

Multimedia Instructional Design

PhD Proposal

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Research Paper (10 pages incl. literature review and methodology)	
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Mind the Gap: Learner-Centred Multimedia Design

Multimedia

Motivated to keep pace with technological developments, many Higher Education institutions are in the process of implementing a variety of eLearning programs.

eLearning program implementation can be technology centred or learner centred. This report views eLearning through a learner centred lens. Learner centred approaches begin with an understanding of how the human mind works and asks, 'How can we adapt multimedia to enhance learning?' Technology should complement human abilities. A technology centred approach results in solutions that can often interfere and confuse learning.

The term *Multimedia* means different things to different people.

In our case it means presentation of material using both words and pictures

- Words (printed or spoken)
- Pictures (static graphics including illustrations, graphs, photos, maps – or using dynamic graphics including animation or video)

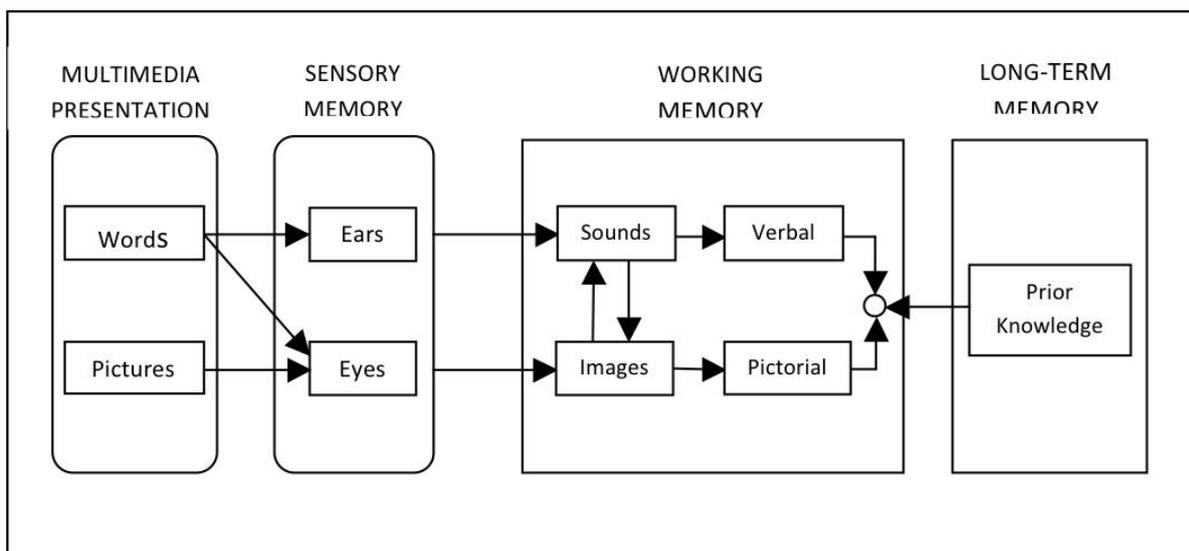
We view multimedia learning as an aid to knowledge construction. (Mayer, 2005)

Cognitive Theory of Multimedia Learning (CTML)

(Cambridge Handbook of multimedia learning)

There are no other comprehensive theories of multimedia design

Fig 1. Cognitive Theory of Multimedia Learning



Source: Mayer, R.E., & Moreno, R. (2003). *Nine Ways to Reduce Cognitive Load in Multimedia Learning Overload*. *EDUCATIONAL PSYCHOLOGIST*

This theory suggests three major characteristics when it comes to multimedia learning:

1. There are two separate channels (auditory and visual) for processing information (sometimes referred to as Dual-Coding theory);
2. Each channel has a limited (finite) capacity (from Sweller's notion of Cognitive Load);
3. Learning is an active process of filtering, selecting, organizing, and integrating information based upon prior knowledge.

Multimedia Design Principles

Design principles for instructional multimedia aimed at reducing cognitive load, proposed by Mayer (2005) have been empirically evaluated (Dwyer & Dwyer, 2006; Hasler et al, 2007 and many others).

These principles provide guidelines for designing instructional multimedia presentations 'in a way that promotes cognitive processing and facilitates learning' (Yue et al, 2013)

The learner experiences each of these three types of cognitive processing while viewing an instructional multimedia presentation;

- *Extraneous processing*, which drains limited cognitive processing capacity without contributing to learning;
- *Essential processing*, which involves selecting relevant information and organising it as presented in working memory;
- *Generative processing*, which involves making sense of the material by reorganising it into a coherent structure and integrating it with relevant prior knowledge.

The three main goals of CTML are, managing essential processing; minimising extraneous processing, and facilitating generative processing (Mayer, 2005)

- How well was essential processing managed?
- Was extraneous processing reduced?
- Was generative processing encouraged?

Aims of this study

Instructional multimedia presentations play an increasingly important role in business education in Irish Higher Education Institutions. This study investigates the use of instructional multimedia presentations to aid teaching and learning in Irish Higher Education.

This research comprehensively reviews instructional multimedia presentations in Higher Education to examine whether these presentations meet the three main goals of CTML.

Research Question

To what extent is Mayer's design principles applied to instructional multimedia videos used in Irish Higher Education business programmes?

Research Instruments and Measurements

Instructional material can be evaluated using three criteria of cognitive effectiveness, efficiency and appeal (Newby et al, 2006).

Cognitive effectiveness of instructional multimedia presentations is evaluated in this research. A comprehensive review of presentations as a teaching and learning tool in business is guided by the Cognitive Theory of Multimedia Learning (CTML).

Hypotheses

Many instructional multimedia presentations do not apply the learning principles, most importantly those principles that support the management of essential processing (constructive learning).

Many instructional multimedia presentations show evidence of excessive extraneous visual and auditory elements.

Conclusions

Opportunities to exploit the benefits of multimedia learning as a learning tool are relatively unexplored in Irish Higher Education. This research seeks supporting evidence to make the case for improving the efficacy of instructional presentations by incorporating the established principles of CTML.

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