An Ideal Computer Keyboard- A case study of Applying Ideality on keyboard evolution

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Abstract:
Any product or system moves towards its ideality. If we know the Ideal Final Result (IFR) it becomes easy to predict the future generation of the product or system. The author made a study of over 100 patents on computer keyboards. Each of these inventions tries to achieve some new feature or functionality. But what is the ultimate keyboard? This article makes an attempt to find the features of an Ideal Keyboard.
Findings of the study

I took a thorough look at almost all the patents in USPTO on computer keyboard. The study is quite large and interesting. I would like to present one aspect of the study in this article, i.e. the Ideal Final Keyboard. The study used Ideality as a TRIZ tool and tried to find all the desirable features of a computer keyboard. The study reveals eight desirable features of a computer keyboard. The features of an ideal keyboard are as follows.

1. Ease of Operation
   - The key layout should be simple for the beginners to learn.
   - Extremely easy transition- the keyboard is nearly identical to traditional PC keyboards.
   - Easy to identify and remember the special keys
   - Displaying definitions of special keys and function keys.
   - Adaptive features to use at any position, viz., sitting straight on chair, leaning back on chair, standing, sitting on floor, lying on bed etc.
   - Programmability or user definable keys
   - Predictive hints for typing
   - Separate numeric keypad and cursor control keys

2. Increased speed of typing
   - Reduced number of keystrokes
   - Less finger movements- maximum characters should be available at the home position
   - Less arm movements
   - Optimize keyboard character layout for speed
   - Auto completing words
   - Pointing device is close to the keyboard or attached to the keyboard
   - The keyboard displays the contextual definition of function keys and composite keys.

3. Reduced stress of typing
   - Ergonomic arrangement of the keys to match the shape of fingers.
   - Reduced finger and arm movements to reduce repetitive stress injuries (RSI).
   - Adjustable height, angles, rotation, tilting etc. The operator should be comfortable to work even without sitting straight
- Keyboards with arm support, wrist support, elbow support. The user need not have to uphold the arms while typing.
- Relaxed back, arms and shoulders - the operator should be able to work continuously for more than 8 hours without causing any injuries because of using the keyboard.
- Keyboard position adjustable to the position of the user, whether sitting or standing.
- Less force required to press the keys - using light tactile keys.
- Visible in dark or low lighting conditions
- Suitable for physically challenged

4. Reduced errors in typing
- Displaying definition of the special keys and function keys.
- Showing hints on typing
- Auto correction features
- Adequate spacing between keys
- Key arrangements matching the finger layout of the operator

5. Increased Functionality of the keyboard
- Keyboard position adjustable to the position of the user
- Suitable to operate for any language
- With attached joystick
- With attached/ attachable trackball or other pointing device
- With barcode scanner, ICC interface, pager, telephone and other functionality
- Keyboard with storage device
- Keyboard with multimedia features
- Programmability or dynamically definable keys
- Keyboard with microprocessor or intelligence
- Keyboard suitable for playing music
- Keyboard with mouse emulation
6. Increased portability of the keyboard
- Reduced size of the keyboard
- Reduced number of keys
- Reduced number of keyboard segments
- Compressibility of the keyboard
- Folding options or collapsible keyboard
- Wireless keyboard
- Detachable keyboard / split keyboard
- Concealed keyboard

7. Increased durability
- Resistance to heat
- Resistance to misuse, excessive pressure while typing
- Resistance to water
- Protection from being stolen even if kept in public places

8. Reduced cost
- Reduced cost of manufacturing
- Reduced maintenance costs
- Reduced up-gradation costs

9. What is the use of this IFR
It is interesting to observe that all the inventions on keyboard have addressed some or other of the above features and all the inventions in future will attempt to do the same.

The above desired features are important to keyboard designers, inventors, manufacturers to build the future keyboard in the right direction.

Different features have priorities for different purposes. For example a laptop keyboard may give more importance to portability whereas a public place keyboard may give more importance to durability.

I will put more examples on using TRIZ to invent a better keyboard in a separate article soon.
10. Summary:

Any product or system moves towards its ideality. If we know the Ideal Final Result (IFR) it becomes easy to predict the future generation of the product or system. The author made a study of over 100 patents on computer keyboards. Each of these inventions tries to achieve some new feature or functionality. But what is the ultimate keyboard? This article makes an attempt to find the features of an Ideal Keyboard.

About the author

After working for more than 18 years in various fields of Information Technology Umakan is currently doing independent research on TRIZ and IT since 2004. He last worked as Director and Chief Technology Officer (2000-2004) in CREAIX Information Technologies (Bangalore). Before that he worked as IS/IT manager (1996-2000) for ActionAid India (Bangalore).

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