Perception difference analysis using digital technology: case study on Ghanaian Adinkra symbols and Chinese traditional symbols

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Abstract—Based on data analysis, this study measured the level of perception of Ghanaians and Chinese cultural symbols. The objective was to investigate the possible differences and misconception in visual perception and comprehension between Ghanaians and Chinese. One hundred symbols, fifty from Ghana and fifty from China was used to administer questions in a survey to a total of hundred Ghanaian and Chinese subjects. By employing digital technology such as data collection and data analysis the most typical and least typical cultural symbols among both countries were collected. Further analysis was done to find out the factors affecting the perception of symbols by subjects and interaction effects between genders. Findings show that at least 40% of both Ghanaian and Chinese subjects had a relatively good knowledge of their cultural symbols which help identify them as typical symbols of their nations. The cultures of the subjects played a significant role on the results while gender, level of education, employment and the academic status of individuals impacted minutely on the outcome. The significant outcome of this study provides the basic foundation for researchers who are interested in examining cross cultural perception of cultural symbols. This study increases the need for awareness of cultural symbols and their meanings outside a country's borders.

1 INTRODUCTION

In order to achieve visual communication that is understood by diverse cultures as well as merge and design appropriate symbols and elements among designers, they must be willing and able to perceive and understand values that cultural symbols stand for across cultural borders. Designers must be conscious of sensitivity when producing culturally related products. Hurley and Lipsey [1] agree that "Sensitivity refers to the likelihood that an effect, if present, will be detected" (p.44). Studies demonstrate the lack of sensitivity among design students Griffin and Gibbs [2]. However, it should be the responsibility of designers to project, recommend and convey meanings and values embedded in cultural symbols in a visually acceptable, meaningful and fashionable ways to ensure that products are more culturally appreciated by clients. Cultural Sensitivity among designers cannot be emphasized without considering symbols since they play a communicative role in our societies. An effective mode of recording the level of perception of elements among individuals is by employing digital technology.

This study is an image based cross-cultural study that focuses on identifying differences in perception of representational symbol and measuring the level of understanding between subjects in two cultures; Ghana

and China. The need for this cultural research is aimed at allowing a better understanding and appreciation of differences in perception of cultural symbols among cultures and this can be summarized as identifying how people perceive differences among the Ghanaian and Chinese cultural symbols and attempt to investigate the level of knowledge about their native symbols as well as other cultures.

2 LITERATURE REVIEW

In a cross-cultural design-based communication research by Zou and Joneurairatana [3], it was acknowledged that communication is a secondary conversion of symbols - meanings - design product then product design - meaning. It was outlined that if the designer and the audience communicate in different language systems, the needful encoding to decoding process can only be successful with the aid of a translator.

After Pötzl [4] got his subjects to observe certain photos, he noted what they had seen. He discovered the items they had perceived didn't show up in ensuing dreams, while those which they had not perceived showed up in their dreams despite the fact that somewhat in a disguised structure. In a similar manner, Allers [5] saw that obscured portions of images were not perceptible to the eyes of subjects showed up in association experiments with certain differences. To better comprehend symbols,

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Tan, et al. [6] employed mainly HOG(Histogram of Oriented Gradient) LBP(Local Binary Patten), RGB(Red Green Blue) to extract the VCS's(Visual cultural symbol) contour, texture, colour elements respectively. Finell, et al. [7]'s research on the perception on national symbols had their findings supporting the idea that pictures of nature and the sauna presented Finland as an exceptional place and additionally, individuals have the ability to perceive their nation through both non-polarized and polarized symbols. During the research by Amevordzie [8] that utilized cultural symbols as a tool in jewellery design by combining cultural symbols of Norwegian silver jewellery (sølje) and Ghanaian Adinkra symbols (Sankofa), it was realized that cultural symbols can be used to redesign meaningful products in the life of the people linked with these cultures. The usage of cultural symbols is unarguably dynamic that they go as far as being incorporated in footwear design. While researching on the Ahenema slippers popularly known in Ghana, Frimpong [9] observed that the symbols on them are not merely for beautification but carry valuable messages intended for the wearer and as well as a means of promoting Ghanaian culture.

In a bid to support the importance of symbol perception among consumers, research led by Carrillo, et al. [10] was to contemplate the perception of symbols and their relative significance, joined with verbal health claims, in impression of product's appeal and attraction in two nations, one Mediterranean (Spain) and the other Scandinavian (Denmark).The results indicated that the general perception of the symbols by the subjects was alike in the two nations yet the way of life impacted the meanings attached to the symbols. Moreover, the symbols on the packaging were discovered to be a higher priority than the verbal inscriptions.

Siddiqi, et al. [11] projected an augmentation of minima rules for partitioning visual form, leading to a notion of limb-based and neck-based parts after subjects underwent series of experiment involving visual perception. As both educated and uneducated subjects were successful in identifying varied outline sketches, Kennedy and Ross [12] agree that the Songe's breadth of pictorial skills, even in the absence of local pictorial art, 'suggests that pictures, and outline pictures in particular, can be recognized on the basis of perceptual strategies present in viewers accustomed to a terrestrial environment of plants and people, objects and scenes' (p.405). Though symbols play a key role in cultures, they seem not to have been merely limited to the confines of individual cultures but have been generously shared by some and borrowed by others. Baxter [13] affirms that native Americans adopted Indian designs suggested by Euro-American's because they found them to be suitable adornments. Whereas some designs were easily taken and offered to native craftsmen as original designs in some cases, all the more strictly traditionalist clans, for example, the Rio Grande Pueblos, Hopi, and the Zuni, got their most consecrated symbols far from prying non-Indian designers. According to Bedinger [14] apart from increased technical means allowing for better precision and finishing in jewelry pieces and the introduction of new materials and tools, an important point that has been overlooked in the

field of jewelry has been cross cultural appropriation of design. There are some who mutually appropriate cultural. Hellyer [15] affirms that "the Navajo, Zuni, and Hopi all borrowed designs from one another for their artwork and still do. Many Navajo jewellers currently work in the overlay style, mimicking the Hopi style and even appropriating some symbols" (p.17).

So far, no research among the reviewed related literature attempts comparison of cultural symbols among nation in the manner of Chu [16], who investigated cultural symbol perception differences between Hong Kong and America. He observed that differences in perception of images of other cultures creates the opportunity for symbols to be shared. However, the opportunity to create design rules and merge symbols for product design was not addressed. With the creation of design rules researchers intending to merge symbols for designing purposes can have the leverage to experiment design rules for a much reliable outcome.

3 METHODOLOGY

3.1 Procedure

Questionnaires were administered and answered by Chinese and Ghanaian participants to identify the most typical symbols among the two cultures. The subjects included students and workers of the Ghanaian and Chinese community. The questionnaire focused on identifying the most typical symbols thus symbols that were easily perceived as cultural symbols by subjects.

3.1.1 Collection of symbols

An initial of two groups of 60 symbols were collected by a team of lecturers and designers with knowledge and understanding about cultural symbols of both the Ghanaian and Chinese culture. One from Ghana and other from China thus, the Ghanaian Adinkra symbols and Chinese traditional symbols respectively. (see Fig. 1 for examples of Ghanaian Adinkra symbols and Fig. 2 for examples of some Chinese cultural symbols).

Figure 1 Some selected Ghanaian Adinkra Symbols

Figure 2 Some selected Chinese traditional symbols

3.1.2 Questionnaire Design and Administration

The survey was administered to 100 subjects; 50 Ghanaians and 50 Chinese. The objective was to help identify the top 15 symbols believed to be most typical

and 5 symbols that is believed to be least typical among both countries. A part from the demographic questions, the questions were a Likert Scale Type where the participants had the opportunity to choose how much they agreed or disagreed on specific statements. The scale indicated 1 = ‘Strongly Disagree’, 2 = ‘Disagree’, 3 = ‘Neither Agree nor Disagree’, 4 = ‘Agree’ and 5 = ‘Strongly Agree’ headings. (See Fig. 3 for image of the questions posed in the questionnaire).

	SD	D	NA/D	A	SA
I recognize this symbol	☐	☐	☐	☐	☐
I know what this symbol means	☐	☐	☐	☐	☐
It's popular in my country	☐	☐	☐	☐	☐
I like this symbol	☐	☐	☐	☐	☐
It's a traditional symbol of my country	☐	☐	☐	☐	☐

Figure 3. Example of questions asked in the questionnaire

4 RESULTS

The categorical data of the 5-point Likert scale questionnaire was translated into numerical variables. Three indexes thus the “I recognize this symbol”, “it’s popular in my country” and “it’s a traditional symbol of my culture” were primarily analyzed with Excel and SPSS softwares to find the level of recognition (see Table 1. and Table 2. for recognition level of subjects) and subsequently the most typical and least typical symbols among the respective cultures. (See Fig. 4 and Fig. 5 for ten most typical Ghanaian symbols and five least typical Ghanaian symbols respectively and see Fig. 6 and Fig. 7 for 10 most typical Chinese symbols and five least typical Chinese symbols respectively).

Table 1. Rating The Recognition Of Ghanaian Adinkra Symbols Stratified By Demographics (Data Is Presented As Percentage)

Parameters	Poor Recognition	Average Recognition	Excellent Recognition
Total Response	54.72	24.53	20.75
Gender			
Female	50.00	25.00	25.00
Male	36.84	36.84	26.32
Education Level			
Doctorate	75.00	25.00	0.00
Masters	62.96	22.22	14.81
Post Graduate	25.00	0.00	75.00
Employment			
Students	58.62	24.14	17.24
Workers	50.00	25.00	25.00

Table 2. Rating Of Recognition Of Chinese Cultural Symbols By Chinese Subjects Stratified By Demographics (Data Is Presented As Percentage)

Parameters	Poor Recognition	Average Recognition	Excellent Recognition
Total Response	40.82	41.84	17.35
Gender			
Female	53.85	32.97	13.19
Male	56.76	29.73	13.51
Educational Level			
Doctorate	20.00	20.00	60.00
Masters	39.74	43.59	16.67
Employment			
Student	33.93	48.21	17.86
Workers	50.00	33.33	16.67

Figure 4. Fifteen (15) most typical Ghanaian symbols collected through the analysis

Figure 5. Five (5) least typical symbols collected at the end of the analysis

Figure 6. Fifteen (15) most typical Chinese symbols collected through the analysis

Figure 7. Five (5) least typical Chinese symbols collected at the end of the analysis

A fractional ANOVA was conducted to compare the main effects of gender and perception as well as their interaction effects on the “I recognize this symbol”, “it’s popular in my country” and “it’s a typical symbol from my country” results.

For the ANOVA of the 15 most typical Ghanaian symbols, there was insignificant evidence to reject the interaction effect null hypothesis $F(1,51) = .003, p = .953, \eta^2 = .001$. However, the estimated marginal means plot also (see Fig. 8) revealed that for about two symbols the males and females had considerable opposing perception.

Figure 8. Estimated marginal means (15 typical Ghanaian Adinkra symbols)

For the ANOVA of the 15 most typical Chinese cultural symbols, gender and perception effects were statistically significant at $p < 0.05$. There was significant evidence to accept the interaction effect null hypothesis $F(1,96) = 8.943, p = .004, \text{partial } \eta^2 = .085$. (see Fig. 9 for plot of the Estimated Marginal Means).

Figure 9. Estimated marginal means (15 typical Chinese traditional symbols)

5 DISCUSSION

The findings from this study suggest that Ghanaians and Chinese perceive symbols differently. Though the questionnaire contained different group of symbols, one representing Ghanaian culture and the other representing Chinese culture, all subjects were required to respond to both questions. The significant differences imply that subjects from the two cultures react to these two groups of symbols differently. This interpretation can be supported by the important interaction effects obtained from responses to each question.

Among the Ghanaians, there was no evidence of a statistically significant effect of gender on the perception of cultural symbols. However, there was evidence from the interaction graph plotted that about two of the cultural symbols had interesting results. The interest perception for those individual symbols were wide apart in opposite direction, implying that those individual symbols may be appreciated more as a typical Ghanaian symbol by one gender while the other does not. This is likely influenced by the answers to the “it’s popular in my country” and it’s a traditional symbol of my country” questions.

Somewhat interestingly, the results from the Estimated Marginal Means showed that the Chinese females subjects had a higher perception of symbols compared to their males. However, among the Ghanaian subjects, it was initially uncertain from the Estimated Marginal Means plot which gender had a better symbol perception. An attempt to find a clear distinction required a revisit to the recognition table (see Table 1). Here the percentage of the average recognition plus that of the excellent recognition proved that the male subjects had a better perception of the Ghanaian Adinkra symbols compared to the females. Findings from the Estimated Marginal Means reinforce and strengthens the hypothesis that there are significant differences between the Ghanaian Adinkra symbol and Chinese cultural symbol perception representing the differences in cultures.

From the overall outcomes certain conclusions and statements can be drawn

1. Ghanaian subjects had more knowledge about their own cultural symbols compared to the Chinese and

the Chinese subjects also had more knowledge about their cultural symbols compared to the Ghanaians.

2. Among the Ghanaians, males have a better perception of their symbols compared to females while among the Chinese, females have a better perception of their symbols compared to their males.

It’s not enough for citizen to perceive cultural symbols by way of recognition only but it’ is necessary to also know what they represent culturally. Perception does not have to be simply based on identification of shapes, forms and color. It should be accompanied by understanding beyond mere visual identification. In a way, cultural symbols are like road signs. Road signs are intended to relay a particular information to road users to ensure their safety on the road however the effectiveness of the signs is partly dependent on road users. Without knowing what the signs stand for they cannot appreciate their relevance. There are many morals, guidance and insight that cultural symbols convey. Data collection and analysis can inform us about how society interacts with them and aid to extract essential design principles and apply them to future research.

6 CONCLUSION

The significant outcome of this study provides the basic foundation for researchers who are interested in examining cross-cultural perception of cultural symbols. This study increases the need for awareness of cultural symbols and their meanings outside a country’s borders. Once cultural symbol meanings and custom of application are well understood, mixed cultural symbol designs can also be explored as a means of effective cultural exchange. A reliable tool of accessing dependable information about perception is through data analysis hence researchers can capitalize on it for more accurate outcome.

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