

# Influence of Media Forms on Painting Appreciation Experiences

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**Abstract.** This study mainly investigates the influence of different media presentation forms on viewers' perception, preference, and viewing time. This study enrolled 15 male and 15 female subjects to participate in the experiment. The independent variables included gender (male and female) and media forms of paintings. The media forms included four factors: original paintings, planar presentation of paintings, screen presentation of paintings, and picture book of paintings. The experimental results showed that, the gender factor did not have significant influence on all the measurement variables. Media forms had significant influence on 4 indices; "viewing paintings arbitrarily," "paintings reflected a sense of value," "preference for paintings," and "viewing time" ( $p < 0.05$ ). According to the research results of this study, the sense of value reflected by original paintings was the highest, and they were most preferred by viewers. It is advised to provide proper painting titles and good viewing environment during exhibition of paintings to help viewers develop pleasant emotions and further increase their preference for paintings.

**Keywords:** Painting · Media forms · Viewing time · Preference

## 1 Introduction

From the point of ergonomics, the human performance and preference would be affected by media form. For text reading task, Mayes et al. (2001) show that subjects take longer to read text on a screen than on paper. As for accuracy, Egan et al. (1989) report that students using digital hypertext on a screen to find out specific information in the text had higher accuracy than students using the paper text. For reading comprehension, Dillon and Gabbard (1998) conclude that comprehension when reading from a screen is better than reading from paper when performing substantial searching or manipulation and comparison of visual details among objects. However, Cushman (1986) finds that

visual fatigue is significantly higher when reading black objects on a white screen background than reading paper. In addition, Martin and Platt (2001) also found that the medical school students still prefer to read from paper rather than from a screen.

Moreover, the better image quality of display could improve visual task performance and reduce visual fatigue. Menozzi *et al.* (2001) reported that using liquid crystal display (LCD) caused fewer errors in visual search tasks than using cathode ray tube (CRT) display. Wang and Huang (2004) also found that using LCD display for after etching inspection (AEI) showed less eye fatigue and better accuracy than using CRT display. This is due to the better image quality and higher refresh rate of the TFT-LCD display. Further, Takahashi (2006) compared the display effect on visual acuity after one-hundred minutes TV program watching, and found that watching LCD display had a significantly higher decrease in visual acuity than that of watching plasma display. The behavior of TV program watching is different from TV game playing, and the users tend to have higher motivation, attention and concentration on video game playing. However, information about the evaluation of a plasma display and CRT display for video game playing on visual fatigue and mental workload is lacking. For visuospatial task, Van Orden and Broyles (2000) compared the visuospatial task performance of participants who used seven types of two-dimensional (2-D) and three-dimensional (3-D) displays. The authors reported that, overall, the task performance of participants who used the 2-D plan, or side-view, display type was more favorable than the task performance of participants who used any other display system, but the 3-D volumetric display type was more suitable for participants performing integration and prediction tasks in a limited 3-D space.

However, previous studies did not consider whether the human behavior and preference of the painting watching would be similar to that of the functional visual task. This study mainly investigates the influence of different media presentation forms on viewers' perception, preference, and viewing time while watching a painting.

## 2 Methods

### 2.1 Subjects

This study enrolled 15 male and 15 female subjects to participate in the experiment. The ages of the participants ranged from 18 to 40 years (mean = 23.23, SD = 4.41). The mean age of male participants was 22.20 (SD = 3.85) years. The mean age of female participants was 24.27 (SD = 4.71) years.

### 2.2 Experimental Design

The independent variables included gender (male and female) and media forms of paintings. The media forms included 4 factors: original paintings, planar presentation of paintings, screen presentation of paintings, and picture book of paintings. For original paintings, this study used 21 pieces of oil paintings of Ms. Li, a novice painter who had learned painting for 5 years, as the experimental samples; 9 of the paintings were landscape paintings, and 12 were abstract paintings, and all of the paintings were



Fig. 1. Twenty-One original paintings and corresponding titles

displayed in frames of the same style (as shown in Fig. 1). Regarding the planar presentation of paintings, 21 original paintings pieces were scanned into electronic image files using the scanner (CRUSE-CS185ST 1100), which were output into planar images of A1 size (84.1 cm \* 59.4 cm) using the HP designjet 5000. Afterwards, they were displayed in the same aluminum frames (as shown in Fig. 2). Regarding the screen presentation of paintings, the electronic image files of paintings were converted into a briefing file, and presented using a 37-inch LCD TV (Panasonic TC-37MPJ), as shown in Fig. 3. Regarding the picture book of paintings, the paintings were bound in a picture book with a spread page size of 60 cm \* 30 cm. Each painting piece was presented on a



**Fig. 2.** One sample of planar paintings (right side: a painting displayed in aluminum frames; left side: the planar painting zooms in partly).



**Fig. 3.** The screen presentation of paintings (right side: a painting displayed in a 37-inch LCD TV; left side: the screen painting zooms in partly).



**Fig. 4.** The picture book of paintings (upper side: a painting displayed in a book; lower side: a partial enlarged view).

spread page and a partial enlarged view on another spread page. Therefore, the picture book included 21 paintings pieces, and 84 pages in total (as shown in Fig. 4).

There were two measuring variables in this study: one was the questionnaire survey on subjective perception, and the other was the record of viewing behavior. The questionnaire included basic information (gender, age, and the highest level of education) and the scale on painting viewing experience (6 items on the perception of the viewing process and 5 items on evaluation of paintings). The latter used a 5-point scale for scoring, where 1 denoted strongly disagree, 2 denoted disagree, 3 denoted neutral, 4 denoted agree, and 5 denoted strongly agree. Moreover, in order to evaluate viewing behavior, this study concurrently used a stopwatch to record the time spent viewing the 21 painting pieces by the subjects.

### 2.3 Experimental Procedure

The experimental sites of this study were the exhibition space and office. The original pieces of paintings and planar presentation of paintings were displayed in an exhibition space, while a screen presentation of paintings and the picture book of paintings were viewed in the office. Every subject was randomized to determine their order of experimental combination. The subjects could adjust the time spent viewing each piece of painting according to their preference. During the appreciation of original paintings or planar presentation of paintings, the subjects had to walk around in the exhibition space. When reading the picture book, the subjects had to turn the pages with their hands. When watching the screen, the subjects had to hold the wireless presenter (Logitech R400) and press “Page Up” and “Page Down” buttons to present the paintings. After viewing the 21 pieces of paintings, the subjects recorded the viewing time and completed the questionnaire. Afterwards, the subjects viewed the paintings under another experimental condition. The subjects only received two experimental combinations each time, and received the other two experimental combinations one week later.

## 3 Results

The analysis of variance results in Table 1 reveal that the gender factor did not have significant influence on all the measurement variables, suggesting that the opinions on issues and viewing behaviors between male and female subjects were the same. Media forms had significant influence on 4 indices; “viewing paintings arbitrarily” ( $p < .05$ ), “paintings reflected a sense of value” ( $p < .01$ ), “preference for paintings” ( $p < .05$ ), and “viewing time” ( $p < .001$ ).

The Duncan grouping results indicate that the “viewing paintings arbitrarily” for the four media forms can be classified into two groups. The first group, with the higher scores was for original painting and planar painting. The second group, with the lower scores was for screen painting and book painting. As can be seen in the table, the average “viewing paintings arbitrarily” scores for the original painting and planar painting is 4.43 and 4.40, respectively; the scores for the screen painting and book painting is 3.97 and 4.10, respectively. In other words, the original painting and planar

**Table 1.** The corresponding mean values of measurements under media forms and gender effects.

Measurements		Gender		Media Forms				Significance
		Female	Male	Original painting	Planar painting	Screen painting	Book painting	
Questionnaire (1 ~ 5 score)	Emotional delighted	3.87	3.57	3.90	3.77	3.70	3.50	
	Emotional relaxation	3.97	3.92	3.93	3.93	4.07	3.83	
	Emotional calmness	4.05	4.12	4.10	4.07	4.17	4.00	
	I can view paintings arbitrarily	4.22	4.23	<b>4.43<sup>a</sup></b>	<b>4.40<sup>a</sup></b>	<b>3.97<sup>b</sup></b>	<b>4.10<sup>b</sup></b>	*
	The painting is unique	3.43	3.62	3.67	3.50	3.30	3.63	
	The paintings are attractive	3.50	3.38	3.63	3.23	3.47	3.43	
	The paintings reflected a sense of value	3.22	3.50	<b>3.80<sup>a</sup></b>	<b>3.00<sup>c</sup></b>	<b>3.33<sup>b</sup></b>	<b>3.30<sup>b</sup></b>	**
	I can feel cloud meaning	3.78	4.05	3.97	3.87	3.93	3.90	
	Painting titles can help improve preference	3.53	3.55	3.73	3.43	3.53	3.47	
	I want the painting in my house	3.73	3.93	4.03	3.73	3.80	3.77	
	Preference for paintings	3.57	3.55	<b>3.77<sup>a</sup></b>	<b>3.47<sup>b</sup></b>	<b>3.57<sup>b</sup></b>	<b>3.43<sup>b</sup></b>	*
Viewing behavior	Viewing time (second)	364.97	420.13	<b>412.17<sup>b</sup></b>	<b>364.73<sup>b</sup></b>	<b>282.17<sup>c</sup></b>	<b>511.13<sup>a</sup></b>	***

\*Significant at  $p < .05$ , \*\*Significant at  $p < .01$ , \*\*\*Significant at  $p < .001$ . a, b, c means Duncan grouping results.

painting score is about 0.5 higher than that for the screen painting and book painting. The Duncan grouping results indicate that the “paintings reflected a sense of value” for the four media forms can be classified into three groups. The first group, with the highest score was for original painting, followed by screen painting, book painting and planar painting. The original painting score is about 0.8 higher than that for the planar painting. The Duncan grouping results indicate that the “preference for paintings” for the four media forms can be classified into two groups. The first group, with the higher scores was for original painting. The second group, with the lower scores was for screen painting, planar painting and book painting. The Duncan grouping results indicate that the “viewing time” for the four media forms can be classified into three groups. The first group, with the longest time was for book painting, followed by

original painting, planar painting and screen painting. The viewing time for the screen painting is about 55 % shorter than that of the book painting.

The present results provide evidence that the media form affects some painting viewing experience and viewing behavior. The painting value was substantially decreased under the planar painting compared with that the original painting. In addition, viewing time was greatest when participants watch the book painting than when they watch the other three painting forms.

## 4 Conclusion

According to the research results of this study, the sense of value reflected by original paintings was the highest, and they were most preferred by viewers. It is advised to provide proper painting titles and good viewing environment during exhibition of paintings to help viewers develop pleasant emotions and further increase their preference for paintings.

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