# Chapter 6
# Exploring the Possibility of Combining High-Richness Media and the Simplification in Multimedia Education

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## ABSTRACT

*Rhythmic shift between the spectrum of difficulty often occurs along with a concomitant change in the level of cognitive load capacity within a lesson. In other words, the learning material is neither constantly simple nor complex. Cognitive load theory (CLT) suggests that simple learning tasks are necessary to be visually simplified to free up limited mental storage. Media richness theory (MRT), conversely, is required for complicated learning tasks to increase the accuracy and efficiency of information transmission. Previous studies have delved into either using CLT for cognitive load reduction or using MRT to enhance the effectiveness of information dissemination, the combination of both is rarely attempted. After analyzing the previous research of CLT and MRT, the authors propose an alternative instructional design strategy, which applies the redundancy principle to simplify instructional content to achieve precise and potent learning, while also using rich media to broaden the channels of information transmission and reduce the cognitive load for complex learning content.*

## INTRODUCTION

The procedure of instructional practices is intricate due to distinct teaching objectives and teaching needs for every subject. Even for the same subject, the adjustment of difficulty levels is required for different teaching strategies. In addition, diversity among individuals can lead to dissimilar instructional

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outcomes. The pursuit and exploration of knowledge have been ceaselessly ongoing for millennia. To ensure the effectiveness in the transference of knowledge, continual efforts by generations of educators have contributed to the modification of teaching strategies, resulting in the diversification of rigorous and scientific instructional models today. The tertiary education environments too must develop at a pace that is consistent with the growing expectations and demands of an innovative society (Crawford & Jenkins, 2017). In fact, as time progresses, the means of teaching and learning across all education stages ought to be adapted accordingly to the needs of the students. Correspondingly, the instructional design emerges in such an educational context. Without exceptions, all individuals were involved in this global-scale technological revolution. Particularly in light of the increasing integration of the web and other mobile devices into our daily lives, these new technologies allow learning to occur in ways never before. With the integration of new technology into the educational sector, e-learning and multimedia education arose. The definition of learning remains the same, but the nature of learning, however, is all about transformation. In correspondence, what changes are the methods to enhance and facilitate learning, in particular concerning ways of new technologies and complex subject matter (Spector, 2001).

In spite of the employment of new technologies within multimedia education or e-learning, it merely focuses on the enhancement and optimization of the teaching and learning process. According to the principles of cognitive load theory, empirical studies have suggested that the working memory load in learning with multimedia could be reduced (Ayres & Sweller, 2010). According to (Richard. E. Mayer, 2005, 2009), the design of instructional material should be based on a person's cognitive rules and how their mind processes information. Thus, the design of any instructional materials should be structured upon an evidence-based theory of multimedia instructional messages. In terms of instructional design, a course is often structured in the following way, which begins with materials that students have prior knowledge of moves on to the main ideas and challenges of the course, and finally concludes with a review of the lessons that were covered. In other words, a lesson's content should be arranged in a rhythmic change between the spectrum of difficulty from easy to difficult and shifting back to simple again. The same occurs when students learn at varied degrees of difficulty that incur a cognitive expense that ranges from low to high and switching back to low. Using high-richness media in a simple task may cause distraction or loss of focus; conversely, for tasks with higher levels of uncertainty and equivocality, using lean media is unable to convey the information efficiently and effectively and hence, resulting in poor communication (Sun & Cheng, 2007).

At the beginning of a lesson, the "introduction" part normally covers the review of learning materials covered in the previous lesson as well as general knowledge, common occurrences in daily life, or other facts that the students are generally aware of. At this point, most students listen to the teacher while trying to recall relevant information in their brains. The knowledge, also referred to as general content knowledge, either has already been retained in the long-term memory, or perhaps in the form of working memory that can be retrieved later after the teacher's recall of information. That is because once information is stored in long-term memory, it can be transferred back to working memory to govern action appropriate to the environment (Sweller, 2020). In short, the brain already has this portion of the information stored within and thus requires a relatively low cognitive load. As the lesson gradually progresses into the core phase, the content of this lesson would primarily focus on the central ideas that could involve abstract and challenging concepts (e.g., the concept of contour lines in Geography). In a similar fashion, the content implicated might also be rather confusing and indistinguishable (e.g., the concepts of luminance, purity, and hue in the basic design courses), or even in the form of unfathomable causal correlations (e.g., the chemical reactions between two matters in a chemistry experiment). This