Human Media Multitasking

(Based on Wang et al., 2015.
Note that some texts below represent direct quotations from this article.)

Focus of Analysis: What is involved when a human being tries to perform two tasks "in which one or both tasks utilize media technology" (p. 106)

Task Relations: How are these two tasks related to each other?

- *Task Hierarchy*: the relative importance given to each task. Cognitive systems allocated more resources to more important tasks, e.g., focusing primarily on homework while listening to music in the background.

- *Task Switch*: how much control do people have over switching between tasks? E.g., it is easier to pay attention to other things while dealing with text messages than with a phone conversation

- *Task Relevance*: do the tasks serve related goals or a single overarching goal or are they relatively separate? It tends to be harder to do multiple tasks when the goals are distinct and unrelated, e.g., assembling materials for a term paper from several different books versus trying to text a friend while solving a geometry problem

- *Shared Modality*: do the tasks share the same sensory modality (vision, audition, kinesthetic) or are they separate? Sharing the same modality creates a cognitive bottleneck, requires sequential processing, and tends to be slower. But, different modalities can be processed in parallel and tend to be faster.

- *Task Contiguity*: what is the physical proximity or closeness of the two tasks? If they are spatially near, task switching time usually decreases. So, multiple open screens on a computer may be easier to handle than shifting from a computer screen to a television screen ten feet away.

Task Inputs: How is task information presented to the user?

- *Information Modality*: how many sensory modalities (visual, auditory, motor) are employed at the same time? Needing to read text on a screen while also listening to a commentary requires greater cognitive resources than either of these modalities alone

- *Information Flow*: what is the rate at which information is being presented to the user? Static written materials can be reviewed again and again while video/audio content is transitory and demands greater attention. Also, what is the pace at which the information flows? Very speeded information is harder to comprehend and process than information presented at a slower speed.

- *Emotional Content*: What is the emotional valence (positive, negative, mixed?) and intensity of the information (arousing or calm)? Here the issue is less what an individual consciously pays attention to and more how the information "grabs" or "seizes" the attention & cognitive resources of the user. For example, information with very intense emotional content (e.g., graphic scenes of violence) will cause greater cognitive engagement even to the point of stimulating the individual user's autonomic nervous system.

Task Outputs: Is any behavioral response required by the task?

- *Behavioral Responses*: does the task require the user to do more than simply process the information cognitively? For example, most TV viewing doesn't demand any behavioral response. But, video game playing is highly demanding.

- *Time Pressure*: is there a time pressure element in either task that causes the user to face the dilemma of speed vs. accuracy in completing the task? For example, if a user has only a single evening to study for a test and the amount of information is very large, the demands of both the study task and any other parallel task may be overwhelming.

User Differences: Do differences in users affect the processing of & response to the tasks?

- Individuals approach multiple tasks with different personality styles and other factors. For example traits like mindfulness, extraversion & neuroticism, sensation seeking, and topic expertise can all affect how well a user can multitask. An individual who has limited vocabulary skills in a particular language will process in a far different way from someone who has strong multilingual skills.

Wang, Z., Irwin, M., Cooper, C., & Srivastava, J. (2015). Multidimensions of media multitasking and adaptive media selection. *Human Communications Research, 41*, 102-127. DOI: 10.1111/hcre.12042