**Unit 6: Mental Models and Risk Communication**

Welcome to Week 6. This week will focus on employing mental models as an approach to developing a Cyber Security risk communication strategy. You will be applying the knowledge you have gained in Unit 5 to identify appropriate mental models and employ these models to develop a robust communication plan, as a method to address the human factors issue in an organization.

**In this unit we shall:**

* + Employ mental models to understand user behaviors.
  + Learn how to use mental models to address specific human factor issues.
  + Explore the use of metaphors as a technique to communicate risks.

**On completion of this unit you will be able to:**

* + Critically assess user behaviors using mental models.
  + Develop the ability to identify and effectively apply mental models to design usable security.
  + Effectively apply metaphors to effectively communicate risk to users.

This week builds on the knowledge gained in Unit 3 by discussing the mental models and how to employ these to design usable security solutions. It also discusses application of mental models to develop risk communication plans.

**Reflection:**

Persons' mental models are their internal representations of the world outside their heads (Jones, N., et. al., 2011). In 1943, psychologist Kenneth Craik was the first to offer the idea that people form mental representations of the world around them. Mental models are typically discussed in terms of human-system interaction by psychologists who investigate human aspects (hfacmethods., 2015). How does one envision the structure and operation of a system? Although the concept of a mental model has no universally accepted definition, it is generally agreed that they consist of the following:

* **Descriptions:** Models offer descriptions of the many components that comprise the system.
* **Functional:** Models can be functional if they provide descriptions of the activities or purposes for which system components are accountable.
* **Interdependence:** Models include a description of the interconnections and interdependencies between the various components.
* **Mental Simulation:** Models combine descriptive, functional, and interrelatedness knowledge to provide simulated models of system functions that can be used to anticipate future system states.

**How mental models are useful:** What purpose can mental models serve if they cannot precisely represent reality, include blatant flaws, and are in a state of perpetual flux? Due to the fact that they govern human behavior, mental models are a crucial aspect of the interaction between humans and systems. A person's mental picture of the system with which he or she is interacting influences both behavior and decision making (Holtrop, J.S., et. al., 2021). It has been established that mental models may properly predict human behavior, including how accurately they will interact with technology, how successful they will be, and how precisely they will interact (Chermack, T. J. , 2003). This suggests that we will be better able to predict how each user will interact with a system if we can identify and differentiate between the mental models of the system's many users. This sort of prediction can help us forecast where users will encounter difficulty or success in the interaction, hence guiding design decisions. However, mental models are not only useful for making predictions; they can also be used for diagnostic purposes. This implies that if you understand a user's mental model of a system, you will be able to identify discrepancies between how the user understands the system and how the system actually operates (i.e. between the user model and the system model) (hfacmethods., 2015).

Some methods for assessing mental models are little more than slightly modified versions of methods used in other human factors approaches, but other methods are more particularly designed for assessing mental models.

Why are metaphors so effective when attempting to establish rapport with others?

A metaphor establishes analogies It makes comparisons between items that are neither directly nor indirectly connected. Metaphors are a highly efficient technique of achieving instant and lasting comprehension. Due to their capacity to generate vivid images and let us to "see" things from a new perspective, they are great tools for the inventive resolution of issues (Mind Tools., 2019).

**References:**

Jones, N., Ross, H., Lynam, T., Perez, P., & Leitch, A. (2011). Mental Models: An Interdisciplinary Synthesis of Theory and Methods. Ecology and Society, 16(1). https://doi.org/10.5751/ES-03802-160146

Holtrop, J. S., Scherer, L. D., Matlock, D. D., Glasgow, R. E., & Green, L. A. (2021). The Importance of Mental Models in Implementation Science. Frontiers in Public Health, 9. <https://doi.org/10.3389/fpubh.2021.680316>

Chermack, T. J. (2003). Mental Models in Decision Making and Implications for Human Resource Development. Advances in Developing Human Resources, 5(4), 408–422. https://doi.org/10.1177/1523422303257373

Mind Tools. (2019). Metaphorical Thinking: Using Comparisons to Express Ideas and Solve Problems. Retrieved from www.mindtools.com website: https://www.mindtools.com/pages/article/newCT\_93.htm

hfacmethods. (2015, November 19). Mental Models. Retrieved August 20, 2022, from Human Factors Methods website: <https://hfacmethods.wordpress.com/mental-models/#:~:text=What%20are%20mental%20models%3F>