

Case Study: Gaming Keyboards

Overview:

Since the invention of the typewriter in the 1800s the standard keyboard has undergone relatively few changes in form. The keyboard for English typing has used the QWERTY format since practically the invention of the typewriter. There have been additions of buttons and functions as computers and laptops became available to everyone, but the general layout is unchanged. However in the digital age we now use keyboards for much more than just typing documents. Computer based video games have adapted this standard keyboard to its optimal design for participating in video games. These “gaming keyboards” have distinct features that allow players seamless interaction with their game as well as the ability to customize the functions to their preference.

What Is Being Organized?:

There are two separate resources being organized with a gaming keyboard. The physical structure and appearance of the keyboard, and the digital game specific commands linked to the keyboard. Physically a gaming keyboard differs from a standard laptop or desktop computer keyboard. These are structural mechanics such as key-button structure, backlighting, and anti-ghosting wiring(the ability of the keyboard to properly read simultaneous and/or incredibly rapid key pressing). These structural functions are irrelevant or a hindrance to non-gaming typing but a necessity for playing computer games. See Figure 1 for visual. There are also digital resources that are being organized with a gaming computer. These are less standard then the physical resources, as they vary from game to game. These digital resources are game controls linking the player to the game using the keyboard as a middleman. There are some more common key organizations, such as linking the “W” ”A” ”S” ”D” to forward, left, down, right commands respectively (Fig 2). But there are also several more game specific commands such as linking the “Q” “W” “E” “R” keys to specific abilities in the popular game League of Legends (Fig 3).

Figure 1.



Figure 2.

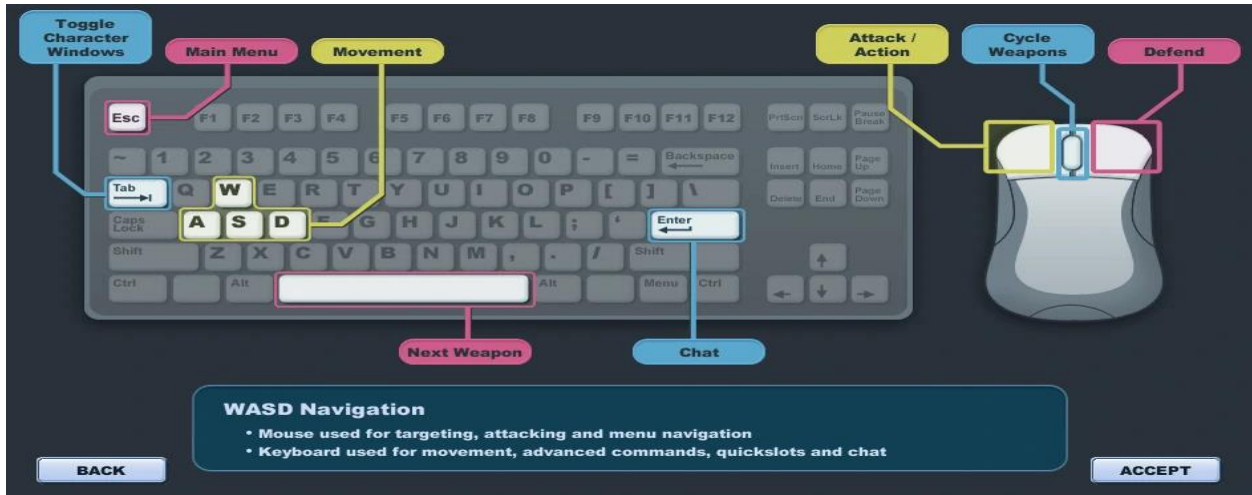


Figure 3.



Why Is It Being Organized?

In broad strokes both the physical and digital organization is to maximize player performance. The three defining physical features of the standard gaming keyboard all have important purposes to reach the goal of maximizing performance. A gaming keyboard uses mechanical keys (Figure 4) as opposed to membrane keys (Figure 5). Membrane keys are sleeker, quieter and have little resistance making them ideal for typing a paper or coding. But when playing computer games having a loud “click” sound, as well as a noticeable feeling of fully pressing a key are crucial for playing a game. When playing a computer game, League of Legends (using an example not a rule) if you pressed “Q” to trigger your avatar's ability on a membrane key, there are a lot of possible user errors that may lead to a miss play. For example a player presses “Q” twice because they did not register the first click, by pressing “Q” twice in quick succession they have now canceled that ability instead of triggering it. With mechanical keys it is much harder to make this error as there is a more pronounced sound and feel..



Figure 4



Figure 5

Colored backlights on a gaming keyboard also have their purpose. The flashy and mixed colors on a keyboard are not there just to make it look fancy. While playing a computer game players will be moving their hands all around the keyboard. Often having to do so with incredible speed and accuracy. The colored backlights of gaming keyboards allow for a player to quickly and accurately identify the region of the keyboard their hand is in without having to take their eyes off the game for more than a few frames. As seen in figure 6 the color changes across the board dividing it into regions. It is a similar concept to having notches on the “F” and “J” keys of a standard keyboard, but when playing games a more diverse method of finding key location is needed to match the speed and intensity of online games.



Figure 6.

A gaming keyboard is also wired to prevent key ghosting. Standard keyboards will not register two keys pressed simultaneously if “F” and “J” are pressed at the same time only one will show up on the document, or if they do support it is slower and less accurate than a keyboard designed to do so. Gaming keyboards are specifically wired as shown in Figure 7. This method will allow the keyboard to properly handle simultaneous key presses.

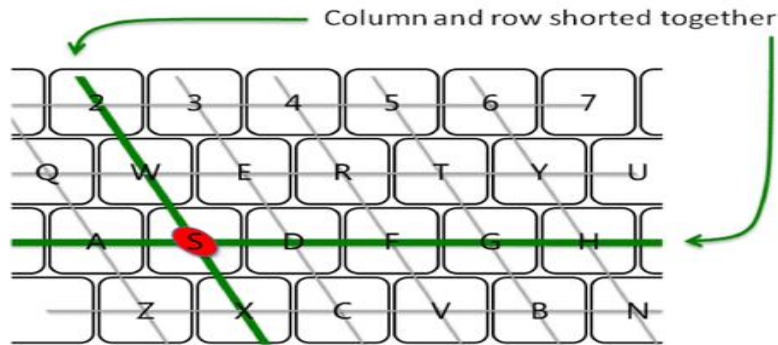


Figure 7.

For the organization of digital resources these are more player dependent. Refer back to figure 3. The abilities are linked to QWERTY and the items to 1234567. These are not hard set commands however. The player always has the option to set their own preferred keys for specific commands. If a player finds they are using the R and the 1 frequently in rapid succession they may change 1 to be the T key to minimize finger movement. This is an example from one game but the principle carries over to all computer games.

How Much Is Being Organized?

This is a granularity question and there are several ways to define how much is being organized. The physical resources are organized into the three features explained above. The key type could be further broken down if referring to figure 5 there are three standard types of mechanical keys. Keyboards out of the box will typically all be set at “Clicky” but with a small amount of work the user can change the type of key to match their preference. The backlights are also a factor set and their brightness can be changed slightly but the color scheme is already largely set. With key wiring each key being able to be pressed with any other key could be a huge number of different resources but it makes much more sense to just have the wiring be one resource.

The key commands to in game ability are one set resource. As with each new game the number of commands, abilities and the key-ability assignment is different.

When Is It Being Organized?

There are three stages to this organization process. The first stage is manufacturing. The completed keyboards are sent out with the features set to a standard, brand specific fashion. The second stage comes with user customization of the keyboard. This is an optional stage as some players will use the keyboard as is. Lastly there is the digital key to in game command organization. This is a continual process as with each new game the keys may change. Player preference of keys may also change over time.

How Or By Whom Is It Being Organized?

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There are three separate but interconnected entities doing the organizing. The manufacturers, the game, and the player. The manufacturer is responsible for organizing the physical resources of the keyboard in a way that players will want to use because they find that design effective for how they play games. The game is responsible for providing a preliminary structure of commands and controls that link the player to the keyboard and the keyboard to the game. The player is responsible for customizing and tweaking the factors set up by the other two in a way that they personally find helps them perform at their best.

Sources

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