

## Chapter 14

# Strategies for Managing Cognitive Load and Enhancing Motivation in E-Learning

**Selina Atwani Ochukut**  
*University of Nairobi, Kenya*

**Robert Obwocha Oboko**  
*University of Nairobi, Kenya*

### ABSTRACT

*Cognitive load and motivation are two factors that have been established as mediators of learning. It has been established that learners who experience low cognitive loads and are highly motivated to succeed in learning. Since e-learning is becoming a very popular means of delivering learning, there needs to be established strategies to ensure that learners learn. This study sought to look at the various means that have been used in e-learning studies to manage cognitive load and enhance motivation through the analysis of literature. Use of metaphorical interfaces, hypertext, sequencing, and fading of learning content, use of transient information, and adaptation of the problem-solving support were the strategies that have been used in e-learning studies to manage cognitive load. Motivation has been enhanced through the use of motivational messages and adaptive navigational support and pedagogical agents.*

### INTRODUCTION

E-learning is becoming a common means of delivering learning in most learning institutions. Most learning institutions all over the world are using e-learning as an alternative means to deliver learning and to widen their reach. In most e-learning initiatives, lecturers or teachers upload teaching materials in form of PowerPoint slides and word documents to e-learning platforms, and learners are left on their own to decide which material to go through distance and open education initiatives. This is deemed to affect the quality of e-learning (Hadullo, Oboko, & Omwenga, 2018) as the uploaded material is usually not interactive and learners are not able to self-regulate. The lack of interactivity of the learning

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materials can lead to an overload on the learners' cognitive load, when they are exposed to new content or complex information (Lange & Costley, 2019), therefore impairing learning. Lack of interactives in e-learning can also affect learner motivation and may make them not put enough effort in gaining mastery of the content.

Learner motivation is seen as of much importance as the performance and capabilities of learners. Low levels or lack of motivation can make learners not put enough effort into learning hence affecting their performance (Li & Moore, 2018). Motivation has been identified as a key learner characteristic that is critical in determining learning success. For instructional designs to be effective therefore, they need to ensure that learners are motivated to invest their mental effort into learning (De Araujo Guerra Grangeia et al., 2016). Those learners who have high motivation have been known to perform better (Hodges, 2004) and are unlikely to drop out of their online or distance classes (Kim & Frick, 2011). Motivation is also instrumental in ensuring that learners put an effort to learn (Li & Keller, 2018) and has been established as a factor that affects learners' cognitive load (Bradford, 2011).

Depending on the nature of instruction and the learning materials learners can experience different levels of cognitive load. According to cognitive load theory, there are three types of cognitive load: intrinsic cognitive load which is related to the nature of the learning material. It is dependent on the complexity of learning materials and the learner's existing knowledge in that particular domain. Extraneous cognitive load, which is related to other things that are not related to learning. It is dependent on the design of the learning environment and learning materials. Extraneous cognitive load can be altered by proper design. The Germane cognitive load which is learning resources the learner needs for learning. It is the load the learners' experience when they get involved in activities such as self-reflection and critical thinking (Sweller, 2011). If learners experience high cognitive loads, their learning can be impaired due to the limitations of our working memory. So for any instructional design, there is a need to reduce extraneous load and increase the germane load while managing the intrinsic load.

Because cognitive load and motivation are important aspects of learning, this study sought to look at the various strategies that have been used to manage cognitive load and enhance motivation in e-learning. The study is aimed to help e-learning instruction designers with a list of strategies that can use in their e-learning initiatives to ensure effective learning.

The study sought to answer the following questions;

1. What strategies have been used in e-learning research to manage cognitive load?
2. What effect did the strategies employed have on cognitive load?
3. What strategies were used to enhance motivation in e-learning?
4. What effect did the strategies have on motivation?

The rest of this chapter is organized as follows: First, we take a look at the theory behind cognitive load and motivation, then we look at the strategies that have been used for managing cognitive load in e-learning and strategies for enhancing motivation. Finally, we give the implication of the study and conclusion.

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