The Myth of Dvorak

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Like most people, you've probably never heard of the Dvorak Simplified

keyboard arrangement. If you have heard of it, chances are you've been told that it is

superior to the more widely recognized Qwerty keyboard, and that it's a real shame the

world isn't using it. For many, the Dvorak-Dealey "Simplified" Typewriter Keyboard, as

its inventors called it, is merely an entertaining conversation piece. For others, it

becomes a topic of heated discussion regarding economic market failure. When the facts

are examined more closely, the truth becomes obvious: It is not a fluke or a mistake that

the Qwerty keyboard has survived so long in the free market. In fact, it is every bit as

sufficient as any of its competitors have been, and continues to meet current necessities

of speed and comfort.

To fully understand the two keyboards it is necessary to start at the beginning of

the typewriter itself. The first typewriter patent was filed by a British engineer named

Henry Mill an 1714, but Mill never implemented his idea. Over the next hundred years

several inventors filed patents similar to Mill's, but none of the various (and sometimes

comical looking) machines were mass-produced or sold commercially. An American

inventor, Christopher Sholes, patented the first commercially produced type-printing

machine in 1868. The patent was sold in 1873 to an American gun manufacturer, E.

Remington & Sons and the "Typewriter" entered production in April 1874.

Sholes's original prototype in 1868 resembled a piano, with its letter keys

arranged alphabetically in a straight line. The printed type was not visible to the typist, as

heavy type bars struck the paper from the backside. This seemingly minor inconvenience was made worse when two type bars in close proximity were pressed in a rapid enough succession: They would wedge together! The problem was not usually discovered until, as *Discover* magazine writer Jared Diamond puts it, "you pulled out the page and saw that you had typed 26 lines of uninterrupted E's instead of the Gettysburg Address" (37). Sholes immediately saw the drawbacks of his piano-like arrangement of keys, and worked for several years improving the efficiency of his typewriter. The first typewriter produced and distributed by E. Remington & Sons six years later sported what is referred to today as a Universal, or Qwerty, keyboard.

Some, like Diamond, would argue that the Universal keyboard was designed to slow down the typist (37). They would do well to remember that, according to University of Chicago professors Stan J. Liebowitz and Stephen Margolis, in Sholes's day, no one had yet conceptualized the method of ten-finger touch-typing (Fable par. 15). In fact, from its beginnings, speed was not the typewriter's greatest advantage. It was the attractive typeface and professional look of the documents that could be produced. There is no arguing, however, that the Universal keyboard was designed to reduce the jamming of type bars. Sholes arranged the keyboard so that the most used digraphs—sequences of two letters—were separated spatially from one another, thereby decreasing the frequency of type bar jams.

In the early 1900's, a professor of education at the University of Washington, Dr. August Dvorak, with the help of his brother-in-law, William Dealey, and several others, spent almost 20 years developing the Dvorak-Dealey "Simplified" Typewriter Keyboard.

His motivation in doing so was simple: By that time, the majority of typewriters were electric, and the methods of printing type on paper had been improved enough that it was impractical to continue using a keyboard designed merely to reduce type bar jamming. Ten-finger touch-typing had become a universally recognized method, and speed had become important to typists. Dvorak designed his keyboard with speed and ease of typing in mind, and consulted every known study regarding letter and digraph frequency in the English language. In 1932, the Dvorak keyboard was made commercially available. In 1936, Dr. Dvorak and his colleagues published a book that chronicles their findings and reasoning behind the arrangement of the Simplified keyboard.

Upon initial examination it is easy to assume that the Dvorak keyboard should be faster and more comfortable to use than the Universal keyboard. Dvorak relied heavily upon several motion picture studies conducted by industrial engineer, Frank Gilbreth. He noticed three things from these motion studies and developed his keyboard layout accordingly. First, the studies showed—and it seems intuitively obvious—that it is faster to type letters on the "home" (middle) row than on the top or bottom rows of the keyboard (Dvorak 323). The Qwerty keyboard places the most common letters (such as 'e' and 't') on the upper row, and some of the least common letters (such as 'j' and 'k') on the home row. The Simplified arrangement places the most common letters on the home row, and the least common letters on the bottom row. Second, motion pictures prove that it is slower to type two letters in succession when they are typed with one hand (324). Typing becomes even slower when entire words are typed with one hand (consider the words 'stewardesses', 'pumpkin' and 'minimum' on the Universal

keyboard). Since the English language has a fairly even frequency of vowels and consonants, a simple solution to this problem was to place all the vowels on one hand and all or most of the consonants on the other hand. This evens the load between the two hands and causes most words to be typed using alternating hand movements. Third however, there are many English digraphs that consist of two vowels or two consonants. For this, Dvorak again uses motion studies to prove that it is easier and faster to type from the outside of the keyboard toward the inside (324). Thus, he placed common letter digraphs on his keyboard in such a way that they would be typed from outside to inside (consider 'th', 'st', 'sh' and 'nd' on the Simplified keyboard). Dvorak tested his keyboard and found in study after study that greater speed and efficiency could be gained by its use than by the Universal arrangement. It is purported that other studies conducted by the U.S. Navy and conclusively showed the Dvorak keyboard to be superior.

Why then, did the Qwerty keyboard survive in the free market economy? If the Dvorak Simplified keyboard is truly superior, why does virtually every computer, word processor, or typewriter come equipped with the Universal key arrangement? This question has puzzled economists for decades, and the answer is simply this: The Qwerty keyboard arrangement is not as inferior as Dr. Dvorak would have us believe. First, there are significant flaws in many of the experiments that "prove" the superiority of Dvorak's keyboard. Second, there are more recent (as well as more scientific) studies that show that the Simplified and Universal arrangements are surprisingly even in their efficiency and ease of use. Lastly, my personal experience with the Dvorak keyboard seems to agree with these findings.

The relatively few studies often quoted by Dvorak supporters as proving its superiority are either largely misquoted, or seem to show markedly unscientific biases. The U.S. Navy experiment is largely unavailable to the public. As a result, many Dvorak supporters quote it as saying one thing or another, but most, in a very non-scholarly fashion, fail to properly document their work. According to Liebowitz and Margolis, those who do properly document their references usually end up citing the works of other authors who are in turn citing others and so on. Thus, they have set up a sort of circular reference, all of them properly citing one another, but none of them properly citing the actual study (Typing par. 31). In another experiment, Dvorak himself claims that students learning the Dvorak keyboard gain speeds 87 to 155 percent faster than Qwerty students after equal amounts of training (226). However, this particular study "compared students of different ages and abilities...in different school systems taking different tests in classes that met for different periods of time" (Fable par. 23). A careful study of Dvorak's text shows that this study and many others he cites were conducted without proper controls or due scientific method.

Second, other more objective studies seem to show less of a divergence in performance between the Universal and Simplified keyboards. Two studies from the early 1980's, cited by Japanese keyboard expert Hisao Yamada, suggest between a 6.2 percent and 2.3 percent typing speed advantage for the Dvorak keyboard, based on relative finger and hand motions alone (336; 365). These numbers do not begin to approach Dr. Dvorak's attested figures. Despite having a large initial following, one major reason Dvorak's keyboard never gained a foothold on the market was a landmark

study done in the 1950's by Earle Strong of the General Services Administration.

Strong's inquiry concluded that "Dvorak training would never be able to amortize its

costs" (Fable 36). His experiment involved the training of ten government typists (who

had previous Qwerty experience) on the Dvorak keyboard. After they had regained their

former typing speed, they continued their Dvorak training, while ten other government

typists (with previous typing experience) began retraining on the Qwerty keyboard. The

two groups were given parallel training in a scientifically controlled manner. They

practiced the same number of hours each day and participated in exactly similar teaching

programs. At the end of the experiment, the twenty typists were given comparable tests

to assess their final typing speeds. Strong discovered that the typists who had retrained

on Qwerty progressed faster than the ones who trained on Dvorak, and thus, after the

same amounts of training, the Qwerty typists were achieving higher speeds. This would

suggest that if the cost of training on Dvorak were equal to the cost of retraining on

Qwerty, the latter would be more profitable for companies and organizations (Strong).

Finally, my own experience seems to suggest that the Dvorak keyboard is no

better than Qwerty. I took my first formal keyboarding class in the eighth grade on a

Qwerty keyboard. A year ago I was typing 65 words per minute, and I cannot remember

having any pain or discomfort while typing. Then I heard about the Dvorak keyboard. I

read some of the fantastic claims made by its supporters and decided that if it really

could improve my comfort and speed I should give it a try. At first I thought I would

have to purchase a new keyboard, but after doing a little research on the Internet I

discovered that almost every computer keyboard could be reconfigured to the Dvorak

key arrangement through operating system settings. This does not change the location of the actual physical keys, of course, but if you strive for good technique in typing you should have no need to look at your hands. So that I could learn the key arrangement, I scotch taped a printed diagram of the Dvorak keyboard to the bottom edge of my monitor. I used a freeware typing tutor program to develop my speed, and, while learning, continued with normal typing in schoolwork and every-day activities. In a month I had regained my original speed. I have now been typing on the Simplified keyboard for a year, but have noticed no significant improvement in speed beyond my previous ability. When I type with the Dvorak keyboard I have noticed that my fingers do, indeed, spend more time on the home row. However, since I felt no discomfort before, I cannot in all honesty admit that a higher percentage of keystrokes on the home row translates into greater comfort. In short, my own experience seems to concur with what scientific research has heretofore established. The Dvorak keyboard is no faster or more comfortable than the Qwerty keyboard.

Many of those who have heard of the Dvorak keyboard have wondered if they should switch. In light of recent studies that are more conclusive (as well as more scientific) than previous ones, the answer is clear. There is no reason to make such a drastic switch, and I have seen no drastic improvements after making that very switch myself. The interesting thing is that for me the issue is now reversed. From what I have learned, the Qwerty keyboard is no faster or more comfortable than the Dvorak, and so it would not be worth it for me to make the switch back! Many people are unhappy with standards that have been chosen throughout economic history. Many in the United States

would like to see a switch to the Metric system as opposed to continued use of yards, gallons, and pounds. Others are disappointed that VHS tapes have become standard when Beta tapes were such a superior option. True, a Qwerty keyboard accompanies almost every computer sold today. Nevertheless, it takes less than 10 seconds to switch almost any existing keyboard to the Dvorak layout, and therefore it is nonsense to say that the Qwerty keyboard is the universal economic standard. Rather, the choice between Qwerty and Dvorak has become a personal standard—and neither choice should be considered superior.

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