

# APPLYING THE COGNITIVE THEORY OF MULTIMEDIA LEARNING TO THE DESIGN OF PHARMACOLOGY LEARNING RESOURCES

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## BACKGROUND

The past few decades have seen an increase in the use of multimedia learning in the teaching of medical and biomedical sciences, where interactive instructions provide an invaluable mean to demonstrate complex physiological processes and simulate clinical environments. In order to develop educationally effective multimedia learning, it is important to design these resources with reference to the human cognitive abilities. Among the proposed human cognitive theories, the Cognitive Theory of Multimedia Learning (CTML) is one of the most effective frameworks in guiding the design of e-learning instructions.

## AIMS

We aimed to develop animations to the teaching of neuromuscular pharmacology according to CTML.

## SOURCES OF EVIDENCE

Interactive multimedia instructions such as animations and simulations have been used increasingly to help students understand complex phenomena that involve dynamic changes over time and location of multiple interacting elements. Past research has found empirical evidence supporting the educational value of the application of CTML to the design of multimedia instructions (Mayer, 2010).

## MAIN ARGUMENT

Neuromuscular pharmacology is an area of biomedical science that explores the molecular events leading to skeletal muscle contraction, as well as the modes of actions of drugs targeting the neuromuscular junction. These concepts encompass dynamic biological processes occurring rapidly at a microscopic level that exceed the capacity of the human visual perception. As a result, it is likely to be more educationally effective to present these processes to students via dynamic visualisations. This study discusses the application of CTML principles such as coherence, redundancy, spatial contiguity, signalling, learner-paced segmenting, modality and multimedia to the development of animations illustrating neuromuscular transmission and how this process can be modified by drugs.

## CONCLUSIONS

Cognitive Theory of Multimedia Learning principles provide a versatile theoretically grounded approach to the design of multimedia educational resources. The application of CTML principles can be extended to other medical and biomedical interactive learning activities such as virtual patients and laboratory simulations. Further research on applying CTML principles to the design of medical and biomedical multimedia learning resources is needed to verify the effect they have on long-term learning outcomes and experience among students.

## REFERENCES

Mayer, R. E. (2010). Applying the science of learning to medical education. *Medical Education*, 44(6), 543-549.

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