



How Chinese Semantics Capability Improves Interpretation in Visual Communication

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ABSTRACT

A visual representation involves delivering messages through visually communicated images. The study assumed that semantic recognition can affect visual interpretation ability, and the result showed that students graduating from a general high school achieve satisfactory results in semantic recognition and image interpretation tasks than students graduating from a vocational high school. Twenty students with low semantic recognition performance participated in our study and completed 24 hours of an intensive Chinese semantics-training course after the design foundation course. The results revealed that the Chinese intensive training improved their semantic recognition in design performance, thereby is confirming the assumption. Our study results suggest that design teachers must not only provide strong practical design training, but also develop skills such as semantic comprehension and object interpretation in young designers.

Keywords: visual communication, semantics, gestalt laws, visual literacy

INTRODUCTION

Visual communication is the process of using visual elements to deliver and share ideas with receivers. Most foundational education systems in design have adopted the Gestalt laws as basic learning material for design students to follow and implement. The primary purpose of such education systems is to help young designers to communicate effectively and acquire meaning-making skills by using visual elements in a certain format. Ron Burnett (2005) defined “image” as the manifestation of human behavior and performance, the core of culture, and a person’s ability to create a visual representation. Therefore, an image is not simply lines, points, and shapes; it represents such aspects as culture, meaning, and human behavior. Visual literacy implies analyzing the theoretical aspect of images, whereas the practical aspect includes studying the design expression according to basic visual elements. A combination of these two aspects may explain how an image communicates with *its intended audience*

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State of the literature

- An image is not simply lines, points, and shapes; it represents such aspects as culture, meaning, and human behavior.
- Visual literacy is a person's capability to interpret, negotiate, and make meaning of information presented in the form of an image.
- Visual literacy is the ability to understand and use images, including the ability to think, learn, and express oneself in terms of images.

Contribution of this paper to the literature

- We confirmed an assumption of semantic recognition can affect visual interpretation.
- After completed an intensive Chinese semantics-training course, the vocational high school students did improve their semantic expression capability.
- This finding will suggest design teachers to integrate advanced semantics courses into their curricula to improve communicated creations for the public.

efficiently and strongly. This study was based on a study conducted by Cheng and Ou (in press), entitled "An Investigation of Basic Design Capacity Performance in Different Background Students," published in the *EURASIA*.

In Taiwan, the higher technical and vocational education system offers bachelor degrees in design to students from vocational (design-based) or general high schools; the qualitative and quantitative abilities of these students are evaluated through a student selection examination. With this emerging composition of high school students, design teachers must inspire high learning achievement in semantic visual representation tasks. Therefore, this study investigated the relationship between Chinese semantic capability and visual interpretation ability on the basis of design training.

LITERATURE REVIEW

Gestalt Laws

Most art and design institutes have adopted Gestalt principles as the first step in the training of design students. In German, "Gestalt" means a unified or meaningful whole. The Gestalt psychology was developed by Max Wertheimer, Wolfgang Kohler, and Kurt Koffka in an attempt to understand the laws governing the human ability of acquiring and interpreting this apparently chaotic world. Wertheimer (1923) proposed the "laws of perceptual organization," which were elaborated by Koffka (1935); they developed a set of principles to explain perceptual organization according to visual design elements. These principles are referred to as Gestalt laws and include the laws of proximity, similarity, closure, good continuation, symmetry, and simplicity (Koffka, 1935). The initial and general formats of these laws explain how basic visual elements (e.g., points, lines, and volumes) can be grouped in a larger presentation. In other words, the Gestalt laws are theories of perception, stating that "the whole is more than the sum of its parts." Koffka indicated that these laws encourage

people to group separate elements into the most comprehensible arrangement for visual communication, rendering the whole-part relationship meaningful (Lugo, Batill & Carlson, 2012; Marder, 2015).

Moreover, meaning-creation requires basic knowledge of semiotics. Therefore, an understanding of semantics necessitates the study of semiotics, which involves the study of signs and sign processes, indication, designation, likeness, analogy, metaphor, symbolism, signification, and communication. Therefore, basic design training requires learning how to use visual elements to interpret and decode messages for a clear and proper communication with the public. This is consistent with the findings of a research paper by Barton and Barton (1987), entitled "Simplicity in Visual Representation," in which they proposed that the goal of visual design is "one idea per visual." A visual is a system of representation and signification that enables humans to conclude and communicate through images (Kazmierczak, 2001). Every image must send one clear semantic and effectively communicate the message to only the viewer.

Visual Literacy

Visual literacy, a term first used by the writer John Debes (1968), is a person's capability to interpret, negotiate, and make meaning of information presented in the form of an image. It is based on how pictures can be "read" and that meaning-making occurs through a process of reading (Bamford, 2003; Giorgis et al., 1999). Visual literacy is what is seen with the eye and what it is "seen" with the mind. Dr. Anne Bamford (2003), Director of Visual Arts at the University of Technology Sydney, summarized the requirements of a visually literate person as a person who is able to

1. analyze and interpret images to acquire meaning in the cultural context that the image was created and exists;
2. analyze the image syntax, including the style and composition;
3. analyze the techniques used to produce the image;
4. evaluate the esthetic merit of the image;
5. evaluate the merit of the image in terms of purpose and audience; and
6. understand the synergy, interaction, innovation, affection, affective impact, and/or "feel" of an image.

Bamford believed that people and designers who understand of the basic principles of visual literacy can produce a more communicable image than people without such an understanding can. Visual literacy is not limited to elements such as shapes, lines, and colors; it encompasses perspective, editing, and juxtaposition, all of which can be used to change how viewers relate to an image. Bamford provided 45 examples of visual syntax, such as scale, dimension, balance, harmony, contrast, emphasis, and rhythm, which correspond entirely with the Gestalt laws. Moreover, Hortin (1980) defined visual literacy as "the ability to understand and use images, including the ability to think, learn, and express oneself in terms of images." (p. 41)

Therefore, the design of a communicable image must combine syntax and semantics in the form of a picture according to pictorial structure and design principles. To effectively conclude and communicate an image, designers must follow a three-step creation process. First, they must understand and express the meaning and cultural background of the image. Second, they must simplify its semantic meaning. Finally, they must complete the graphic expression by applying design principles.

In summary, when designers are trained to communicate semantic meaning through visual representation, the following three fundamental questions must be asked: (1) How are the Gestalt laws applied in design to accurately express thoughts? (2) Can design principles bridge the gap or reduce the learning path between visual design and semantic expression? (3) Can students' Chinese semantics capability affect their learning outcomes in visual representation? Although Cheng and Ou (in press) failed to answer the previous questions, they revealed that high school students graduating from general high schools achieved more satisfactory results in meaning transfer and visual representation tasks than those graduating from vocational (design-based) high schools did. This difference in results is an issue that requires review and reflection in the education systems currently implemented in design institutes. Nevertheless, the relationship between professionally practicing design and knowledge proficiency in other general disciplines is often not acknowledged. This study conducted a pre-training task to understand the relationship between design ability and language proficiency by using semantic interpretation tasks from a foundational design course.

METHODOLOGY

Participants

The study was conducted during the fall semester, with 72 first-year undergraduate students (62 females and 10 males) at the Creative Product Design Department of Southern Taiwan University of Science and Technology in Taiwan. The participants were high school students with distinct educational backgrounds: general, participants who were graduating in disciplines other than design; and vocational, participants who were pursuing a 3-year design-based course. The participants received 54 hours (3 hours/week for 18 weeks) of fundamental training in the principle design course "Basic Design in 2D" and in Chinese semantics. All of the participants completed the training and passed the examinations in both classes.

Experimental Task

Pre-training Test

Although the participants completed the foundational design course with the Gestalt laws, they performed eight tasks of basic design expression in eight principles with the following eight expressions: "jump," "apparent," "increment," "order," "expansion," "stress," "playful," and "squeeze." They had to create eight compositions on 20 × 20-cm sheets of white

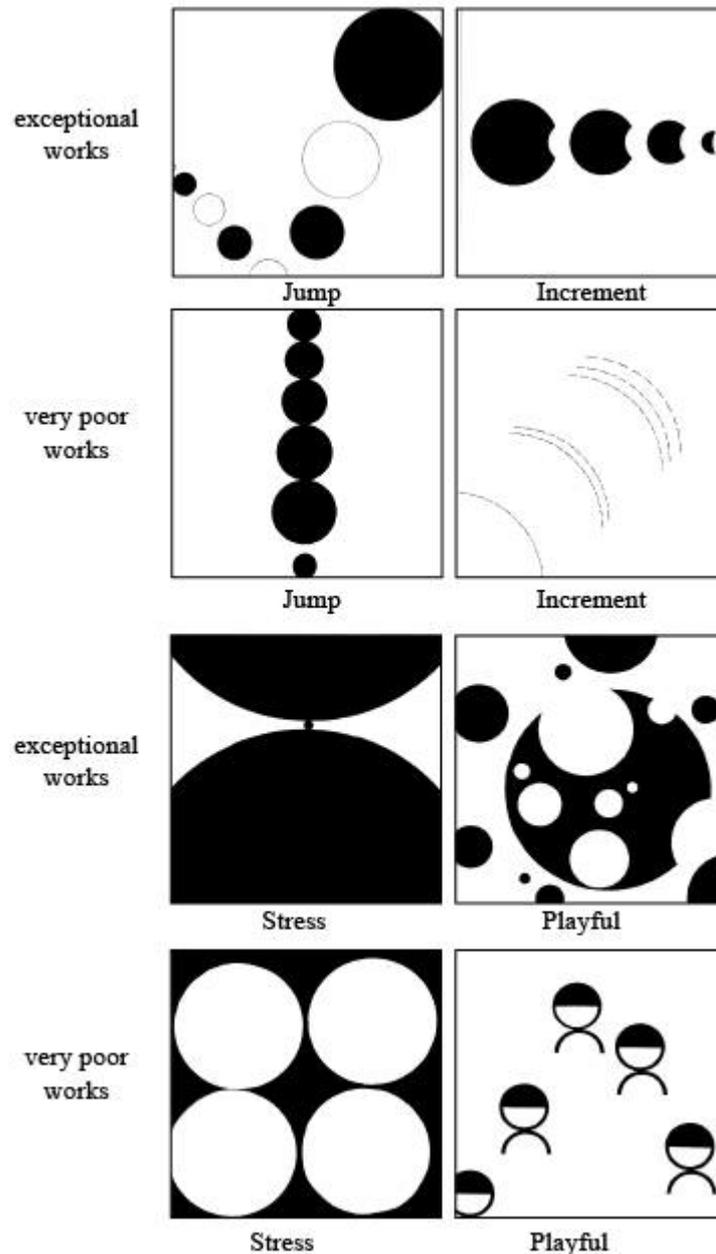


Figure 1. Samples of visual interpretations in Pretraining Test

construction paper with an unlimited number and size of points. The participants were given a week to complete the task. They were permitted to overlap or fold these points, to make a three-dimensional composition, or to place the points out of the format area (see [Figure 1](#)).

Intensive Chinese Semantics Training and Post-Training Test

Following the completion of the pre-training test and declaration of the first semester results for design principles and Chinese semantics, we selected 20 participants (of the

previous 72) with poor performance and low scores in “Basic Design in 2D.” These participants completed a 24-hour intensive course in Chinese semantics. The course instructor had 20 years of experience in teaching Chinese as well as a PhD in Chinese semantics.

The purpose of this training was to improve the participants’ semantic understanding and help them achieve an appropriately communicated expression through images in future tasks. The classes were organized to introduce allusions, rhetoric, and meanings found in the themes of pop music, movies, creative sentences, and new poetry. The participants enhanced their semantic capacity by observing familiar pop music and linguists. Finally, the participants solved crossword puzzles to stimulate their creativity and imagination. All of the participants completed pre- and post-training tests in Chinese semantics proficiency.

Semantic Visual Expression Test

After 3 days, the participants retook the semantic visual expression test in design principles. The following six expressions from the pre-training task were randomly selected: “apparent,” “increment,” “order,” “expansion,” “playful,” and “squeeze.” The task instructions were similar to those of the previous task: draw on a 20 × 20-cm sheet of white construction paper with an unlimited number and size of points for each phrase. The participants had a week to complete and submit their creations. Overlapping, folding, and outside (of the format area) placing of points was permitted to create a three-dimensional composition.

Statistical Analysis

The major outcome variables were evaluated on the basis of semantic visual expression test scores. We asked three experts to rate each creation on a 7-point Likert scale (1 = *very poor*; 2 = *poor*; 3 = *fair*; 4 = *good*; 5 = *very good*; 6 = *excellent*; 7 = *exceptional*). Expert A had a 9-year experience in visual communications design teaching and was influential in the design industry. Expert B had two Phds in the field of design, 11-year experience in basic design teaching, and specializations in creative training and graphic designing. Expert C had a 13-year experience in visual communications design teaching.

The variances of the results were analyzed using the SPSS version 18.0 (IBM Corporation, Armonk, NY, USA), and post hoc analyses were conducted using the least significant differences (LSD) tests. The significance level for all analyses was $\alpha < 0.05$.

RESULTS

The results of an independent samples *t* test revealed that the eight design principles in the pre-training test for the semantic visual expression task did not differ significantly between genders (**Table 1**); thus, the effectiveness of the learning outcomes was similar for both genders. Moreover, the general high school students achieved more satisfactory results than the vocational high school students for the expression “jump” ($t(70) = 2.66, P < 0.01$). The remaining expressions did not differ significantly.

Table 1. Basic design assessment results stratified by gender and educational background

		jump	apparent	increment	order	expansion	stress	playful	squeeze
gender	male (n=10)	3.48	3.25	3.96	3.90	3.95	3.88	3.45	3.73
	female (n=62)	3.76	3.49	3.62	3.59	3.97	3.63	3.86	3.79
Pervious education backgrounds	High Shool (n=30)	3.98	3.55	3.60	3.56	4.00	3.61	3.77	3.89
	Vocation High School (n=42)	3.54	3.39	3.71	3.68	3.93	3.70	3.82	3.70

Table 2. Pre-training scores for the semantic visual expression task

		jump	apparent	increment	order	expansion	stress	playful	squeeze
Students*	Lower score groups (n=20)	3.27	2.94	2.98	2.80	3.24	3.33	3.49	3.29
	High score groups (n=52)	3.90	3.65	3.93	3.95	4.24	3.79	3.92	3.97

* $P < 0.01$ **Table 3.** Post-training scores for the semantic visual expression task

		apparent	increment	order	expansion	playful	squeeze
Training course*	Pre-training (n=15)	3.13	3.07	2.88	3.07	3.51	3.22
	Post-training (n=15)	6.21	6.14	5.93	4.64	5.36	5.36

* P -value < 0.01

In this study, we selected students with the lowest average score (27%) in “Basic Design in 2D” in the fall semester. In addition, the independent samples t test showed that the 20 participants selected for the Chinese semantics training course had significantly lower scores than the other 52 participants (Table 2).

To determine the differences in the learning outcomes after the Chinese semantics training course, the scores of only 15 participants were considered because five participants did not complete the course. According to the results of the paired t test, the difference between the before and after training samples was significant ($t(14) = -4.47, P < 0.01$). The results of the Chinese semantics test revealed that the participants’ scores improved from pre-training (58.93) to post-training (73.92).

After all of the participants completed the Chinese semantics-training course, they were assigned another semantic visual expression task within 3 days. The randomly selected six expressions for this task were “apparent,” “increment,” “order,” “expansion,” “playful,” and “squeeze.” Regarding the pre- and post-training results, a paired t test revealed that the 15 participants demonstrated significantly improved semantic visual expression through applying design principles after they had completed the training (Table 3).

DISCUSSION

According to Cheng and Ou (in press) revealed that students graduating from general high schools achieved more satisfactory results in semantic recognition and image interpretation tasks compared with those who graduated from vocational high schools. The authors assumed that semantic recognition affects visual interpretation. Therefore, we conducted a study to confirm this assumption. The semantic expression capability of visual designers is crucial in delivering effective communication. The study refutes the claim that students graduating from vocational schools with design experience have a more satisfactory design learning achievements than those graduating from general high schools. Moreover, the general high school students in this study had completed only an intensive Chinese semantics-training course, whereas the vocational high school students had been learning this discipline from years 10 through 12 at high school. After the participants completed the pre-training test, Chinese semantics course, and post-training test, their creative communication was improved by reinforcing their semantic expression capability. This finding corresponded with the purpose of teaching visual literacy, as proposed by Bamford (2003): "Visual education provides a foundation for understanding and evaluation esthetic intention and artistic skills. It also makes students more resistant to manipulation by visual means." (p.5).

CONCLUSIONS

Visual communication is primarily aimed at communicating meaning to an audience. This study explained that being an accomplished designer requires more than perfecting practical design skills and learning design principles; it also requires the general capacity of language and semantics, which are considered initial necessities for design expression. This finding suggests that design teachers can integrate advanced semantics courses into their curricula to improve communicated creations for the public.

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