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Abstract
The study aims at investigating the legibility in terms of the reaction time and accuracy rates of an outdoor large LED display and the satisfaction of the audience as well. The viewing conditions were administered at daytime and night time, respectively. In order to find the optimal way of the LED presentation, six factors were studied, which were Chinese character typeface, character size, the colors of the characters collocates with the background colors, environmental illumination, the moving speed and direction of the characters.

The study used a psychophysical experimental design. Three experiments were administered and 12 subjects were included in total. The LED display was 512cm by 384 cm in size with a resolution of 480x640 pixels and was remotely controlled by a notebook. 144 series of 10 characters were chosen respectively and randomly from the frequently used words published by the Department of Education in order to have ten chunks of cognitive units. A questionnaire with a ranking scale was used to find the first find kinds of colors the subjects liked the most. And 24 sets of different color characters with different backgrounds were listed. Two kinds of Chinese character colors (black and white), 6 kinds of typeface and 3 kinds of character sizes were used as independent variables in the first experiment. Experiment Two used the 24 background/ character color sets under two kinds of illumination. The third experiment used two kinds of moving directions and three kinds of moving speed.

The results showed that the presentation in black character with a white background was better than the one in opposite arrangement, i.e., black/white, no matter the typeface or the size of the characters in the first experiment. The legibility was better for the bold black or bold round font. Color characters in white background had better legibility than the ones in other color background both in the two kinds of illumination, i.e., day or night time. Although subjects performed better with the vertical moving direction than with the one with the horizontal direction, they preferred the one with the horizontal direction. Moreover, they tended to perform better under a moving speed of 12 seconds per frame than the others. i.e., 6 and 9 seconds per frame.

The study suggested that Chinese character typeface, character sizes, the colors of the characters collocates with the background colors, environmental illuminations, character moving

speed and direction had a quite complex interaction and influenced the legibility and satisfaction of the audience. Although the audience had a worse legibility, they had a higher sense of satisfaction.
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