 25.8wpm

2011-2014 = 26.9wpm

2015-2018 = 25.8wpm

The above data would suggest that although initial typing scores have decreased recently, the ceiling that we can expect students to attain does not seem to be affected by these initial scores. For us, this was the most surprising result from our compilation and analysis of all this data. While it's not surprising that lower initial scores would allow for more room for improvement in general, it is quite surprising that there would be no statistically significant difference in the final typing speed scores. One intuitive conclusion that might be drawn from this is that around 26 wpm, there is a bit of a ceiling beyond which requires a level of time and effort that wasn't available to our students.

The authors fully understand that the results of this analysis and the data that we have presented are very limited and are not meant to be in any way conclusive. We have mentioned that our intuitive assumption is that a decrease in typing speeds over the last 15 years is primarily attributable to the smartphone. While this is certainly a very plausible possibility, and our modest study certainly added some credence to that idea, there is not any tangible research to conclusively indicate that this is true, and it would require a more extensive multivariate analysis in order to more confidently draw any conclusions. There are indeed many other possible explanations for these results including changes in Nagoya-area high school curriculums, changes in study habits in general, or maybe student

achievement is decreasing in other areas too and typing ability is just one of them. Finally, these are only the results of one class measured over 14 years.

All this said, it is still hoped that this paper might raise teacher awareness of not only the basic changes that have taken place with young learners recently in general, but also of these specific issues for those who are tasked with increasing the typing skills of young Japanese students. Finally, it goes without saying that further research needs to be done to make more conclusive observations about these important academic and social issues.

References

- Ghosh, S., Ganguly, N., Mitra, B., De, P. (2018, Feb 1). Evaluating effectiveness of smartphone typing as an indicator of user emotion. 2017 Seventh International Conference on Affective Computing and Intelligent Interacting (ACII).
<https://ieeexplore.ieee.org/xpl/conhome/8263545/proceeding>
- Holst, A. (2019, Aug 30). Number of Smartphone Users in U.S. 2010 to 2023. Statista.
<https://www.statista.com/statistics/201182/forecast-of-smartphone-users-in-the-us/>
- Starr, M. (2016, July 1). A brief history of the QWERTY keyboard. Cnet.
<https://www.cnet.com/news/a-brief-history-of-the-qwerty-keyboard/>
- Trubek, A. (2011). Out of touch with typing. MIT Technology Review.
<https://www.technologyreview.com/s/425018/out-of-touch-with-typing/>

Appendix:

Speed Typing Diagnostic Test Used in This Study

230 Words

The Seattle area was originally the home of the small peaceful Duwamish Indian tribe. The modern city of Seattle began in 1851 as a small fishing village started by a New Yorker named David Denny. Seattle was the Duwamish Indian chief's name.

In the early days, the men of Seattle were so lonely that they sent someone back to the East Coast to bring 57 unmarried women back. Here Come the Brides! In the 1890s, many people went to Alaska to try and find gold. Seattle was where most began their journey. Seattle became very rich, because everyone spent their money in Seattle to get ready, and also, if they were lucky enough to get rich, after they came back.

Today Seattle is famous for being home to three very famous American companies: Starbucks Coffee, Microsoft, and Boeing Aviation.

We will be visiting Seattle for only one day and will have a chance to see several famous places. Our first stop will be Safeco Field which is where the famous Japanese baseball player Ichiro Suzuki played baseball for the Mariners.

After Safeco Field, we will visit the world-famous Space Needle which is now the most famous symbol of the city of Seattle. From the top you can get great views of the mountains and the ocean. Finally, in the evening, we will enjoy a delicious salmon dinner at the waterfront.