

# Two further examples of using the Model Human Processor

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This is an extension of Table 14.1 in the *Foundations of User-centered design: What system designers need to know about users*, using the Model Human Processor (Card, Moran, & Newell, 1983).

## Table 14.1 Extra. Example MHP analysis.

### MHP: Example 3: Perception, visual

Compute the frame rate at which an animated image on a video display must be refreshed to give the illusion of movement

Consider: cycle time of the Perceptual Processor: closely related images that appear nearer in time than the processing time will be fused into a single image. Therefore

$$\text{frame rate} > 1/\text{cycle time of processor} = 1/(100 \text{ ms frame}) = 10 \text{ frames/second}$$

Frame rate should be faster than this. Upper bound specified by for how fast the rate needs to be can be found by redoing the calculation for fast-man

$$\text{max frame rate for fusion} = 1/(50 \text{ ms/frame}) = 20 \text{ frames/sec}$$

### MHP: Example 4: Motor skills typing behavior

On a certain pocket calculator, the heavily used gold F button employed to shift the meaning of keys is located on the top row. How much time would be saved if it were located in a more convenient position just above the numbers?

Assume that the position of the 5 button is a fair representation of where the hand is just before pressing the F button. From the calculator, the distance from the 5 button to the present F button is 2 inches, to the proposed location 1 inch. The button is 0.25 inch wide. By a version of Fitts' Law,

where movement time is  $C * \log_2 (D/S + .5)$  where C is expected to be about 100 ms/bit. So the difference between the two locations in time is

$$T = 100 [\log_2 (2/.25 + .5) - \log_2 (1/.25 + .5)] = 100(3.09 - 2.17) = 90 \text{ ms}$$

Note redesign entails trade-offs, but this analysis computes one cost.

## References

Card, S. K., Moran, T., & Newell, A. (1983). *The psychology of human-computer interaction*. Hillsdale, NJ: Erlbaum.