Cues-enabled instructional videos of construction methods and technologies to enhance students' learning

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Abstract:

It is essential for the civil engineering and construction management students in the ACEdepartment to be proficient in construction methods and technologies for their future jobs. The construction methods and technologies include many abstract conceptions and intricate details (Figure 1). Thus it is hard for the students to understand the knowledge through text descriptions or static images. Recent studies showed that instructional videos could improve student learning motivation and further enhance learning outcomes1 . Instructional videos (Figure 1) have been regarded as a practical approach and widely applied to teaching construction methods and technologies. However, students have to memorize and integrate the information appeared in video frames before and after, which might lead to a cognitive load on students.

Cues (e.g., coloring, words, and arrows) are added information that can help improve students' learning through 1) guiding students' attention to specific information and locations, reducing extraneous cognitive load; 2) emphasizing the structure of the information; 3) illuminating relations between and within elements of instructional videos. The cues generally have three forms: text-based cues (i.e., textual cues), picture-based cues (i.e., visual cues), and combined cues. It has been found that adding cues in short instructional videos improves students' learning outcomes in retention tests, transfer tests, and organizing and integrating information. Besides, different forms of cues are found to bring various benefits, e.g., visual cues are found to be better than textual cues in improving learners' transfer tests2.

Adding cues in the instructional videos of the construction methods and technology has a great potential to help improve the students' learning. Therefore, this project aims to apply the cues to improve the video-based teaching and learning of construction methods and technology. It aims to investigate the impacts of various forms of cues in instructional videos on students' learning and further obtain the best way to use cues for fostering and optimizing video-based learning. The project deliverable will be a set of instructional videos of construction methods and technologies added with the best cues.