

# Perceived Affordances of Web Advertisements: Implications for Information Artifacts Design

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## Abstract

*Perceived affordance is utilized as a theoretical lens to explore factors influencing consumers' positive or negative perceptions of Web advertisements, which is one type of information artifacts. Content and form are two main attributes shared by information artifacts. Based on the literature review and content analysis, a conceptual framework is proposed to shed light on perceived affordance of information artifacts for the IS researchers and designers.*

**Keywords:** Information artifacts, Web ads, Perceived affordances, Design

## 1. Introduction

The Internet has transformed consumers' lives and how they experience information, work, entertainment, and brands. According to a recent report from the Interactive Advertising Bureau (IAB) and PricewaterhouseCoopers (PwC), U.S. Internet advertising revenues hit \$6.4 billion in the third quarter of 2010, representing the highest quarterly result ever for the online advertising industry and a 17% increase from the same period in 2009 (IAB 2010). Web advertisements or Web ads are those advertisements that are presented to the targeted consumers through the World Wide Web. With the increase of Web ads on the Internet, many researchers from various disciplines have been paying attention to the effectiveness of Web ads, i.e. how consumers react to Web ads and how Web ads affect consumers. Zhang and Kim (2008) conducted a qualitative meta-analysis to provide a comprehensive view of the state of empirical research on various factors that influence consumers' reactions to Web ads and factors that influence Web ads' impacts on consumers. The findings reflected that three kinds of interactions (View-Ad, View-Host, and View-Product/Service) play an important role in terms of the consumers' perceptions towards Web ads. The Viewer-Ad interaction is about consumers' reactions to the features or characteristics of Web ads. The Viewer-Host interaction represents consumers' perceptions of the hosting entities (normally websites). The Viewer-Product/Service interaction concerns about consumers' perceptions and attitudes to the products or services being advertised. The last two interactions may be more related with the marketers, policy makers, and managers who are behind the Web ads, while the Viewer-Ad interaction may attract more interest from the designer's perspective.

Design science is one of the most important research paradigms in Information Systems (IS) field (Henver et al. 2004). Previous studies investigate the design principles of IT artifacts from different angles (Ponte et al 2009; Hanseth and Lyytinen 2010; Tilson et al 2010). As a large portion of consumers don't have direct interaction with the technical layer of the IT artifacts, and technologies are often transparent to those consumers, they may value more about the applications and information that are exposed to them. In that case, it is meaningful to explore the IT artifacts in a dualistic way, i.e. we divide the IT artifacts into the 'hard' and 'soft'

components. The former focuses on technology dimension, such as the emergent technology innovation, convergent technology mashup, technology evolution, change, and adaption, while the latter highlights the information dimension of IT artifacts, which has more relations with social purposes that address the information lifecycle, such as information being acquired or created, processed, disseminated, and used (Zhang and Benjamin 2007), thus we name it *Information Artifacts*. The concept of information artifact covers a wide range of information technology products, such as blog, twitter, wiki, and user-generated media, to name just a few. Web ads are one kind of information artifacts. So far few researchers from IS discipline have examined the Web ads as an information artifact from the design perspective, hence, in this paper we attempt to use the “Perceived Affordance” as a theoretical lens to study the design related issues of Web ads. Affordance is a perceptual psychological concept defined by Gibson (1979) as the actionable properties between the environment and the animals, and then it was introduced to the interaction design research by Norman (1999), who clarified the differences between real affordance and perceived affordance. Perceived affordance is users’ perception of actionable properties of the artifact, and it can result from the mental interpretation of environments based on consumers’ past knowledge, experiences and memories (Norman 2002). The idea of affordance has gained increasing attention from researchers who share the interests of design research, and many previous studies emphasized on the real affordances (Maier and Fadel 2009; Sadler and Given 2007; Zhang 2008). The paper aims to explore various types of the perceived affordances of Web ads, and the representations of those perceived affordances on the main attributes of Web ads as an information artifact. Our study may help the Web ads designers better understand users’ perceptions, and shed light on perceived affordances of information artifacts for the IS researchers.

## **2. Related Concepts**

In this paper, two groups of related concepts will be clarified. One group of concepts is relevant to the information artifacts design. Based on our observation, information artifacts share two primary categories of embedded attributes, i.e. content and form. Another group of concepts is relevant to people’s perceptions in terms of various kinds of affordances, i.e. perceived affordances.

### ***2.1 Contents and Forms***

In terms of contents of Web ads, they mainly consist of types and attributes. In terms of forms of Web ads, it mainly consists of presentations and behaviors. Form presentations refer to the static elements, including place location, banner size, color scheme, and media form, etc., while form behaviors refer to some dynamic elements such as movement, flashing, pop-up, etc. (Zhang and Kim, 2008).

### ***2.2 Perceived Affordance***

When information artifacts are designed, they possess certain degree of affordance, however, due to consumers’ mental transformation processes, sometimes, the real affordance of the information artifacts cannot be detected by the consumers, and the consumers’ perceived affordance of the artifacts may mismatch the real affordance. Hartson (2003) expands the affordance concept and identifies four types of affordance, including physical affordance, cognitive affordance, sensory affordance, and functional affordance. In our study, the perceived physical affordance and perceived cognitive affordance are developed on the basis of Hartson

(2003). However, the perceived physical affordance in this paper is broader, covering the physical affordance and sensory affordance in Hartson's study (2003). In addition, we add two new types of perceived affordance, one of which is perceived affective affordance, related to the affective properties of the information artifacts. The other one is the perceived control affordance, considering the controllability of the information artifacts from consumer's angle. It is worth noting that these four types of perceived affordance are not considered exclusively, and some of users' perceptions or reactions may involve more than one perceived affordance.

### *2.2.1 Perceived Physical Affordance*

Physical affordance is the attributes of the information artifact that can be sensed, acted upon, or physically manipulated by users or consumers for a particular purpose. Perceived physical affordance usually utilizes human senses to achieve certain goals of the information artifact. Perceived physical affordance is a user's perception or appraisal of the degree of Information artifact's physical affordance. For example, Web ads with well-designed figures may support human sensing. In interactive technology design, vision, audition, and touch are three physical attributes considered to lower the complexity between human-computer interaction (Te'eni et al. 2007).

### *2.2.2 Perceived Cognitive Affordance*

Cognitive affordance is the attributes of the information artifacts that would help, aid, support, facilitate or enable a consumer's thinking, knowing, and/or cognitively/mentally processing something, which may take effect immediately or have a potential impact. Perceived Cognitive Affordance is a user's perception or appraisal of the existence or lack of information artifacts' cognitive affordance. It is not about how people learn to use the artifacts, but it is about users' perceptions of the artifacts to support conceptual, analytical, and problem-solving process. Types of examples include: provide information, such as news, reminders, reinforcement, or suggestions, etc.; influence information processing, such as affect work, jobs, learning, or performance, etc.; inspire or enlighten some ideas which may lead to some valuable behaviors.

### *2.2.3 Perceived Affective Affordance*

Affective affordance is the attributes of the information artifacts that can trigger or stimulate users' emotional reactions. For example, Web ads with pornographic scenarios may offend some consumers. Perceived Affective Affordance is user's perception or appraisal of information artifacts' affective affordances. For example, some people may feel certain web ads make them feel positive about life, or make them feel embarrassed.

### *2.2.4 Perceived Control Affordance*

Control affordance is the attributes of information artifacts that emphasize a consumer's power of making choices of the situation or the environment rather than of one's own behavior. For example, whether it is a consumer's own decision to enter into a Web ad reflects the degree of control affordance. It is different from physical affordance in that physical affordance does not hint whose will it is for the information artifacts to be displayed or interacted in certain way, while control affordance gives hints of who should initiate the action or interaction. Perceived Control Affordance represents the features of information artifacts that support consumers' willingness to be in control. Consumers tend to feel and behave more positively when they perceive that there is more room for control in the environment. Examples can be something that

against the consumer’s will. For instance, pop-up ads block the main content without any early warning, or unwanted noises interfere with current tasks without any noticing, etc.

### 3. Research Method

The data used for this study was a part of a larger dataset collected through an online survey. Since it was an exploratory study, we only used the data collected through two open-ended questions in the survey instrument, which asked the respondents to list the most negative and positive web ads they ever met, and to explain the reasons. Participants were 111 Chinese users of Web ads, and the demographic showed that most of them were from universities and colleges in China. Each participant’s responses to one question were treated as one unit for coding and analysis. Open coding was conducted by two coders independently. The coding scheme was developed throughout the coding process. The raw disagreements between the coders are around 70%. Disagreements were resolved by consulting with the third researcher and the final agreement was 100%.

### 4. Preliminary Findings

According to our statistics, 77 out of 111 respondents gave their answers about positive ads, and 107 out of 111 respondents gave their answers about negative ads. Besides comments on ads, 25.97% of the positive responses and 35.45% of the negative responses referred to the products/ services being advertised, and 22.08% of the positive responses and 3.74% of the negative responses referred to the hosts where those ads appeared. Those numbers support that the respondents’ perceptions of Web ads are not only relevant to ads itself, but also relevant to the products/ services and hosts.

Among the participants who responded on the Web ads themselves, Table 1 shows the frequencies of the four types of perceived affordances, indicating that perceived affordance plays an important role in shaping consumers’ perception of the Web ads. Specifically, the high frequencies of the perceived affordances in the negative ads category may indicate that the lack of those perceived affordances is more likely to result in consumers’ negative perceptions. Table 1 illustrates that perceived cognitive affordances significantly affect consumers’ perceptions of both positive and negative Web ads. Additionally, perceived physical affordances and perceived cognitive affordances are also frequently referred and valued by the respondents.

Table 1 Perceived Affordances of Positive/ Negative Advertisements

	<i>Perceived Physical Affordances</i>	<i>Perceived Cognitive Affordances</i>	<i>Perceived Affective Affordances</i>	<i>Perceived Control Affordances</i>
<b>Positive</b>	17	66	17	10
<b>Negative</b>	50	102	22	55

Table 2 shows the co-occurrences frequencies of the “Content/ Form” codes and the “Perceived Affordances” codes. The “Perceived Cognitive Affordances” and the “Content Attributes” are the pair with the highest frequency that is mentioned by respondents. For example, the respondents perceived the Web ads to be positive because those ads provide suggestive information, such as book recommendation. Another interesting finding is that the “Perceived Control Affordances” and the “Form Behavior” is also a pair of codes with high frequency,

which indicates that consumers would like to have higher level of control over the Web ads, especially the Web ads' behaviors. The data also shows that the overall co-occurrences frequencies between perceived affordances and content are much higher than that between perceived affordances and form, which indicates that regarding the designing of Web ads as an information artifact, designers should place more emphases on the content part, especially on the content attributes which may have the strongest relevance to consumers' perceptions.

Table 2 Frequencies of Co-occurrence of Web Ads Content/ Form and Perceived Affordance

		<i>Perceived Physical Affordances</i>	<i>Perceived Cognitive Affordances</i>	<i>Perceived Affective Affordances</i>	<i>Perceived Control Affordances</i>
<b>Content</b>	Content Type	20	113	26	32
	Content Attribute	24	137	32	43
	<b>Total</b>	<b>44</b>	<b>250</b>	<b>58</b>	<b>75</b>
<b>Form</b>	Form Presentation	12	28	11	12
	Form Behavior	15	61	16	59
	<b>Total</b>	<b>27</b>	<b>89</b>	<b>27</b>	<b>71</b>

### 5. Future Work

Based on the discussion above, we propose the following conceptual framework (see Figure 1) and suggest considering the perceived affordances as a new lens from which researchers can study the design related issues of Web ads as an information artifact. We believe that the perceived affordances can largely support the positive design of information artifacts, especially act on two attributes of information artifacts: content and form. It would be interesting to explore to what extent each type of perceived affordances can influence consumers' perception of the content or form attributes of the information artifacts, and consequently, have impact on the negative or positive judgments or attitudes towards the design of information artifacts. Our future work may further explore some constructs derived from the four types of perceived affordances, and conduct some survey or lab experiment studies to examine how the perceived affordances can impact the design of information artifacts (e.g. Web ads), thus propose some design principles or guidelines.

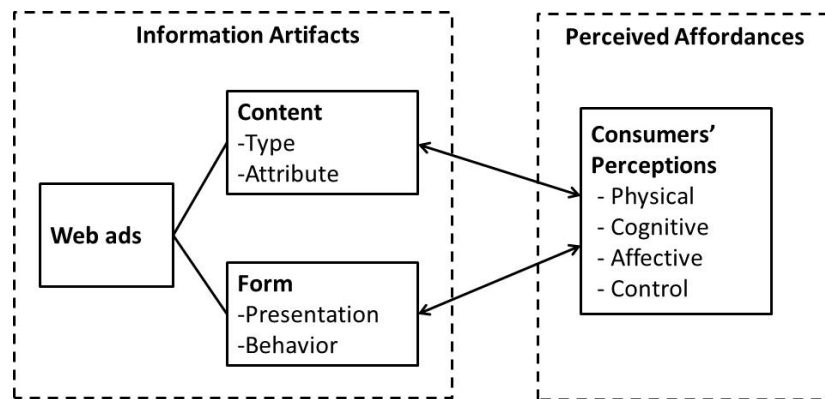


Figure 1 A Conceptual Framework of the Information Artifacts and Perceived Affordances

References are available upon request