

The Study of Correlation between Affective and Cognitive Response on Educational Video Mobile-Learning

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Abstract

This paper studies the correlation between affective and cognitive response from students toward educational video mobile-learning. In theory, the engagement experience on educational video can be heightened with the availability of time point feature on YouTube because of user control and the benefits of flexibility in learning. However, the time point feature is only accessible for desktop and laptop users, whereas the feature is inoperative for smartphone users. Hence, a prototype of interactive video mobile-learning, Pocket IVML apps, was developed as an alternative video mobile-learning with cue point feature to examine the possibility of a correlation between the affective and cognitive response among students. Three different production styles of educational video mobile-learning were involved in the experiment; non-linear video with visual effects (interactive video mobile-learning), linear video with visual effects (green screen) and linear video with no visual effects (screencast). The data extracted from affective and cognitive response was then analyzed using Pearson's r and Scatter Plots to measure the bonding between affective and cognitive variables. The study results show the possibility of a relationship between the affective and cognitive responses elicited from video production style.

Keywords: Educational Videos, Production Style, Affective and Cognitive Correlation, Mobile-Learning.

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I. INTRODUCTION

An educational video is audio-visual information, a medium that applies the edutainment concept in every teaching and learning activity. A video mobile-learning is one of the alternative tools which can cause an imperative implication on learners' affective and cognitive values. Mobile-learning invests the quality of flexibility in learning with the benefits baseline of anywhere anytime, inspires autonomy in learners through the learning experience, motivation, and self-learning. Despite that, the mobile-learning is still a new exercise and rarely utilized in teaching and learning practice [8]. Furthermore, researchers are concerned about the lack of teaching and learning quality in video design for the current educational

video. The needs of in-novation in the educational video are important as scarce researches were conducted on affective and cognitive value of learners that bases with educational video [7].

The learning approach via educational video or video-based learning could improve learning results and satisfaction [1]. Hypothetically, teaching and learning using creative video design as the delivery mechanism, for instance implementing the cue point feature relatable to video contents and the visual aesthetics on video interface, can increase affective and cognitive receptions among students more than the non-creative video design. Based on the Kaltura's survey, it is reported about 97% of participants around the world agreed that in the future, interactive video may become important to education [6].

The time point feature enhances the interactivity of a current linear video. The feature is already available on YouTube website and can be accessed for a desktop computer and laptop users. Unfortunately, the feature does not yet extend to YouTube mobile in which deters the idea of flexibility in learning concept among the smartphone users. Thus, an initiative mobile application, interactive video mobile-learning (IVML) prototype with a cue point feature for a mobile-learning plat-form was developed to measure the correlation between affective and cognitive response.

The motivation for this experimental investigation is because of the scarce re-researches with a practical experiment conducted on educational video for mobile-learning. There are many articles related to the educational video can be found, how-ever, only a few with an experimental investigation was executed whereas more researches are bound to theoretical and empirical concepts [9]. A study should be conducted on factors embedded with learning quality which is important in order to create tools that could assist self-directed learning among learners [4]. The engagement, cognitive load, and active learning are the elements recommended in video design implementation [3]. On the other hand, the pedagogy goal and learning out-comes are attainable with the help of visual aesthetics on a video [11]. Although, the visual aesthetics and production value could affect the pedagogical objectives, yet they are bound to production styles [5]. Not to mention, overused or oversimplicity of special video effects and transitions are part of the weakness in video evaluation [2]. Nonetheless, the video composition could elicit the specific engagement or intellectual response from viewers [10]. Despite thereof, the relationship between the engagement (affective) and learning process (cognitive) elicited from the production style of a video mobile-learning are abstractly unclear.

Thus, this study will investigate the correlation between affective and cognitive responses among learners based on three production styles, non-linear video with visual effects (interactive video

mobile-learning), linear video with visual effects (green screen) and linear video with no visual effects (screencast). The objective of exploratory on the correlation between affective and cognitive response derived from educational video mobile-learning is to understand the probable existence of a significant relationship between the affective and cognitive response prompted from using the educational video mobile-learning.

II. METHODOLOGY

A. Research Samples

Submit your manuscript electronically for review. The study experiment was conducted with one hundred and fifty respondents wherein all are students from college and university. Three production styles of the educational video were used on the respondents involved to test the probable correlation between affective and cognitive values. In accordance with the three different production styles embodied by their respective product samples, the target respondents were divided into three groups: Group A consists of fifty students with Product A: Pocket IVML (Non-Linear Video with Visual Effects) sample, Group B consists of fifty students with Product B: Green Screen (Linear Video with Visual Effects) sample and Group C consists of fifty students with Product C: Screencast (Linear Video with No Visual Effects) sample. Fig. 1 shows the sample of Product A: Pocket IVML (Non-Linear Video with Visual Effects).



Fig. 1. Product Sample of Pocket IVML Prototype Beta Test for Android platform (.apk format).

The IVML prototype conceptual idea is based on the baseline purpose of embedding the cue point feature for mobile-learning as an alternative source to enable the idea of flexibility in learning. The IVML prototype is a collective idea of interactive mobile-learning (IML), teaching and learning (T&L) and a video as a starting point to the new direction of interactive video mobile-learning (IVML).

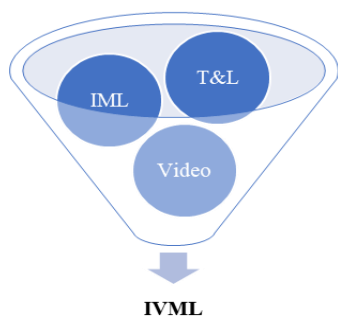


Fig. 2. New Direction of Interactive Video Mobile-Learning (IVML).

A questionnaire was developed and distributed to respondents during a class session. Respondents were required to rate their feelings from 1 to 5 in the given questionnaire after they have utilized the assigned educational video samples. The aim is to collect the affective value data based on their feeling's reaction toward the product samples. Respondents were also required to answer the multiple-choice quiz to measure their cognitive performance in digesting the information retrieved from these three product samples.

B. Research Framework

When you submit your final version, after your paper has been accepted, prepare it in two-column format, including figures and tables. A framework was designed to visualize the measurement process of affective and cognitive responses derived from the production styles. Fig. 2 shows the correlation strength verification design framework between the affective and cognitive values based on teaching and learning (T&L) video quality by using Pearson's r and Scatter Plots analytical technique. The aim is to examine the probable existence of the relationship

between affective and cognitive values by measuring the strength correlation form between the two variables, affective and cognitive value. The Pearson's t and Scatter Plots then will determine whether if there is any significant value to help justify their interdependent bonding relationship.

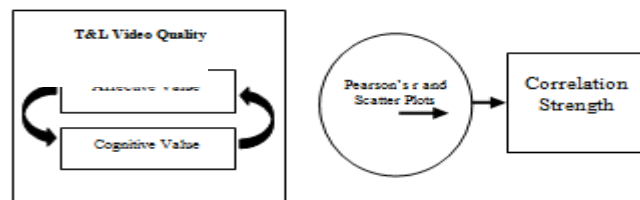


Fig. 3. Correlation Strength Evaluation Treatment Framework.

The Pearson's r and Scatter Plots is an analysis method that can help to determine the bonding relationship between affective (human emotions) and cognitive (intellectuality) as the variables in a production style. The Pearson's r and Scatter Plots will measure the correlation strength and verify the presence of a relationship between the two variables. The data for affective value was derived from a questionnaire with a rating scale between the range of 1 to 5 level. The affective value data was obtained from the feelings measurement by using the Kansei Engineering approach. The cognitive value data is based on the passing rate performance compiled from a follow-up quiz. Both data retrieved from affective and cognitive response were then analyzed using the Bivariate Correlations statistic package. According to the Pearson's r explanatory statement, when r is close to 1 means the relationship between the variables is strong and when the r is close to 0 means the relationship between the variables is weak. Denoting to the Scatter Plots graph, when the dots are clustered together, and a virtual straight line can be seen as if the dots are forming a line going upward from zero, the graph signifies a strong and positive correlation between the two variables.

III. HYPHOTHESIS RESULTS

A. Supporting the Hypotheses using Pearson's r

The mean value obtained from affective domain and the mean value derived from the cognitive domain for each production style was compiled and analyzed. By using the Bivariate Correlations analysis, Pearson's r in Table 1 shows the correlation strength between affective and cognitive responses obtained from all three production styles in the experiment. Product A: Pocket IVML (non-linear video with visual effects), Product B: Green Screen (linear video with visual effects) and Product C: Screencast (linear video with no visual effects).

The Pearson Correlation is the *r* value and if the *r* value is positive, this explains that the correlation between the affective and cognitive is in a positive correlation. Referring to Table 1, the *r* value is 0.088 which is close to 0 and extensively far from 1, thus statistically confirms that the bonding between affective and cognitive for all production styles combined is weak. However, the *r* value = 0.088 is a positive value which explains the condition of correlation, whereby, if the affective value increases, in small chances it may still probable to influence the cognitive value to increase as well. Even so, the *sig. (2-tailed)* = 0.284 as shown in Table 1 here is exceeded the standard amount of 0.05 *sig. value*, thus deflected the mean condition of affective capability to influence the cognitive response.

Therefore, the Pearson's *r* results in Table 1 confirm the lack of strength in interdependent relationship between affective and cognitive values for the three production styles, Product A: Pocket IVML (non-linear video with visual effects), Product B: Green Screen (linear video with visual effects) and Product C: Screencast (linear video with no visual effects).

The cue point production style such as Product A: Pocket IVML (non-linear video with visual effects) is also unable to form a correlation between affective and cognitive values. Although the cue point feature embedded in Pocket IVML is able to generate more positive feelings and good passing rates when

compared to the other samples, yet still the interdependent bond between these two variables is negative.

Referring to Table 2, the *r* value is -0.077 which is close to 0 and extensively far from 1 thus statistically confirms that the bonding between affective and cognitive for all production styles combined is feeble. The *r* value = -0.077 is a negative value explains the condition of correlation, whereby, if the affective value increases, the condition of cognitive value will remain as it was. The results show that both affective and cognitive are independent and separate entities. Moreover, *sig. (2-tailed)* = 0.596 as shown in Table 2 here is way exceeded the standard amount of 0.05 *sig. value*. Therefore, *sig. (2-tailed)* deflected the mean condition of affective ability to inspire the cognitive response.

Table 1. The Correlations Strength between the Affective and Cognitive Response using The Pearson's R on All Products.

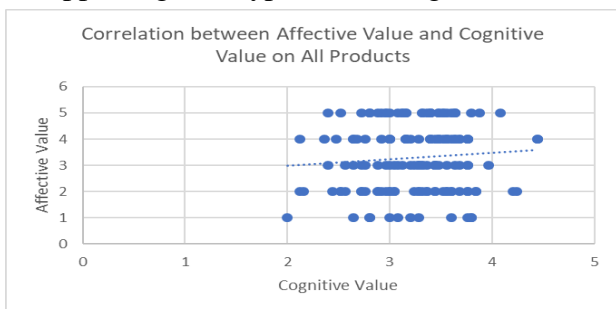
		Mean Value Affective of All Products	Mean Value Cognitive of All Products
Mean Value Affective of All Products	Pearson Correlation	1	.088
	Sig. (2-tailed)		.284
	N	150	150
Mean Value Cognitive of All Products	Pearson Correlation	.088	1
	Sig. (2-tailed)	.284	
	N	150	150

Thus, Table 2 results generated from Pearson's *r* confirms that the probable interdependent relationship does not exist. This means the positive engagement feelings the respondents stimulated during the experiment conducted has no power to stimulate their cognitive process in digesting the information even with the aid of cue point feature embedded in interactive video mobile-learning.

Table 2. The Correlations Strength between the Affective and Cognitive Response using The Pearson's R on Cue Point Feature.

		Mean Value Affective of All Products	Mean Value Cognitive of All Products
Mean Value Affective of All Products	Pearson Correlation	1	-.077
	Sig. (2-tailed)		.596
	N	50	50
Mean Value Cognitive of All Products	Pearson Correlation	-.077	1
	Sig. (2-tailed)	.596	
	N	50	50

B. Supporting the Hypothesis using The Scatter Plots



Plots

Figure 2 shows the scatter plots of the correlation between affective and cognitive based on the mean values. The dots presented in Scatter Plots graph are dispersed around, and the dots that are unable to form a clear straight line upward from zero. The scattered dots indicated that there is no correlation between the affective and cognitive values.

Fig. 4. Correlation Strength Evaluation through Scatter Plots Perspective.

The Scatter Plots for Product A: IVML Prototype also displays a negative correlation between affective and cognitive values. Even with the aid of cue point feature embedded in IVML prototype yet this feature is unable to form and manipulate the relationship between the affective and cognitive values. The line

forming downward to zero denotes the negative correlation. In this case, the virtual line shows the affective and cognitive have no relation to each other.

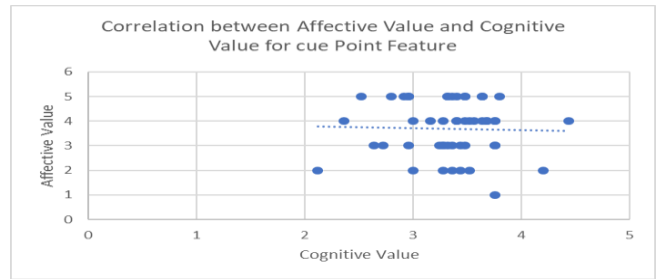


Fig. 5. Correlation Strength Evaluation through Scatter Plots Perspective.

C. Hypotheses Derived from Pearson's r and Scatter Plots

The Null Hypothesis is $H0_x$ and the Alternative Hypothesis is $H1_x$. Thereof, for Hypothesis A, the Null Hypothesis [$H0_1$] is accepted and the Alternative Hypothesis [$H1_1$] is rejected. Since there is no relationship between the affective and cognitive responses in production style, therefore, the Scatter Plots diagram as shown in Fig.2 denotes the negative correlation between the affective and cognitive values. It can be concluded that there is no correlation between the affective and cognitive responses under educational video mobile-learning.

Hypothesis A: There is a correlation between the Affective and Cognitive Responses under Educational Video Mobile-Learning

$H0_1$: There is no correlation between the affective and cognitive responses under educational video mobile-learning.

$H1_1$: There is a correlation between the affective and cognitive responses under educational video mobile-learning.

		Sig. (2-tailed)
Pair 1	Cogniti	
	Affective	0.284

Hypothesis B theorizes the probable interdependent relationship between the affective value and cognitive values with the aid of cue point feature to project the

idea of flexibility in learning for mobile users. However, in accordance with the results generated from Pearson's *r* and Scatter Plots, it can be decided that the cue point feature is unable to form a bonding relationship between the affective and cognitive values. For hypothesis B, with the *sig. (2-tailed) = 0.596* is clearly rejecting the Alternative Hypothesis H11 and hence approve the Null Hypothesis H01. Thus, decidedly that even with the aid of cue point feature, there is no correlation between the affective and cognitive responses under educational video mobile-learning.

Hypothesis B: There is a correlation between the Affective and Cognitive Responses with The Aid of Cue Point Feature under Educational Video Mobile-Learning

H01: With the aid of cue point feature, there is no correlation between the affective and cognitive responses under educational video mobile-learning.

H11: With the aid of cue point feature, there is a correlation between the affective and cognitive responses under educational video mobile-learning.

		Sig. (2-tailed)
Pair 1	Cogniti	0.596
Affective	ve	

IV. CONCLUSION

To conclude, in overall one hundred and fifty students involved in the experimental study have projected diverse reactions in the affective and cognitive domains for each production style used in this study. However, the correlation between their engagement and cognition are separate elicitation that is not relatively connected due to the manipulation of production style in educational video mobile-learning even with the aid of time point feature embedded in an educational video. Thereof, even if the video design for mobile-learning may be creatively developed combined with the aesthetic visual effects as an attraction for students' engagement, and even if the students do feel that the video mobile-learning is enjoyable and engaging, however, it does not mean

that their engagement feelings could influence their cog-nition process to understand the audio-visual information presented. In other words, their engagement feelings have no relation or influence on their mind cognition when it comes to video mobile-learning.

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