Introduction

A keyboard is a panel of keys that operate a computer or typewriter. The layout of a common computer keyboard today, was originally designed for a typewriter. The primary function of a keyboard, computer or typewriter alike, is to allow a user to write in characters, quickly, and uniformly. In particular I have opted to use modern keyboards as a focus of my case study particularly because of its prevalence in day to day office activities. While observing the novice to expert typists in my own workspace, I also use the keyboard myself for the occasional excursion of expression; take for example this case study, in which I am actively using a keyboard to present my findings. To put the keyboard into perspective, and help build some context, let us briefly examine the typewriter, more specifically the layouts. As early as 1873 the keyboard was human engineered, several designs were attempted but the most famous was and still is, the “QWERTY” layout. The other two prominent keyboard layouts are Dvorak, and alphabetical order.

The alphabetical order layout, which while more user friendly to the novice typist, is considered less efficient as the user would use “considerable mental processing” power to utilize the alphabetic keyboard. Alternatively, a randomly organized keyboard, did not slow a user down significantly, if at all, from an alphabetic keyboard. The Dvorak layout did however show an improvement over the standard “QWERTY” layout, of 5 percent. Which by most standards can be seen as insignificant. This information is as a result of the research done by Donald A. Norman, and Diane Fisher, findings summarized in their paper “Why alphabetic keyboards are not easy to use: keyboard layout doesn’t much matter,” (1981) we learn that layout is almost irrelevant. Although, it is worthwhile to note that Dvorak studied movements and reorganized the keyboard such that there was a more equal
distribution of commonly used letters between both hands thus some thought in the design was put forth. In summary, the typical computer or electronic keyboard user expects the layout to follow the QWERTY design.

The particular keyboard I have chosen to examine is classified as a “gaming keyboard” by its producer Razer. This particular keyboard is sub-categorized as blue switch, which is infamous for its loud “clicking” noise when typing.

Observations

The good part about having a standard design for keyboard layout is that a user can move from computer to computer and still enter in character commands without having to relearn a significant amount. Some keyboards vary in their size, shape, and extraneous function buttons but the primary keys are in the same order. The expert typist, which are most individuals today, make use of a keyboard regularly, and will occasionally find themselves entering the wrong key into the system when spacing of the keyboard is different from their regular keyboard. Generally, this does not take much time for the typist to resolve. In observation I noted that many of my coworkers found no great satisfaction in their keyboard, or frustrations on a day to day basis. User experience with the keyboard is of the following format, if it functions, and its layout is standard, the user is generally satisfied. This disregard for the value of the keyboard is negative in the sense that it holds little value to the average user. However, in the same day of observation my coworkers found themselves increasingly annoyed by the speed in which I typed, the vigor in which I pressed my keys, and the distinct click that each key of my Black Widow produced as I wrote several hundred e-mails in a small confined office space. In order to best observe the response of those around me, I chose to vacate my own office and sit quietly behind other individuals while they worked in their own office.
Goals

As discussed prior the usability goal of a keyboard is simple, a functional keyboard that allows the user to input their keys to the machine. As the usability of a keyboard has been more or less defined in the last 141 or so years, and disregarding other character or key command entry methods: the primary focus becomes user experience. Users tend to forget they are actively using a keyboard, after but a few minutes of typing a user can already determine whether or not a keyboard’s spacing, feel, and response is adequate enough to be used. Once the user has decided the keyboard is functional, they tend to no longer notice the keyboard and garner no additional satisfaction from its use. This leads to the question: what if the user finds the keyboard unsatisfactory? In short, if deemed unsatisfactory, then the product is drawing negative attention to where attention is not normally given. This stems from the lofty expectation that all keyboards should be useable for all the basic functions and that drawing attention to a deficient keyboard will distract the user from any good qualities to be had. In short, the keyboard is a basic tool that has become the standard entry method, and basic tools are expected to fulfill basic functions. The primary goal of usability is ensure functionality, best achieved by following the standard QWERTY format.

There are however, groups of people whom make consistent use of keyboards and their underlying design has an impact on their experience. Let us then categorize the different kinds of keyboards. Primarily focusing on standalone keyboards, those not attached to the base of a laptop. The depth of compression when entering a key, the tactile response, audible response, point of actuation, spacing, and ease of cleaning all factor into the design of a computer keyboard. The most important of these particular components of design are audible and tactile response. The remaining categories have different orders of importance dependent on the user, some weigh spacing more than point actuation, while others ignore all other categories and simply refer to spacing. There are a great number of different underlying designs to keyboards, ranging from the membrane, dome-switch, capacitive, to the mechanical. The two primary type of keyboards in discussion today are membrane technology based, and mechanical technology based. At this juncture the vast majority of keyboards on the market are membrane based. Membrane based technologies have a distinct advantage, and particular focus, over their mechanical counterparts: they are significantly quieter. Those who choose to make use of mechanical keyboards, however, find that the weighted response of the key and audible point of actuation impact their ability to type. When entering a key on a membrane keyboard the point of actuation, when the command is presently recorded, is as the user would expect. The compression of the membrane, or when a key is fully pressed, connects two previously parallel membranes creating a current allowing the parent machine to recognize a key press. A mechanical keyboard, when receiving actuating force, will forcibly press back against the user, and make a distinct clicking noise, approximately half way through a full key press. Giving numeric value to these examples, a common membrane keyboard would require the use to compress 4mm for the point actuation, while a mechanical keyboard would only require 2mm for point of actuation. The primary goal then for user experience is to ensure that the user has a fine balance between audible response, and tactile response from their keys.

A custom key mechanical keyboard
Evaluation

One point of evaluation to ask a user is first whether they want to feel each and every key press when making functional use of their keyboard.

   Absolutely, I want my keyboard to press back quickly so I can prepare for my next key entry. (10/10)

A second point of evaluation to ask a user is whether or not they want to hear each and every key press.

   It is to the benefit of my peers that they hear each and every key press. (8/10)

A third point of evaluation is the size of the keyboard, does a user want spacing between each of their keys?

   Key spacing is of little value to me, as I generally swap between several different keyboards. (N/A)

A fourth optional question, which was not discussed here within this paper is the question of portability.

   The Black Widow is both heavy and large, which makes it difficult to run when someone chases you, but effective as a tool of self-defense. (3/10)

Improvements

The possibility for improvements on a particular keyboard design is nigh impossible, the keyboard evaluations help a user determine which keyboard is best suited to their particular needs. In this particular instance, I chose the physically responsive, and loudest of the mechanical options. The only available improvement at this time in returning greater features to my particular model, using the goals set forth, would be to install a mini-drum at the base of each individual key. Although, there are times when a quieter keyboard, and a softer response is appreciated, which adjusts the order of importance of the keyboard characteristics. Should I so desire a quieter, less responsive, and softer keyboard, I would immediately choose my Logitech illuminated membrane based keyboard.

For others, asking oneself the evaluation questions can cognitively reduce the number of options, and help to choose the right keyboard for their daily usage.