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Commentary

The Influence on Data Statstics in Cognitive Ergonomics

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DESCRIPTION

The increasing complexity of patient monitors and data displays in the operating room places increased cognitive demands on clinicians. Increased cognitive demands can lead to errors in patient care, especially if the cognitive load is further increased by a critical event. Little thought is usually given to the human factors involved in the way information is presented to clinicians in the operating room, and little usability testing is done before new displays are introduced. In this issue of the British Journal of Anesthesia, Roche and colleagues1 present a study involving 52 anesthesia teams undergoing 154 high-fidelity simulations using a novel 'humanoid' display format, which addresses some of the known problems in patient monitoring by making significantly greater use of human factors.

The widespread adoption of computerization in healthcare in recent decades has resulted in a rapid increase in the number and complexity of patient monitors and displays, particularly in high-intensity treatment areas. The clear and concise presentation of information in various formats is a well-established area of study in many industries. Computerization, in particular, is known to result in the generation of large amounts of data. The difficulties of displaying such data and making sense of it emerged as a new field of study called information visualization. However, the most common approach for displaying data on patient monitors remains the Single-Sensor Single-Indicator (SSSI) paradigm, in which data from each individual sensor is displayed as a separate data element on a computer. Because there is little standardization between manufacturers or hospitals in the placement of data elements on displays, including the possibility of the same data element being displayed on more than one monitor, the search time to find relevant information can be extended. Many patient monitors have multiple display modes, including the ability to customize displays, which can lead to additional confusion. The presence of many separate SSSI data elements on a display, or series of displays, crowds the visual field and requires the clinician to locate, synthesize, and interpret data elements in order to determine the status of their patient.

Multiple distinct data elements are combined into a single intuitive display in the form of a stylized human form or avatar. An approach like this does more than just standardize the display; it groups data elements into a meaningful whole that is the avatar patient itself, a kind of visual mnemonic. Changes in the patient's body systems are displayed as stylized animated changes in the avatar's body parts; for example, a patient with cyanosis shows the avatar with a purple body, and high blood pressure is shown in the avatar by the outline of the entire body pulsing beyond normal limits.

Despite having a small working memory, the human brain is a strong and intelligent filter. Our senses constantly pick up stimuli from the environment, but the majority of them are filtered out by the brain before we become aware of them. The information from the outside world that is able to pass through is initially sorted and organized by meaning. Every human activity, and experts working within their highly specialized field of expertise in particular, involves the process of grouping information from the outside world into meaningful units .In order to do this, masters must be able to divide the entire chessboard into a manageable number of meaningful groupings of pieces, with each grouping forming a chunk that can be processed collectively and effectively by their limited working memory. Beginners struggle to consider all of the potential individual moves because they are unable to discern meaningful chunks in the chess pieces on the board. Most astoundingly, master chunkers can only chunk when the chess pieces on the board are arranged in sensible ways.

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