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The Impact of Online Visual on Users' Motivation and Behavioural Intention - A Comparison between Persuasive and Non-Persuasive Visuals

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Abstract. Research related to the first impression has highlighted the importance of visual appeal in influencing the favourable attitude towards a website. In the perspective of impression formation, it is proposed that the users are actually attracted to certain characteristics or aspects of the visual properties of a website, while ignoring the rests. Therefore, this study aims to investigate which visual strongly appeals to the users by comparing the impact of common visuals with the persuasive visuals. The principles of social influence are proposed as the added value to the persuasiveness of the web visuals. An experimental study is conducted and the PLS-SEM method is employed to analyse the obtained data. The result of the exploratory analyses demonstrated that the structural model has better quality when tested with persuasive data sample compared to non-persuasive data sample, evident with stronger coefficient of determination and path coefficients. Thus, it is concluded that persuasive visual provides better impact towards users' attitude and behavioural intention of a website.

INTRODUCTION

In the field of human-computer communication (HCC), communication relies heavily on the following factors, namely 1) how well the web designers deliver/design the visual property of a web and 2) the users' visual information processing ability to recognise, interpret and recall the web content [1]. If a website fails to deliver the required information, or if the user fails to recognise the information upon his/her arrival at a website, the user might instantly think that the website is not favourable to his/her taste, and subsequently leaves the website without the idea of returning. The user takes such detrimental decision because of the impulsive behaviour that is tied with the first impression of a website [2]. Therefore, designers are advised to design the web content persuasively to simplify the role of users [3]. However, the recipe of a persuasive website design that both appeals to the users and influences them to remain at the website is still unclear. The authors in [4], [5] investigated the impact of several persuasive visuals that are commonly used in the e-commerce website towards the user's perceived emotion, perceived credibility, and perceived logic. It is highlighted that the influences of each visual property may vary according to different products, user characteristics, or different stages in the users' decision cycle [4]. Furthermore, it is found that visual persuasion that appealed to website's credibility and logic is more important than being appealed to users' emotion [5].

The aim of this paper is to quantitatively examine the power of persuasive visual by comparing the impact of non-persuasive visual and persuasive visual on the website towards user's motivation and behavioural intention. This study will help to answer the question of 'which', that is "to identify which type of visual that favourably affects the users' attitude and behavioural intention". The study employs six principles of social influence as defined by

Cialdini [6] to successfully enhance the persuasiveness of the web visuals. Even though the principles are initially used in the context of human-to-human communication, some studies also suggested that the principles of reciprocity, commitment, social proof, authority, liking, and scarcity are also relevant in the context of HCC [2], [7]–[10]. Potential visuals that are representing each principle in the online context have been previously discussed [11]–[14]. Notably, non-persuasive visuals are represented by other visuals that are unrelated to the principles of social influence.

FACTORS AFFECTING THE PERSUASIVENESS OF WEB VISUALS

In this study, persuasive visuals are conveyed in the form of pictorial and short textual messages. It is believed that the impact of persuasive visual is ambiguous from the viewpoint of HCC, in which the information is communicated to the viewers in the form of visual elements within the website. This study examines the relationship between the user's perception of web design characteristics and their intentional behaviour resulting from the user's prior experience with the persuasive visual design. This study extends the model of the first impression formation for the tourism destination websites discussed in [2]. In the original model, informativeness, usability, credibility, aesthetic, engagement, and reciprocity (reciprocity is one of the social influence principles) are proposed as the factors for persuasive web design. The extension is completed by including another 5 principles of social influence by Cialdini [6] into the model, thus implying that the added value of the social influence principles will enhance the persuasiveness of a website. It is hypothesised that the more persuasive a website is perceived to be, the more likely web users to form a favourable impression toward the website, which consequently will affect the users' satisfaction of a website. As a result, favourable users' behavioural intention can be expected. Figure 1(a) shows the conceptual model of the study. However, to achieve the objective of the paper (i.e. to compare the impact between the non-persuasive visual and the persuasive visual of the website towards the user's motivation and behavioural intention), the social influence factors were excluded from the SEM model (see Fig. 1(b)). The exclusion is carried out because the specified persuasive visuals are not presented at the control website; therefore the impacts of social influence constructs are not comparable.

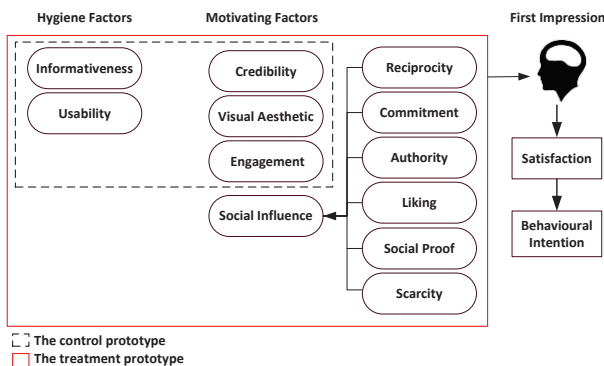


FIGURE 1(a). The complete conceptual model of the persuasive visual design for web design.

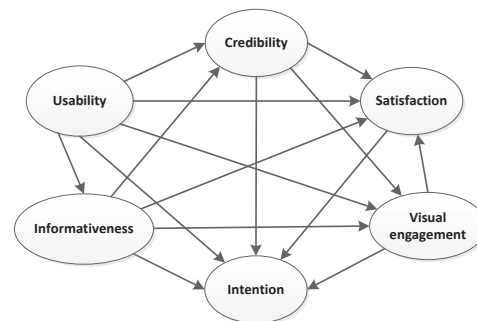


FIGURE 1(b). Basic SEM model.

RESEARCH DESIGN

The comparison between non-persuasive and persuasive visuals in this study is carried out specifically for the area of online tourism website. In this investigation, two web samples with 5 pages are developed, where each sample acting as the control and the treatment web samples. These web samples are identical and shared the same colour, navigation, and layout themes to ensure that there are only small differences between both samples, and that will be on the persuasive and non-persuasive visuals only. The quantitative approach is employed by conducting an online study for data collection. The instruments used in this survey have been examined and approved by the Murdoch University Human Research Ethics Committee (Approval #2013/155). The procedures of the experiments are adopted from [15], where each participant is randomly assigned to evaluate only one website.

Once the data is cleaned from missing values and outliers, an exploratory factor analysis (EFA) is carried out to measure the scales' validity and reliability. The analyses are important because the instruments are being reused from various resources and applications; in this regard the instruments assessed only the visual design of a website instead of assessing the usability of the entire website. The conceptual model is amended according to the results obtained from EFA, resulting to combination of the visual aesthetic and engagement constructs into a construct labelled as visual engagement [13]. Further exploratory analysis is completed to explore the significant associations between variables (i.e. the factors in the conceptual model) to better understand the nature of the variables. The analysis is carried by using the second-generation technique of data analysis, known as Partial Least Squares Structural Equation Modelling (PLS-SEM). PLS-SEM is chosen due to the following justifications:

- This is an explorative study as it is extending the model by Kim and Fesenmaier [2]. PLS-SEM is preferable when the research is exploratory or an extension of an existing structural theory [16].
- Data obtained from the study did not meet the requirement of normal distribution and the sample size is small. PLS-SEM does not require multivariate normality and large sample sizes [17].
- Construct with few items are used in the study [16].
- PLS is particularly well-suited on defining the behavioural intention models in an applied setting [18].

The goals of conducting the PLS-SEM exploratory analysis are 1) to explore significant associations between latent variables to better understand the nature of the variables, which enables to build a theory-supported model [19], and 2) to select the model with better quality for further assessment in the next phase. In this paper, behavioural intention is measured by four items, specifically intention to use, intention to purchase, intention to recommend, and one item to measure the attitude towards the destination.

Once the usable data are finalised, the data are split into two groups, that is the non-persuasive group and the persuasive group. At this stage, there are 181 rows/responses that represent the persuasive group, whereas only 109 rows/responses represent the non-persuasive group. As a result, the data proportions are unbalanced because the persuasive group results in approximately 62.4% of the data, while the non-persuasive group only accounts to 37.6% of the data. It is highlighted in [20] that unequal sample size bring about the situation where "the effect size formula will tend to underestimate the actual effect size". "Insufficient power to obtain a p-value at some predetermined level of significance" may occur with unequal sample sizes [21]. Researchers also discovered that equivalence testing performs best when sample sizes are equal [22]. Therefore, equal sample size is used to compare the effect of persuasive and non-persuasive visuals on the users' motivation and behavioural intention to avoid the above-mentioned issues. Notably, PLS-SEM minimum sample size should be ten times the largest number of structural paths directed at a particular latent construct in the structural model [16]. Hence, the assessment of the basic SEM model requires at least 50 responses for each group, because the maximum structural paths directed at a latent construct in the basic SEM model are 5. Since 109 are well above 50, it is concluded that the sample size used for the study is satisfactory.

RESULTS AND CONCLUSION

In the situation of finding a model with better quality, model fit indices should be referred. Kock [23] recommends three main criteria during a model assessment, namely 1) significant p values at 0.05 level for the Average path coefficient (APC), 2) Average block VIF (AVIF) must be lower than 5, and 3) significant p values at 0.05 level for Average R-squared (ARS); respectively in order of importance. Referring to TABLE 1, it is noted that the model with persuasive sample data seems to have better quality than the one tested with non-persuasive sample data, which can be observed through the improved APS, and ARS indexes.

Further investigations are carried out on the structural models by assessing the coefficient of determination (R-squared) and path coefficients. R-squared is a statistical measure that indicates how close the data are to the fitted regression line, where 100% of R-squared value indicates that the model explains all the variability of the response data around its mean. The value of R-squared at 0.75, 0.50, or 0.25 are considered as substantial, moderate, or weak, respectively [16]. As shown in Table 1, the R-squared values for the non-persuasive group are all below 0.50; hence the respective variables are explained by less than 50% by the structural paths that are directed to them. Meanwhile

the R-squared value for the persuasive group ranges from 34.0% to 66.3%, showing a better variability of the response data.

Concurrently, path coefficients are assessed to estimate the magnitude and significance of the hypothesised causal connections between the sets of variables. The measure determines the strength of the association between the predictor variable and the dependent construct. The path coefficients should be supported with the recommended effect size (ES) of 0.02, 0.15, or 0.35; representing small, medium or large effects, respectively. Any path coefficient with ES that is below 0.02 is regarded as irrelevant, even if the corresponding p values are significant [23].

TABLE 1. Exploring the constructs' relative to the basic SEM model

	Non-Persuasive Data (N=109)		Persuasive Data (N=109)	
Average path coefficient (APC)	0.214, P=0.005		0.268, P<0.001	
Average block VIF (AVIF)	1.317		1.984	
Average R-squared (ARS)	0.264, P<0.001		0.514, P<0.001	
Latent variables coefficients: R-squared (R²)				
Informativeness	weak		0.434	
Usability	n.a.		n.a.	
Visual Engagement	0.346		0.642	
Credibility	weak		0.340	
Satisfaction	0.429		0.490	
Intention	weak		0.663	
Path coefficients				
Associations	β	ES	β	ES
Usability → Informativeness	0.451	0.204	0.659	0.434
Informativeness → Credib	0.308	0.105	0.441	0.249
Usability → Credib	n.s.		0.190	0.091
Informativeness → VisEng	0.247	0.115	0.360	0.257
Usability → VisEng	0.225	0.096	n.s.	
Credib → VisEng	0.284	0.135	0.420	0.297
Informativeness → Satisfy	0.296	0.113	0.198	0.117
Usability → Satisfy	0.376	0.181	0.306	0.181
VisEng → Satisfy	0.281	0.133	0.248	0.149
Credib → Satisfy	n.s.		n.s.	
Informativeness → Intention	n.s.		n.s.	
Usability → Intent	n.s.		n.s.	
VisEng → Intent	0.393	0.190	0.384	0.290
Credib → Intent	n.s.		0.209	0.139
Satisfy → Intent	n.s.		0.272	0.183

** weak: R²<0.25, n.a.: not applicable, n.s.: not significant

The exploratory analysis (see Table 1) shows that the persuasive group sample has more significant associations compared to the non-persuasive sample. The persuasive sample also exhibits stronger path coefficients, evident with stronger effect sizes, ranged from 0.091-0.434. Furthermore, with the non-persuasive sample, only visual engagement significantly impacted the perceived behavioural intention, while other predictors appeared to be insignificant. On the other hand, with the persuasive sample, as credibility, satisfaction, and visual engagement increased, perceived behavioural intention also significantly increased with effect size ranged from 0.139-0.29.

Thus, it is concluded that persuasive visual is having more impact towards user's motivation and behavioural intention compared to the non-persuasive visual, which is evident with stronger path coefficients. Moreover, the observed variables in the persuasive model are better explained compared to the variables in the non-persuasive model, as highlighted through the improved R-squared indexes for the respective variables. Notably, the strength of the associations between the predictor variables and perceived satisfaction are slightly stronger in the non-persuasive model. It is inferred that the difference between the visuals for non-persuasive website and persuasive website leads to different impacts on users' perceived satisfaction. Moreover, the non-persuasive website may appear simpler in terms of its visual design compared to the persuasive website that is equipped with additional visuals that are meant

for emphasising the social influence principles. This could very well explain the reason why the association between usability and visual engagement is significant with the non-persuasive sample whereas the same association appears insignificant with the persuasive sample. Conversely, in the model with non persuasive sample, perceived satisfaction insignificantly associated to perceived behavioural intention whereas the same association appears to be significant with persuasive sample. This finding suggests that even though users are more satisfied with much simpler visual design, however this attitude is not strong enough to influence behavioural intention. Hence, further investigations are required to understand on how the web users interpret visual messages, as well as to identify which persuasive visuals positively influence web users to stay at a website, and motivate them to make favourable decisions or actions.

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