Evaluating the Efficacy of Digital Design Platform in Improving Public Speaking Proficiencies

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Abstract: *In the wake of COVID-19, educational institutions worldwide rapidly shifted from traditional in-person instruction to fully virtual or hybrid classrooms. This study investigates the role of multimedia design guided by the Cognitive Theory of Multimedia Learning (CTML) in enhancing student engagement within an online Public Speaking course at UiTM Sarawak, Malaysia. Specifically, three CTML components are examined: video animation, video organization, and working memory overload. A purposive sampling approach yielded 103 student participants, representing an 80.62% response rate. Data was collected via a structured questionnaire comprising 22 items adapted from established CTML and engagement scales. Descriptive and inferential statistics, including Pearson's correlation and multiple regression, were employed to analyse the relationships between the CTML factors and student cognitive engagement. The findings demonstrate that video organization (r = .722) exhibits the strongest positive correlation with cognitive engagement, followed closely by video animation (r = .703). Working memory overload (r = .698) also shows a moderate yet significant positive relationship with student engagement. Regression results further identify video organization as the most influential predictor (β = .335, p < .05), underscoring the critical importance of logical structuring and coherent flow in multimedia-based instructional materials. These results suggest that thoughtfully crafted video*

content particularly when supported by online design tools such as Canva can reduce extraneous load, improve information retention, and foster deeper engagement. Consequently, educators are encouraged to integrate well-organised animations, visual cues, and measured pacing into their online teaching practice. Future research should explore the long-term effectiveness of such multimedia interventions and extend investigations to various academic disciplines.

Keywords: *Cognitive Theory of Multimedia Learning, Cognitive Engagement, Online Distance Learning, Graphic Design Online Tool, Canva*

1.0 INTRODUCTION

Educational institutions, including universities and schools, are obligated to comply with the decision made by the government on movement controls even after the rise and subdued of Covid-19. When it comes to assisting teachers in delivering courses in a safe atmosphere from the comfort of their own homes via a virtual platform, technology is a seamless tool. Despite this, problems emerged, such as the unequal distribution of technology capabilities and the poor quality of the digital content of educational materials (Muflihin et al., 2024; Razak, 2021). Therefore, universities in Malaysia, such as Universiti Malaya, Universiti Sains Malaysia, and Universiti Teknologi MARA, have adopted fully virtual asynchronous and synchronous learning styles. This is in addition to changes in the educational landscape that have been brought about by the pandemic and technological advancements in Malaysia (Valmay et al., 2024; Razak, 2021 & Chin, 2020).

Seeing that it was difficult to use only online learning platforms, it is more important for educators to use other educational tools. Some examples of these tools include gamified online quiz platforms such as Quizziz or Kahoot, online video conferencing platforms such as Zoom (Mikhailov et al., 2024; Kristof, 2020; Stafford, 2020), and social media online video-sharing and hosting platforms such as YouTube (Gill et al., 2020). In spite of the fact that technological advancements are beneficial to educators in the process of teaching and learning, educators must also take into consideration the instructional learning approaches in order to maximise the potential, independence, and interests of their students. Guilmette et al.

(2019), King, McQuarrie, and Brigham (2021), and Satriani et al. (2022) are the referenced authors. For the purpose of illustration, the most important aspect of adopting asynchronous learning mode for online distance learning (ODL) at Universiti Teknologi MARA (UiTM) Sarawak is the process of developing excellent instructional learning environments.

Using a fully online learning strategy to instruct students in public speaking is a somewhat uncommon practice. Due to the fact that students in the Public Speaking course have expressed concerns about enrolling in online public speaking, the instructors have been forced to take into consideration any lingering problems with the idea and design of the course (Allen, 2006; Corum, 2013; Hunt, 2012; Teng & Wang, 2021). Learning through the course is intended to be delivered in a manner that is analogous to that of a traditional classroom setting. On the other hand, it would prevent the implementation of strategies that would successfully adapt the pedagogy and content to a digital setting (AlAli et al., 2024; Schwartzman, 2007; Liu & Elms, 2019; Bond et al., 2020). According to Valentini et al. (2001) and, Robinson and Hullinger (2008), the internet, the web, and educational technology have all contributed to the transformation of education. Other stakeholders in education, such as students, teachers, and institutions, have also played a role in this transformation. According to Pallof and Pratt (2001), the efficacy of online learning is primarily measured by the way it achieves learning outcomes, which include student grades, attitudes, and the degree to which students are satisfied with online learning. It is also essential to evaluate the quality of the learning experience based on the student and the level of students' involvement, which is defined as the extent to which students make an effort to read about a topic, practise, and find solutions to issues (Kuh, 2003).

Without a proper multimedia instructional design, even the full capabilities and user-friendly interface of video meetings could not be implemented, particularly in the context of distance learning (Stafford, 2020; Knoster, 2021). There is no significant difference in the performance outcomes of students when they receive their education either in-person or online. In addition, the utilisation of multimedia in the classroom has proven to be an essential component in enhancing student engagement, strengthening instructional methodologies, and ultimately enhancing student outcomes (Allen et al., 2016) However, attitudes regarding the level of success

that may be achieved through online learning have recently shifted. As a consequence of this, the teaching staff continues to be cautious regarding the efficacy of online learning in terms of providing high-quality educational experiences (Allen, Seaman, Poulin, & Straut, 2016; Manu et al., 2021).

The purpose of this research is to investigate the ways in which successful multimedia design can be included into the construction of video-based learning through the utilisation of online graphic design tools such as Canva for educational technology. Canva.com online design tool and Cognitive Theory Multimedia Learning (Mayer, 2001) were employed in order to ascertain which multimedia aspects university instructors may utilise in order to construct their video-based learning.

2.0 LITERATURE REVIEW

Online graphic design tool is utilised as a component of a project in order to facilitate the creation of a live multimedia learning experience. The term "student engagement" refers to the "cognitive, emotional, and behavioural effort students put into a course, as assessed by their time, involvement, feelings, and communication with instructors and peers" (Dixson, 2015). This definition was provided by the Department of Education. The social contact that occurs between teachers and pupils, which is fostered by the presence of teachers in the classroom, ultimately results in the formation of a rich and meaningful sense of community within the classroom. According to Bowers and Kumar (2015), the results are an increase in employee engagement and a decrease in employee turnover. Richard E. Mayer and other cognitive researchers collaborated to develop instructional technology for learning, with a particular focus on the ways in which multimedia might improve the learning process. When the artist or instructor constructs internal representations using words and visuals, this is an example of multimedia learning. An application of the theory is made to the problem of organising educational practices that involve multimedia and employing more effective cognitive strategies in order to support successful learning. The strategies suggested are as follows: (1) selecting relevant words for the processing of verbal working memory; (2) selecting relevant pictures for the processing of visual working memory; (3) organising the selected words into a verbal model; (4) organising the selected pictures into a pictorial model; and (5) integrating the verbal and pictorial representations with each other and with prior knowledge.

It is possible for instructors to express both verbal and nonverbal instructor immediacy behaviours with the assistance of video technology. Borup et al. (2011), Griffiths and Graham (2009), and Collins et al. (2019) agree that the use of this technology is extremely important for shaping the perceptions that students have of the social presence of their academic teachers. The interaction between students and teachers is considered by Collins et al. (2019) to be the most significant kind of engagement in online learning. This is because it helps to maintain students' interest in the material being taught. Increasing the social presence of instructors and the level of student involvement in online classrooms can be accomplished through the utilisation of asynchronous video, which is an effective method that is made possible by technological advancements that allow for enhanced communication.

According to Dilani and Arezou (2018) and Ng et al. (2022), the level of maturity is currently increasing as a result of technological innovation. The next stage for instructors is to choose appropriate educational resources for their students to use. Researchers are going to make use of Canva media for their educational purposes. In order to make studying public speaking more appealing and effective, the use of this tool is intended to accomplish this purpose. That Canva has the potential to be used as a multimedia learning tool is the innovative element of the program. According to Desai and Kulkarni's (2022) theory, learning media, in particular online learning, are designed and deployed to enhance subject matter appeal and boost student involvement in their studies. The process of learning using Canva would be consistent with this idea. The content that was generated is quite appropriate and assists both teachers and pupils in carrying out their educational responsibilities.

In addition, Canva may be utilised for the creation of graphics and content for social media platforms, including logos, posters, and advertising banners (Kartiwi and Rostikawati, 2022). Canva is a web-based design tool that allows users to create a wide variety of designs that are visually beautiful or useful. The adaptability and depth of Canva's benefits are demonstrated by the versatility. There are a variety of elements that may be utilised in Canva, including but not limited to graphics, posters, presentations, flyers, and brochures. By registering with Canva, customers are able to establish a connection with Google Mail prior to selecting and creating designs.

Immediately following the addition of content by users, the design can be downloaded and distributed. Canva is an application that can assist users in developing their creative abilities when it comes to the creation of articles, presentations, and posters. images and pictures. The Canva design program was used to produce all of the instructional materials that are utilised in this study.

According to Oh et al. (2022), audio or pictorial animation calls for a wide variety of technical abilities as well as collaboration in order to produce a product that is of sufficient quality. The cognitive abilities of students are only able to capture one facet of their whole learning experience, and that is the outcome. Over the course of the past few years, there has been a substantial and remarkable shift in the educational experience that animation students in higher education have. According to Oh et al. (2022) and, Liu and Elms (2019), all that is required for students to have a positive learning experience is for the learning process to be fascinating, enjoyable, and straightforward for them. As a consequence of this, it is important to point out that the design of an animated video plays a key part in catching the interest and attention of pupils. According to Theobald (2017), Allcoat and von Muhlenen (2018), and Liu et al. (2019), the most effective hooks for engaging student attention and improving viewer satisfaction are character design, dialogue scripting, and voice acting. Therefore, the first hypothesis can be proposed as:

H1: Animation in instructional video-based learning can significantly influence student engagement

A multidimensional construct would indicate the burden that doing a given task exerts on the students' cognitive students' cognitive systems (Pass & Van Merrenboer, 1994). The working memory must process the cognitive load associated with a particular instructional message (Sweller et al.,2011) There are three different types of cognitive load namely germane load, extraneous burden, and intrinsic load. Regardless of how the learning challenge is presented, intrinsic load represents the native complexity of the

learning task (Sweller et al., 2011). The instructional message and learning task are the only external workloads that students must deal with since they must exert effort to complete the assignments they have been given. Hence, the second hypothesis can be proposed as:

H2: Organization Load Instructional Video-based Learning can significantly influence student engagement

Working memory would manipulate knowledge in active consciousness. Working memory inputs received from sensory and transform to a concrete pictorial and verbal representation. However, the capacity of remembering one piece in human's is limited and divided approximately to seven segments (Mayer & Pilegard, 2018). When students' working memory is cognitively overwhelmed with unnecessary information, the students are unable to pay attention to specific pieces of information that have been presented. In the CTML perspective, students' selection, organisation and integration of novel information. Thus, it constitutes the causal mechanisms through which learning exists, able to make sense of new information and finally promoting learning engagement. Similarly based on previous research exploring the impacts of prior knowledge of instructional learning contents inhibits the learning enhancement (Mayer & Pilegard, 2018). The third hypothesis can be proposed as:

H3: Working Memory Overload in Instructional Video-based Learning can significantly influence student engagement
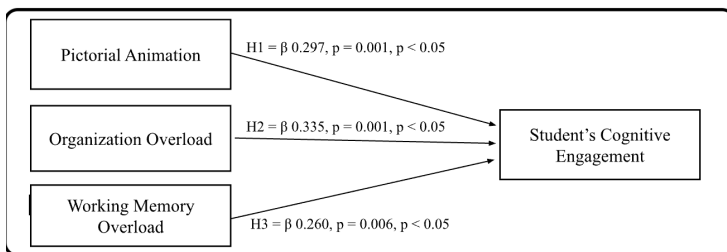

Figure 1: Conceptual Model adapted from Knoster (2021)

3.0 METHODOLOGY

This study was guided by the Cognitive Theory of Multimedia Learning (CTML) to examine how specific multimedia elements namely pictorial animation, organizational load, and working memory overload impact student engagement in an online Public Speaking course offered at UiTM Sarawak, Kota Samarahan, Malaysia. The CTML framework, which emphasizes the effective integration of visual and auditory information to facilitate knowledge acquisition while minimizing unnecessary cognitive demands, served as the theoretical underpinning for the research design and instrument development. Data for this study were gathered through a cross-sectional survey. The population comprised 129 students enrolled in the targeted Public Speaking course. A purposive sampling approach was used to focus on those students currently taking or retaking the course, as they were deemed most likely to offer relevant insights into their learning experiences. Out of the 129 students invited to participate, 104 valid responses were obtained, yielding an 80.62% response rate. According to Fincham (2008), such a high response rate is considered significant in survey research, enhancing the generalizability of the findings within this specific instructional context.

A structured questionnaire was developed to capture the constructs of interest. Building on prior studies by Knoster (2021) and Liu and Elms (2019), the instrument was designed to measure three core elements aligned with CTML principles. The student engagement component was informed by Reeve and Tseng's (2011) conceptualization of "agency," which highlights cognitive, emotional, and behavioral dimensions of active participation in learning.

By incorporating insights from established literature, the questionnaire ensured content validity and theoretical coherence.

The questionnaire featured multiple items for each construct, using a five-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5). For instance, items related to pictorial animation examined how often students perceived animations, graphics, and voiceovers to be engaging

or helpful; items on organizational load assessed whether the instructional content was logically structured and easy to follow; and items on working memory overload explored whether students felt overwhelmed by the amount of information presented at one time. The section on student engagement included prompts that probed how well students could focus, relate new information to prior knowledge, and remain motivated throughout the learning process.

Data collection was conducted online, ensuring that all students had convenient access to the survey via their course platform. Students were informed about the research objectives, assured of the confidentiality and anonymity of their responses, and given the freedom to withdraw at any stage without penalty. These measures complied with ethical standards for research involving human participants, safeguarding the integrity and voluntariness of the data collection process.

Once the surveys were completed, data were subjected to several statistical analyses. First, descriptive statistics were calculated to summarize demographic details and the overall response patterns for each variable. Means and standard deviations were examined to gain an initial understanding of how students rated the different dimensions of pictorial animation, organizational load, working memory overload, and engagement. Next, reliability analyses were performed to ensure the internal consistency of the survey scales. Following the guidelines by Nunnally (1978) and Sekaran and Bougie (2010), Cronbach's alpha values of .70 or higher were taken to indicate acceptable reliability. All variables in this study exceeded this threshold, confirming that the questionnaire items consistently measured the intended constructs.

With reliability verified, Pearson's correlation analyses were conducted to explore the strength and direction of the relationships among the independent variables (pictorial animation, organizational load, and working memory overload) and the dependent variable (student engagement). This step provided insight into whether greater emphasis on visual animation, better organization, or reduced cognitive burden corresponded to higher engagement levels. Finally, multiple regression analysis was performed to

determine the unique contributions of each independent variable to student engagement, controlling for the influence of the others. This approach helped isolate which factors had the strongest predictive power regarding student engagement in the online Public Speaking course.

By grounding each stage of the research process in the CTML framework, this study effectively integrates theoretical perspectives on how visual and verbal information should be presented to optimize learning. The deliberate focus on organizational load and working memory constraints aligns with Mayer's (2001) contention that multimedia design plays a critical role in shaping cognitive processes. Consequently, this methodology affords a comprehensive view of how carefully structured multimedia materials incorporating targeted animations, coherent organization, and well-managed information flow may enhance learning outcomes and student engagement in virtual academic settings.

4.0 FINDINGS AND DISCUSSION

Purposive sampling was used to determine the population size. Descriptive analysis has been conducted and indicated 103 respondents answered the survey. Around 97.1% (100 respondents) took the Public Speaking course and only 2.9% (3 respondents) repeated the course in the previous semester. The analysis proceeded with gaining more insight into the identification of the study by 103 respondents through descriptive analyses of all the items. Five-point Likert scale was used in this study with 1 = Strongly Disagree, 2 = Disagree, 3 = Disagree, 4 = Agree and 5 = Strongly Agree. The highest mean value with a mean score of 1.03 and the standard deviation is 0.169.

Factor	Measurement Item
Pictorial Animation	1) Voice acting – I was able to concentrate when there is a voice explaining the lesson to me in this instructional video. 2) Picture – The use of pictures in this instructional video makes my learning more enjoyable. 3) Text colour – The use of text colour in the instructional video is interesting. 4) Visual cue and graphic – I find the visual cue, transition and graphic use in this instructional video make my learning more interesting.
	5) Music – I find the music background in the instructional video makes my lesson more enjoyable. 6) Background or set design – Overall I find the instructional video helpful to my learning.
Organization Overload	7) I was able to organize the material presented in this instructional video in a logical manner. 8) I could connect the ideas from this instructional video to one another in a coherent fashion. 9) I understood the relationships between the various parts of this subject. 10) I had the ability to logically model concepts from this lesson as they applied to one another. 11) I understand how the various parts of this lesson worked jointly to form the ideas I was learning.
Working Memory Overload	12) The amount of information presented in the instructional video lesson was tolerable. 13) I don't have a hard time keeping up when watching the instructional video because the transitions are reasonable. 14) I felt comforted trying to keep up with the amount of information presented in this instructional video-based learning. 15) This instructional video-based learning made me feel calm because of the amount of information I was asked to learn all at one time.

Cognitive Engagement	16) I find the animated instructional video-based learning is interesting to watch.
	17) I enjoy watching the animated instructional video-based learning for Public Speaking's online class.
	18) The animated instructional video-based learning for Public Speaking's online class grasps my attention and helps me concentrate.
	19) I try to relate what I'm learning from public speaking's instructional video to what I already know.
	20) When I am working on task assessment for Public Speaking, I try to connect what I had learned from the instructional video with my own experiences.
	21) I try to make all different ideas fit together and make sense after watching the instructional video.
	22) Overall, I find the instructional video able to help me understand the topic's concept.

Table 1: Cognitive Theory Multimedia Learning & Cognitive Engagement Measurements.

The reliability of scales depicts the scales are free from random error and have high internal consistency. Nunnaly (1978) and Sekaran and Bougie (2010) recommended a minimum level of .700 of Cronbach alpha values and above is considered greater reliability. In the current study, the Cronbach alpha coefficient of all variables is above .700 which is between .798 to .881 respectively.

Variables	No. of items	Cronbach's alpha
		Reliability Analysis (n=103)
Independent Variables		
Video Animation	6	.798
Video Organization	5	.881
Video Memory Overload	4	.844
Dependent Variables		
Student Cognitive Engagement	7	.873

Table 2: Reliability Analysis

Pearson Product-Moment Correlation Coefficient was used to assess the strength and direction of between independent variables (Video Animation, Video Organization, Video Memory Overload) and dependent variables (Cognitive Engagement). The reliability of the instrument was determined by the Cronbach's Alpha value from Hair et. al. (2020). Based on the table above, Video animation (r=.703, n=103, p<.0005) and Video organization (r=.722, n=103, p<.0005) have a high and positive correlation toward Cognitive Engagement. However, Video Memory Overload (r=.698, n=103, p<.0005) has a moderate and positive correlation toward Cognitive Engagement.

Variable		Student Cognitive Engagement
Video Animation	Pearson Correlation	.703**
	Sig. (2-tailed)	0.000
	N	103
Video Organization	Pearson Correlation	.722**
	Sig. (2-tailed)	0.000
	N	103
Video Memory Overload	Pearson Correlation	.698**
	Sig. (2-tailed)	0.000
	N	103

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3: Pearson Correlation

The result depicts that Video Organization has the highest beta coefficient with the value of β 0.335 (p=0.001, p<0.05). Video Organization has the strongest and unique contribution toward Cognitive Engagement when the variance supported by all other independent variables in the model is controlled for. This is followed by other variables such as Video Animation (β 0.297, p=0.001, p<0.05) and Video Memory Overload (β .0.260, p=0.006, p<0.05). The overall finding shows that three independent predictors (Video

Organization, Video Animation and Video Memory Overload) are indicated as unique, statistically significant and best contribute to the prediction of the dependent variable (Cognitive Engagement). The findings of the study by Nives and Tomislava (2020) corroborate this, showing that learning media created through the application of Canva are well-suited for usage in education, especially in the online learning setting.

Coefficients[a]					
Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig**
	B	**Std. Error**	**Beta**		
1 (Constant)	1.275	0.945		1.349	0.180
Video Animation	0.346	0.106	0.297	3.273	0.001
Video Organization	0.453	0.127	0.335	3.577	0.001
Video Memory Overload	0.385	0.137	0.260	2.804	0.006

Table 4: Dependent Variable (Student's Cognitive Engagement)

5.0 CONCLUSION

This study examined the impact of a graphic design online tool, Canva, on student engagement in a public speaking course through the lens of the Cognitive Theory of Multimedia Learning (CTML). The findings reveal that Canva can significantly enhance students' cognitive, emotional, and behavioral engagement, validating the potential of multimedia tools in educational settings. Specifically, video animation, organization, and working memory load were found to be pivotal in influencing student engagement levels, with organized multimedia design showing the strongest impact on students' cognitive involvement. This aligns with the CTML framework, suggesting that well-structured multimedia content can optimize students' cognitive resources by helping them effectively process information.

The analysis underscores the importance of balancing multimedia elements such as animations and visual aids in educational content to avoid cognitive overload. Tools like Canva offer diverse design features that aid instructors in creating engaging, visually appealing instructional materials, thereby fostering a conducive learning environment. By enhancing organization and minimizing extraneous load, these tools improve the ability of students to retain and synthesize information effectively. Video organization, in particular, was found to be crucial, as it allows for a logical flow that aids in comprehension and memory retention, which directly contributes to higher cognitive engagement.

Overall, this study supports the integration of multimedia design tools into classroom settings to enrich learning experiences and enhance engagement, especially in courses where visual communication plays a key role. Future researches could explore the long-term effects of such tools on student learning outcomes and expand the scope to different academic disciplines. By leveraging multimedia technology, educators can better align instructional methods with cognitive learning processes, ultimately improving student learning and engagement.

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8.0 AUTHORS' CONTRIBUTION

All authors offered valuable feedback and contributed to shaping the research, analysis, and manuscript.

9.0 CONFLICT OF INTEREST DECLARATION

We certify that the article is the Authors' and Co-Authors' original work. The article has not received prior publication and is not under consideration for publication elsewhere. This research/manuscript has not been submitted for publication, nor has it been published in whole or in part elsewhere. We testify to the fact that all Authors have contributed significantly to the work, validity and legitimacy of the data and its interpretation for submission to IJELHE.

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