

# Chapter 1

## Designing Multimedia for Improved Student Engagement and Learning: Video Lectures

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### **ABSTRACT**

*Instructional video in flexible education is a critical knowledge dissemination method using multimedia. Video lectures can produce effective learning when instruction is designed with consideration for the limited and transient information processing capacity of working memory to manage concurrent mental processing in both the auditory and visual channels and generate active processing. Using theories of cognition, this study devised an instructional design (ID) framework for video lectures of varying formats and lengths to enhance the experience of novice learners in an undergraduate course during the COVID-19 pandemic. The ID articulated the complexities and nuances in multimedia teaching and learning. A mixed method study obtained participant (n=180) perceptions about their learning experience and engagement. The study concluded that segmented lectures in various formats positively impacted learning and engagement, with the optimal video lecture length being 5-10 minutes. This chapter discusses the ID elements, viewing practices and engagement in multimedia learning.*

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## **INTRODUCTION**

Multimedia is an increasingly critical component in teaching and learning in both higher education and K-12 education (Garrison, 2017), and instructional video in particular has an indispensable role in educational delivery models such as technology enhanced learning in traditional face-to-face classrooms, flipped classrooms (Bates, et al., 2017; Guo, et al., 2014; Mazur, et al., 2015), distributed delivery (Downes, 2017), and more recently hybrid (HyFlex) and blended flexible (BlendFlex) learning (Abdelmalak & Parra, 2016; Chicca, 2021; Keiper, et al., 2020; Miller, et al., 2021).

Instructional videos used for a variety of purposes, including knowledge building, enrichment, and consolidating learning (Alber, 2019), are of varying types and offer a range of benefits. The affordability, accessibility and customisability of instructional video has contributed to its burgeoning uptake globally (Next Thought Studios, 2020). The five most widely used types of instructional video - the micro video (i.e., short instructional video), the tutorial video, the training video, lecture capture, and screencast (Bruner, n.d.), afford teachers and students new possibilities for designing online learning experiences. Instructional videos can be created in different styles, including lecture with narrated slides, talking head (i.e., instructor talking on camera), on location lecture, interview, documentary, visual sketching (i.e., drawing a concept map or diagram), demonstration (e.g., screen capture), and light board video (i.e., doing board work and talking directly to the audience at the same time) (University of Michigan, 2021). Pedagogical benefits of instructional video include improved learner engagement, retention, mastery, metacognition, learner autonomy and differentiation (Kolber, 2019; Next Thought Studios, 2020).

Despite the wide range of purposes, variety in formats, and pedagogical benefits of instructional video, recent studies have found that not all students view the full suite of instructional videos available to them within a course (Hibbert, 2014), students frequently disregard large segments within instructional videos (Guo, 2014), and some instructional videos contribute little to student performance (MacHardy & Pardos, 2015). Analysis of instructional video viewing behaviour of students has revealed some critical insights in relation to viewing practices, namely videos with high numbers of views usually have a direct connection to course assignments or assessments, the average viewing time is four minutes, and most students watch instructional videos on their computer rather than mobile devices (Hibbert, 2014; Schwieger & Ladwig, 2018); Seemiller & Megan, 2017), all of which have implications for designing effective instructional videos. These issues raise concerns about optimum length for instructional videos and instructional strategies for the enhancement of learner engagement.

Although instructional video is pervasive in university teaching and learning, it is not an inherently effective medium for delivering educational content as it places

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