Rodrigo, M. M. T. et al. (Eds.) (2021). Proceedings of the 29th International Conference on Computers in Education. Asia-Pacific Society for Computers in Education

A Development of Instructional Video for Increasing Learners' Motivation and Content Mastery in Video Learning Environment

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Abstract: Learners learn better when motivated as motivation is the degree of desire to learn new things, to put in more time to study and to discover more about what is being taught. In video learning environment, it implies learners' cooperation with the video in order to gain knowledge from the experience and what video does to stimulate and maintain interest in learners. Considering this issue, careful attention must be paid to the design of instructional video concerning in learners' motivation in enhancing them to stay on task and improve their knowledge and skills. This study, therefore, attempted to design the instructional video model based on Motivational Design Theory, Cognitive Multimedia Learning Theories, and Cognitive Load Theory in order to increase learners' motivation in video learning environment for achieving the learning outcome. The key features of effective techniques used in this model were Multimedia feature, Coherent feature, Contiguity feature, and Engaging feature. Significantly, the result revealed that the proposed instructional video model could increase learners' motivation and understanding of the learning content. Accordingly, the findings of this study could provide an effective model for creating instructional video aiming for maximizing working memory's capacity and increasing learners' motivation in video learning environment.

Keywords: Instructional video, Learners' motivation, Video learning environment, Cognitive multimedia learning theory

1. Introduction

Instructional media has been receiving great attention from teachers and has been utilized in the teaching and learning processes for a long time. Teaching and learning processes have been undergone great revolution due to the advancement in technology that has made education more readily available leading to the improvement of its quality bringing the most relevant and wide range of experiences for learners, especially during the outbreak of global pandemic COVID-19. Both online and blended learning grow in popularity and rely more on technology and instructional media to enhance the academic achievement of learners. Among a variety of instructional media, video is believed to be particularly useful and appropriate for facilitating and stimulating learning experiences and increasing learners' concentration and retention (Hsin & Cigas, 2013).

Nowadays, there exists an abundance of instructional video assisting the teaching and learning processes, and one of the popular methods used for designing instructional video is the use of multimedia software which can interrelate textual descriptions, diagrams, photos, and sounds making it possible to explore the presentation of material under ludic perspectives, counterbalance boredom, and maintain the level of attention (Farani, 2016). However, Mayer (2017) has claimed that most of instructional videos are generally pre-made and designed for the general population without considering individual interests and abilities. Besides, Anderson (2018) has pointed out that designing effective instructional video becomes a major challenge for the majority of teachers since there are various factors affecting the development of learners' competencies, and one of the crucial factors is learners' motivation (Anderson, 2018).

Cook (1991) demonstrates that learners learn better when motivated as motivation is the degree of desire to learn new things, to put in more time to study and to discover more about what is being taught. It implies learners' cooperation with the video in order to gain knowledge from the experience

and what video does to stimulate and maintain interest in learners. Significantly, motivation can be seen as the need for learners to actively engaged in learning enabling them to learn effectively.

Even though some studies related to instructional video were conducted, few studies have investigated the relationship between learners' motivation and their learning achievement in a video learning environment. This study, therefore, would like to conduct a study to fill this gap and the result of this study may fulfil the understanding on learners' motivation and their learning success. Accordingly, this study developed the model for designing an instructional video which was designed based on Motivational Design Theory, Cognitive Multimedia Learning Theories, and Cognitive Load Theory consisting of Multimedia feature, Coherent feature, Contiguity feature, and Engaging features (MCCE Model) aiming to increase motivation in video learning environment for achieving the learning outcome. Besides, the experiment was conducted to examine the effectiveness of the MCCE model with the following research questions:

- Does the MCCE instructional video model increase learners' motivation in video learning environment?
- What is the learners' performance after experiencing the MCCE instructional video model?

2. Related Studies

2.1 Motivational Design Theory

Keller (2016) defines the Motivational Design Theory as "the process of arranging resources and procedures to bring about changes in people's motivation" (p. 5). His theory provides the process approach seeking to increase learner motivation in online learning by incorporating design elements that promote attention, relevance, confidence, and satisfaction. Therefore, this theory is known as ARCS model of motivational design.

The ARCS model describes strategies for stimulating and sustaining motivation in each of the four categories: Attention, Relevance, Confidence, and Satisfaction. Keller (2016) further explains that when these four components of motivation are properly addressed withing learning processes, learners can be motivated a desire to study more and fostered an increased sense of achievement.

2.2 Cognitive Multimedia Learning Theory

Mayer's (2014) Cognitive Multimedia Learning Theory focuses on learners' active cognitive processes in multimedia learning environments assuming that learners use dual channels, visual, and auditory for processing and actively process relevant information and integrated it into their developing system.Accordingly, it is significant to include relevant visual and verbal information to guide learning and not overtax processing in one channel over the other while designing the instructional multimedia.

Cognitive Multimedia Learning Theory consists of many principles informing multimedia design and suggests that meaningful learning arises from active cognitive engagement and processing in selecting, organizing, and integrating relevant information. Accordingly, to design instruction video, using the two channels for information acquisition and processing, a visual or pictorial channel and an auditory or verbal-processing channel, can facilitate the learning, maximize working memory's capacity, and increasing learners' retention in learning.

2.3 Cognitive Load Theory

Cognitive load is one of the crucial factors when creating instructional materials. It is suggested that there are various components of memory related to the achievement of learning. Sweller (1988) explains that our working memory is very limited, for example, sensory memory which is transient in collecting information from the environment. Accordingly, during the learning processes, learners have to be selective about what information from sensory memory should be paid attention for encoding into long-term memory.

Based on Sweller's Cognitive Load Theory (1994), if the cognitive load exceeds learners' processing capacity, they might struggle in completing the learning task successfully. This implies for the design of instruction video that it is crucial to minimize extraneous cognitive load and consider more on germane cognitive load when constructing learning experiences. It is necessary to prompt working memory to accept, process, and send to long-term memory only the most crucial information (Ibrahim et al., 2012).

All in all, the review of related studies helps providing the scholarly framework for this study. The Motivational Design Theory briefly addresses that motivation could be determining factors for the success of online learning, and it should be more learner-centered and independent so that learners have the capacity to control the pace of their learning. Mayer's Cognitive Theory of Multimedia Learning also provides several crucial elements for multimedia learning such as dual coding, cognitive load, and learning processes. Last but not least, Cognitive Load Theory emphasize the relationship between working memory and learning information assisting the understanding on maximizing learners' working memory's capacity

3. MCCE Instructional Video Development

This study attempted to design the instructional video model called MCCE. The goal of this model is to suggest the teachers who would like to design an instructional video that promote an increasing of self-motivation and content-related comprehension in video learning environment. The key features of MCCE model are illustrated in Figure 1.

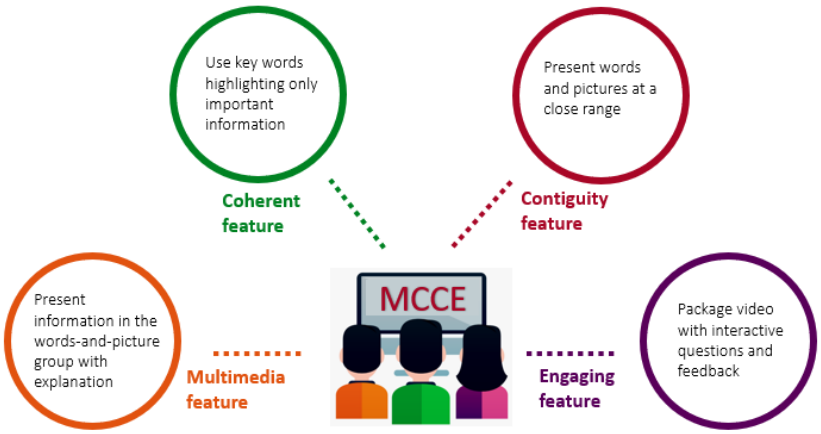

Figure 1. The Features of MCCE Model.

The key features of MCCE model designing for promoting learners' motivation and content-related comprehension are as follows:

- Multimedia feature: learners study more deeply from a video explanation presented in words and pictures rather than in words alone. Besides, learners construct knowledge more effectively when nonverbal and verbal groups of mental representation have connections. The first feature of designing, therefore, should present the information in the words-and-picture group with explanation. Besides, it is significant to present an explanation in images and words at the same time to increase learner's capacity of working memory (Figure 2).
- Coherent feature: learners study better from a video explanation when extraneous information is excluded. Therefore, information presented in the video should focus only on key words highlighting only important information and eliminate complex elements or backgrounds (Figure 2).
- Contiguity feature: learners study better from a video when corresponding words and pictures are presented at a close range rather than from a distance on a screen (Figure 2).
- Engaging feature: learners study better when making a video interactive. Package video with a series of questions and feedback while watching can increase learners' motivation and improve comprehension and memory ((Figure 3).

Figure 2. Illustrative Examples of MCCE Model in Maximizing Working Memory's Capacity.

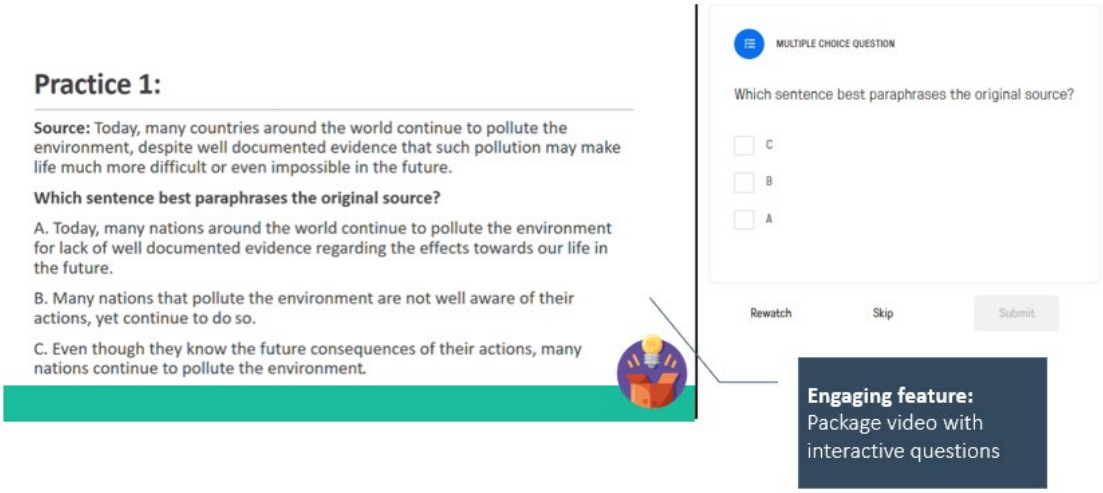

Figure 3. Illustrative Examples of MCCE Model in Increasing Learners' Motivation.

4. Experimental Design

4.1 Participants

In order to examine the effectiveness of the MCCE model in increasing learners' motivation and understanding of the learning content in the video learning environment, this study conducted an experiment with 40 undergraduate students studying in the second year of a university in Thailand. All participants had similar understanding of the learning content, *Paraphrasing Technique*, and they were required to study the videos as the self-study task which was one of the assessments of the course.

There were 7 videos teaching about how to paraphrase covering with Recognizing Plagiarism, When to Paraphrase, Using Synonyms, Changing Sentence Structure, Changing Percentage to Fractions or Ratios, Qualities of a Good Paraphrase, and In-Text Citation. Participants could study the videos independently, and they had 9 weeks to study before doing the test.

4.2 Research Tools

The research instruments used in this study were:

- Keller's Instructional Materials Motivation Survey (IMMS) was used to measure learners' motivation in the video learning environment. This survey was the short version of IMMS which was modified by Heo and Han (2011). It is a 20-item survey with a Likert-type scale asking participants about each component of motivation (Attention, Relevance, Confidence, and Satisfaction) and the external motivation asking about flexibility and interaction. The IMMS survey also yielded a high reliability coefficient (Cronbach's alpha = .92).
- Pretest and Posttest were designed in parallel to examine the understanding of the learning content, Paraphrasing Technique. Accordingly, the aim of the test was to evaluate participants' paraphrasing ability. Each test was composed of 5 questions asking participants to paraphrase the source materials (total score = 20). Two professors related to the filed reviewed the test to check whether questions corresponded to learning objectives, so that the content validity of Pretest and Posttest was ensured.

5. Results

5.1 Learners' Motivation

Table 1. *Learners' Motivation After Experiencing the MCCE Video*

n	M	SD	Maximum	Minimum
40	79.02	7.63	94	60

According to Table 1, learners seemed very motivated when learning from the MCCE instructional videos model. Besides, their feedback indicated that learners had high motivation and positive attitudes towards the video designed by MCCE model. The interactive questions and instant feedback were highly satisfied with the model to increase learners' motivation and retention in learning as shown in Table 2.

Table 2. *Qualitative Feedback towards the MCCE Video*

Category	Feedback
Attention	• Using key words and nice pictures helped keep my attention on the lessons. • It was pleasure to study such a well-designed video, nice, easy to follow, and eye-catching. • There were many interesting techniques that helped me remember and understand the content.
Relevance	• The lessons from the videos were useful for me. • What I learned from the videos helped me understand more about the content in the class. • I could review what I could not follow in class from the videos, and it helped me get high scores in the test.
Confidence & Satisfaction	• After studying the videos, I felt more confident that I would be able to pass the course. • The feedback after the exercises helped me understand more what is right or wrong. • I prefer the interactive questions and explanation after the exercises as it helped me know how well I have done.
Flexibility & Self-regulation	• It is convenience to study from the videos as I can pause or rewind any time I want. • I felt nervous every time I study with the teacher in class, especially when I could not answer the questions, so watching and doing exercises from the videos work for me because it reduced my stress, and I can watch it over and over.

5.2 Learners' Paraphrasing Ability

Apart from examining the learners' motivation, this study investigated the effects of the MCCE instructional video model on learners' comprehension about the learning content, *Paraphrasing Technique*, by evaluating learners' performance in paraphrasing the source materials. A paired samples *t*-test was used to compare the pretest and posttest mean score of the participants. As shown in Table 3, the results revealed that learners' posttest mean scores was significantly higher than the pretest mean score meaning that learner ability in paraphrasing source materials was improved after studying from the MCCE instructional video model (t = -14.03, p = .00). This indicated that the MCCE instructional video model could help learners increase their understanding about the learning content.

Table 3. *Learners' Pretest and Posttest Results*

Test	n	$\bar{x}$	SD	Mean Difference	t	*p*
Pretest	40	8.26	1.72	6.37	-14.03	.00*
Posttest	40	14.63	2.05			

***p < .05

Based on the result of this study, it can be stated that giving learners opportunity to study actively with the subject matter and supporting them during video viewing with explanation and feedback could effectively increase learners' motivation in learning. Besides, the highly visual presentation with audio explanation is regards as the most important features for maximizing working memory in the instructional video. Consequently, to design the instructional video, the use of the four proposed features were noticed to be an effective property of the design process.

6. Conclusion and Discussion

This study proposed the MCCE model for designing the instructional video which can be used both in online and blended learning, and the goals of this model are to promote learners' motivation and comprehension of the learning content. The key features of effective techniques used in this model are the techniques of maximizing working memory's capacity and increasing learners' retention in learning consisting of Multimedia feature, Coherent feature, Contiguity feature, and Engaging feature. According to the experiment result, it confirmed that the MCCE instructional video model could increase learners' motivation and comprehension of the learning content.

This result was supported by the cognitive theory of multimedia learning building on the cognitive load theory describing that the utility of the video lessons can be maximized by using both the verbal and visual channel to convey information and highlight features that should be processed in working memory. This way could enhance the germane cognitive load of a learning experience and increase learners' retention and ability to transfer information (Mayer, 2014). Another lens through which to consider in creating instructional video is promoting cognitive activity during video viewing. As mentioned by Keller (2016), watching a video can be a passive experience; therefore, engaging learners in video learning by promoting active learning activities can maximize their attention and motivation to instructional video.

Even though the MCCE model serves as a proof of feasibility of the design-oriented research, one of the limitations of this study was the limited participants that were only 40 learners, and the participants had limited diversity as the researcher collected the data from the learners who studied in the same major which may make the result of this study less generalizable. Consequently, larger scale studies are needed if claims are to be made about the viability of the model in wider contexts. Besides, this study adopted the action research approach, so the researcher's own discipline and teaching area were chosen so that the study has focused on the language studies students who were completing a specific module of study.Therefore, a wider study with a more diverse range of students from alternative subject disciplines may yield different results and experiences.

Acknowledgements

The researcher would like to extend my heartfelt gratitude to my colleagues at MFU Learning Innovation Institute for research paper preparation and consultation. Their help, support, advice, and guidance were immensely important throughout this process. Also, I am sincerely grateful Mae Fah Luang University for the research support.

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