

Effect of Visual Analogy and Design Values In Ideation Phase, Generated by Designers From Different Educational Background

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The issue on how designers generating ideas to solve a design problem is being investigated in this research. A variety of empirical studies on the use of visual stimuli and its effect to ideation process of designers has had been conducted by many design researchers. However previous research has focused only in the effect of the stimuli from a clustered group of designers. In the following experiment a selection of two different educational backgrounds of design, architecture and industrial design, is made to obtain new information about the different design values precipitated within the given conception. A qualitative analysis was done as part of assessing the ideas given by research participants. Quantitative analysis of a design solution given by both architects and industrial designers were conducted and reported as further down. The objectives for this research are to find [1.] the effect of visual analogy stimuli into the ideas generated from designers for a specific design problem, [2.] differences of design values from the solutions given by designers from divergent educational background, and [3.] to find the correlation of the design values which used to construct the assessment criteria.

Keywords – visual analogy, visual stimuli, ideation phase, design values, different design educational background

Introduction

Design researchers agreed that design has several definitions. Hegelian perspective may have an influence in the following assertions, as the design process itself, involving dialectic reasoning of creating and solving a problem (Lawson, 1980), which act as a social process (Schon, Buccionelli, 1987). The problem for designers to solve is more into complex (Badke-Schaub, 2005), ill-defined (Eastman, 1969, Casakin & Goldschmidt, 1999), and contextual (Lawson, 1980). It is the designers' task to reconstruct the problem and make sense of things by creating meanings (Verganti, 2009). This situation will enforce designers to forge a novel solution that eventually leads them and the stakeholders to get out of the problem. Ergo, designers will provide a systematical cognitive

approach for progress and movement by synthesizing ideas from its thesis and antithesis.

Being baptized as a visual communicator, designers' activity cannot be detached from sketching activity (McKoy, et al, 2001). Designers communicate using sketches. Not only pouring their idea visually, designers also conducting visual-mental process (Oxman, 1997) as their representation of knowledge (Casakin & Goldschmidt, 1999), and use it as a means of conversation (Schon, 1983, Lawson, 1980). This visual-mental process in ideation has known can be triggered by seeking analogical inspiration (Tseng et.al, 2008). Since designers work in a complex and contextual problem while fabricating a social process, we believe that there are different values

generated from designers of different educational background whilst the visual-mental process is similar. As asserted by Lawson (1980), “... *design does not happen in isolation, but rather, refers to the various social, cultural, and intellectual perspectives on design, to the possibilities of the medium, and to the history or present-day state of one’s own field of action.*”

Albeit researchers have long studied about the ideation process of designers, not much information can be gathered regarding the effect of the solution given by designers from different educational background being exposed into particular analogical inspiration. A study conducted by Holm (2006) only provides knowledge about the amalgamation of design values generated from both industrial designers and architect. For this reason, one of the main goals of the experiment is to yield the issue and found if there are any differences in the values of design given by designers from different educational background.

Literature and Theory

Graham Wallas (1926) a gestalt psychologist asserted a theory of four stages in creative process ; 1] Preparation, 2] Incubation, 3] Illumination, and 4] Verification. In the incubation stage, often designers endeavor a fuzzy process and non-conscious idea, the stage that has the slightest understanding (Best, 1999 as cited by Snyder et.al, 2004). To help them synthesizing a more concrete idea, designers often trace back their memory and might get a fixated design solution. To cope with this fixation, most of the time designers will look for novelty solution in a form of analogical inspiration by means of graphical representation. An analogy is defined by Goldschmidt (1999) as “*likeness of relations; as in A:B::C:D, or A is related to B like C is related to D.*” of which may involving a transfer of associational information from a known situation, to an unknown situation. It seems that the process has become a vicious cycle of fixation, because there’s no such thing as truly as novel solution. In this research we will not focus on the fixation, but more into the use of visual analogy representation and its effect to designers from different educational background. Based on its historical perspective, design has emerged into a social power that can append, alter, adapt, and directing the civilization. As discussed earlier, designers build a cognitive, creative process and they will act as a decision maker on how to solve the ill-defined problem in different context

eventually. Nevertheless, designer is an entity, an individual that cannot escape from its portion of the society. Adjacent to that assertion a designer’s perspective is now not only focusing more into an individual “*decision maker*”, but already become a “*conversation-maker*” (Boland et.al, 1994 as cited by Gasson, 1998).

An architect is making conversation between the people and its environment, in a form of a building, urban planning activity or landscaping. Industrial designer has intentionally produced a conversation of a product with its user. Both are designers, and both are a producer of meaning and moving people into progress, which is an important factor of civilization and defined as part of human nature by Kant (1784). Therefore design itself is as old as human civilization which has a considerable tradition (Heufler, 2004, as cited by Holm, 2006) entails plan and intention that submerged into ideas, beliefs and values of the designers and being carried out into a design proposal (Holm, 2006). A design value is defined as the following; “*A scope consisting of : attitudes, beliefs, orientations, and underlying assumptions*”, (Holm, 2006).

In this research, the focus is to go deeper into different design educational background. Western history credence their root of civilization comes from Ancient Greek. An embodiment of human knowledge and intelligence can be transferred in a formal way. The notion was introduce by Plato in 387 AD in a form of institutional concept of Academia, a place of knowledge disputation (Schubert et.al, 1998). Although the concept of academia is the core of design school, its distinguished characteristic of combination of theory and practice has been argued by Holm (2006) as an influence of Judeo-Christianity tradition. The doctrine of master and disciple relationship still can be seen in todays curriculum of a design school, emphasizing the needs of a student to comprehend theoretical matters contiguous with practicality issue. That relationship is a common idiosyncrasy found in architecture and industrial design education. Following industrialization and the birth of Bauhaus in Europe in 1919, hence the first modern day design academia, at present design has already become an exclusive word segregated into many clusters and branches. Focusing more into that historical reasoning (of European industrialization), we decided to opt for architecture and industrial design as they grew

along with the revolt of machines and manufacturing.

Similar characteristics shared by architecture and industrial design education are ; [1.] *emphasis on project based learning*, [2.] *a student/teacher relationship that mimics the traditional master-disciple relationship*, and [3.] *Design educators both consciously and unconsciously instill fundamental value-system into students, especially through design criticism in architectural or industrial design school studios*. (Holm, 2006). While sharing homologous features, both pedagogical systems also share contrasting values, ideas and beliefs.

Data and Methods

We investigated the research conducted by Holm (2006) to provide better understanding in values generated by architect and industrial designer. Holm (2006) asserted five distinctive design values of designers; [1.] Aesthetic, [2.] Social, [3.] Environmental, [4.] Traditional, and [5.] Gender. Within these values, there are sub-values that characterized a composite of ideas and beliefs of which an architect or industrial designers possess. In this research we will only addressing several criteria that we use as a criterion. Succeeding the outline of our research objectives, we stipulated our research question as: *“When provided with a stimulus of Pictorial Distant Analogy how would designers with different educational background to be influenced in their idea generation stage?”*, and *“Is there any difference of values between Architect and Industrial Designers in their ideation?”*

Following that, we postulated hypotheses as following; H1] Pictorial Distant Analogy stimulus has an influence on the idea generation process of designers when it lead to a practical solution for the problem; H2] Different educational background has a certain influence on the performance of designers during their idea generation process; and H3] There are differences in design values of ideas given by designers from different educational background.

Then we set up three experimental conditions in which participants were asked to solve a design problem and present their ideas in a visual way by sketching or drawing although explaining the idea with text was allowed. The first condition is a control condition. In this condition, the participants would be invited to a laboratory designed specifically to monitor an experiment, usually for

focus group discussion purpose. They were asked to sit in front of a table where s/he could be videotaped easily. Before the experiment the participant would be asked to fill in a pre-questionnaire with some basic questions about their background. Then we gave the design brief sheet of “How would you design a mode of transportation in 2050?”, accompanied with sketch tools like markers and blank A3 sheets to the participant. The participant then started to sketch on the given sheets. He/she was allowed to use his/her own tools but not allowed to draw on both side of a paper. The sketching process would take about 45 minutes and the participant would be informed of the last five minutes time prior to end. The control group consists of 10 designers that were still a student from bachelor and master program, five from architecture and five from industrial design.

After sketching, participants were required to fill a post-questionnaire in which the participant could provide comments on the experiment. The whole experiment last approximately one hour. The researchers didn’t interfere into the ideation process, but only giving short, clear answer regarding participant’s question about unclear things from the brief or the instruction. The second and third condition were *Distant Pictorial Analogy Condition*. In the second condition the design brief and experiment procedures would be the same as control condition, but participants were industrial design students only. For the third condition, participants were architecture students only. They would be required to solve the same design problem with distant pictorial analogy of a twister presented during the experiment as an inspirational stimulus for idea generation. A group of 10 students from architecture comprise mostly from first year master program students and some already in their second year. Similar condition applied into 10 students from industrial design background. In total there were 30 students joining the experiment. All subjects were acting voluntary and didn’t get any reward whatsoever in term of financial or academic related to course credit.

Result and Discussion

Design performances of the participants were assessed in six dimensions with two criterions for every each dimension except one; [1.] Practicality: Ideas are evaluated to be practical or not based on judges’ knowledge, [2.] Originality: Ideas are evaluated to be original or not based on judges’ experience and comparison to other participants’

ideas, [3.] Contextually: Ideas are evaluated to be elitist or populist, [4.] Conceptualization: Ideas are evaluated to be prompted or impromptu based on previous sketches or textual explanation of the participant, [5.] Functionality: Ideas are evaluated to be artifact or user experience, [6.] Fluency: Number of ideas. For *Practicality* and *Originality*, we use a guideline from previous research by Finke (Smith, Ward, Finke, 1995) on judging an invention. The scale is a pre-setup distinct scale of 1-5 that referring to the practicality and originality of ideas given. Finke stressed that a series of possibilities might emerged based on the scale, and idea can be very practical (VP) but in the same time not original (NO), or the other way around, very original (VO) but not practical (NP) at all.

The other three criteria were constructed from the previous assertion of distinctive design values of designers. A semantic scale is used to assess the category, using semantic descriptor. Then we bring the scale into ordinal. *Contextually* proposed as a criterion, based on the design values of social and environmental. Semantic descriptors for *Contextually* are *Elitist* (EL) and *Populist* (POP). *Elitist* means the idea given by group of designers incorporate an individualistic interaction only. Therefore designers does not really think about the bigger context of the problem and only implementing his own way of thinking, while *Populist* is the opposite. Conceptualization is based on the traditional design value. *Prompted* (PR) means designers were only using their own relevant experience, and may found the ideas given are a bit repetitive. In a way this semantic descriptor is also assessing the degree of innovation. *Impromptu* (IMP) means every design solutions are new, not related to their previous idea.

Table 1. Scale of Assessment Criteria

<i>Evaluation Criteria</i>	<i>Scale</i>
Practicality	NP 1 2 3 4 5 VP
Originality	NO 1 2 3 4 5 VO
Contextually	EL 1 2 3 4 5 POP
Conceptualization	PR 1 2 3 4 5 IMP
Functionality	ART 1 2 3 4 5 UX

The aesthetical value of design is used to raise the *Functionality* criterion. An *Artifact* (ART) of an idea is basically confirming the value of self-expression, where the designers were seeing their position in the problem as an artist. So they only provide some tangible/intangible solution that has

no meaning for people or user. Whilst a semantic descriptor of *User Experience* (UX) is elucidating the ideas generated by designers, that are looking more closely into fabricating solution which holds meaning besides trying to incorporate relationship between the idea and its user. Fluency is based only from the number of ideas given as a solution.

The first analysis we did is to find the effect of the stimuli in their ideation. The second was finding any significant differences from two different educational backgrounds. Final analysis was conducted to search any further correlation of the assessment criteria. After analyzing the data collected, it led to conclude that we confirmed only two of our proposed hypotheses. H1 did not support by the statistical analysis of MANOVA Test, because the measured results from the control group and the treatment group shows only one significant different value of functionality. The value of functionality from the treatment group has a lower mean score compared to the control group. This means there is no effect of stimuli on ideas generated by designers. H2 is being confirmed since the result gave an endorsement of different mean for architecture students and industrial design students. H3 also verified by the outcomes of statistical data of repeated Pearson tests, comparing every pair of criterion in the assessment criteria shows a significant difference between different educational background. In other word, industrial designers and architects do not share the same values of design being generated in their ideation phase.

Even though these results are being induced, several things must be taken into consideration such as; small samples of participants joining the experiment and the composition of designers in the control group for ideal condition would be much better suited if it was consists of industrial design and architecture students rather than homogeneity. In this case, albeit we argued that we separate the analysis process and consider them in the first phase as a group of designers, a further research represents the ideal condition would be suggested.

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