Cognitive Load/ HCI/ Interface Design/ Utilizing Psychology to Optimize Interface Design

Bødker, S. (1991). *Through the interface: A human activity approach to user interface design*. Hillsdale, NJ: L. Erlbaum.

Carroll, J. (1991). *Designing interaction: Psychology at the human-computer interface*. Cambridge, MA: Cambridge UP.

Chalmers, P. (2003). The role of cognitive theory in human-computer Interface. *Computers in Human Behavior*, *19*(5), 593-607.

Geriach, J., & Feng-Yang, K. (1991). Understanding human-computer interaction for information systems design. *MIS Quarterly* , *15*(4), 527-549.

There is a basic user recognition cycle for understanding the psychology of a Human Cognitive Interface. The important part of these cycles is the identification of them and then using them to empower the memory and increase cognitive capacity otherwise the user gets bogged down with the interface and not be able to use the program to it’s full capacity. One of the most important components of interface design is designing the system so that the underlying framework and processes are performed in a manner so the user can understand, this usually consists of combinations of patterns and symbols. This allows the user to create their own mental mode or their interpretation of what is actually happening with the system. Then, the closer the interface is to the user’s expectation, the quicker they can learn to use the system.

Horii, K., & Tsuchiya, K. (1996). Three-element schema technique in schema-based user interface design. *International Journal of Industrial Ergonomics*, *18*(2-3), 127- 133.

Lal, R. (2013). *Digital design essentials:100 interface guides for optimal user experiences on desktop*. Gloucester, MA: Rockport Publishing.

Laurel, B. (1990). *The art of human-computer interface design*. Reading, MA: Addison Wesley Publishing.

Norman, D. (2002). *The design of everyday things*. New York, NY: Basic.

Odeh, S. (2007). Cognitive-compatible human machine interfaces by combining ecological interface design and object-orientated programming. *International Journal of Online Engineering*, *3*(1), 1-13.

If human factors are considered in the design of the management system as well as the interface, a more user friendly system can be created. When designing Human-Machine interfaces, a distinction between the science of perception, i.e. the design when it comes to color, shape, form dimension, allocation and highlighting and cognition-ergonomics, attention allocation, human memory storage and abstraction level, in order to provide an effective interface design. This is referred to as the software and ergonomics structure when it’s implemented in a program An effective human- machine interface also needs to be cognitively compatible, this means that the numbers of errors that occur is minimalized, and if the software and ergonomics structures of the program match or are equivalent to those of the user.

Oviatt, S. (2006), Human-Centered Design Meets Cognitive Load Theory: Designing Interfaces that Help People Think. *Annual ACM international conference on Multimedia*, New York, NY. ACM.

Human Centered Design advocates for interfaces designed to be more intuitive, easier to learn and freer or errors, rather than designing systems and having users adapt to them. Several key components to human centered design are, identifying and modeling major sources of variability in human input, designing an interface that easily reduces the difficulty of the variability previously mentioned, allow for the adaption of human communication that frequently changes modes, and allowing for users to use their intuition to determine what mode is to be used. A few other key components that need to be included in effective interface design. Adaptation to the users’ behavioral patterns and preferences, support multiple modes and patterns, transparently guide users input to help reduce system errors, minimize cognitive load (shorter sentences, less visual clutter), accommodate the users already existing work practice, support a variety of different visual representations within the interface, and minimize interruptions that interfere with high level thinking.

Pannafino, J. (2012). *Interdisciplinary interaction design: A visual guide to basic theories, models and ideas for thinking and designing for interactive web design and digital device experiences.* Pennsylvania, PA: Assiduous.

Pratt, A., & Nunes, J. (2012). *Interactive design: An introduction to the theory and application of user-centered design*. Beverly, MA: Rockport Publishing.

Rogers, Y., Sharp, H., & Preece, J. (2011). *Interaction design:beyond human-computer interaction*. Chichester, West Sussex, U.K.

Shneiderman, B., & Plaisant, C. (2010). *Designing the user interface: Strategies for effective human-computer interaction*. Boston, MA: Addison-Wesley Publishing.

This book first addresses the problem of making a system universally compatible, then goes in depth about development and evaluation of an effective interface with direct emphasis on usability testing and appropriate user interaction designs. Topics such as direct manipulation, or continuous representations of objects, i.e. changing the dimensions of a box on screen with your mouse, as well as virtual and augmented reality.

This book also puts a heavy weight on social media’s influence on HCI and its constant growth and demand for a product that meets a wide range of needs for a diverse user group.

Somporn, P. (1990). Interface design and user problems and errors: A case study of novice searchers. *RQ*, *30*(2), 195-204

Errors in Human-Computer Interaction are a result of a mismatch between human abilities and the demands of a task and environment. Our goal should never be to develop a system that is error free- a system of that nature does not exist. But rather develop a system that is suited to the users’ needs with special attention on those who are not computer professionals and do not use them in their job or everyday life.

There are several types of errors that occurred. One, incomplete description problems, or problems that occur when all the information needed to solve a problem is not provided. Two, menu selection problems, when the user executes the wrong command from the menu screen. Three, Executing the wrong function because the description of what the command would perform was not clear. And four, documentation overload, or not using the built in help function because of the lengthy and crowded help screens Other errors that occurred were, problems abbreviating commands, failure recognizing system defaults.

One major fault of the designers of this program was, although they thought that their program as extremely user friendly, they realized that after consulting novice users, the problems they thought were easily fixable were not so.