Visual Presentation Modes in Online Product Reviews and Their Effects on Consumer Responses

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ABSTRACT

Online product reviews posted by consumers are becoming a staple part of e-commerce websites. Researchers demonstrate that the volume and strength of online reviews, among others, have a significant impact on consumer responses. These studies have focused on the effect of text-based online reviews, but current information technologies enable the posting of online reviews with higher visual content, such as with images and videos. Using the elaboration likelihood model and the dual coding theory, we examine the effects of three visual modes for presenting online reviews with three products – backpack, digital camera and video game. Our results indicate that video-based online reviews are perceived as being more credible, helpful, persuasive, and providing a great sense of involvement, compared to text-based and image-based online reviews, but with no significant differences among the latter two. The influence of presentation modes on consumer responses is partially moderated by product type.

Keywords

Visual interface, online product reviews, presentation mode, elaboration likelihood model, dual coding theory

INTRODUCTION

Advancements in information technology (IT) are constantly changing the nature of human computer interactions (HCI), as new visual and animation laden forms of communication enter our daily life (Jiang and Benbasat, 2007; Zhang, 2006). The common adage "One picture is worth 10 thousand words," is now complemented with this: "A YouTube Video Is Worth Nearly 2 Million Words!" (Crowell, 2009). Images and videos are starting to be included in corporate communications as well as in product marketing strategies. For example, Amazon, Best Buy, and a few other e-commerce websites are now allowing the posting of consumer-generated online product reviews (hereafter referred as online reviews), in richer visual formats, such as images and videos. For IS researchers studying HCI and e-commerce topics, the natural follow-up inquiry is whether these new visual forms of online reviews are justified from a theoretical perspective and whether they have any practical effect on consumer responses.

Online reviews are considered useful to marketing a product because they create an electronic word-of-mouth (eWOM) buzz, and thus influence consumer decisions (Chen and Xie, 2008; Chevalier and Mayzlin, 2006). Previous findings indicate strong positive relations between the characteristics of online reviews and sales performance (Duan, Gu and Whinston, 2008; Forman, Ghose and Wiesenfeld, 2008; Hong, Thong and Tam, 2004; Zhu and Zhang, 2006). Although a large body of HCI research shows that the presentation mode of information influences how users perceive information (Vessey, 2006), the visual presentation modes of online reviews has not been addressed, perhaps due to its recency. Does posting more visual online reviews have an effect on consumer responses? Will high visual presentation only work for certain types of products? To address these issues, we conducted a laboratory experiment to study the effects of visual media on three products, backpack, digital camera and digital game. As predicated by the elaboration likelihood model (ELM) and the dual coding theory (DCT), video-based reviews are perceived to be more credible, persuasive, and helpful and have stronger effect on intentions to purchase. The effects on product type were not conclusive and require further investigations. We discuss implications and future research directions that emerge from this study.

CONCEPTUAL BACKGROUND

Online review of products and services, referred as eWOM, is a powerful tool that is advantageously used by vendors (Li and Hitt, 2008; Park, Lee and Han, 2007). For example, Amazon Vine™ program is created to enable a select group of loyal Amazon consumers to post opinions about new items. It is believed that prospective consumers prefer such consumer-generated reviews over opinions from experts, because it is perceived as being more democratic (Dellarocas, Gao and Narayan, 2010). But, the features of online reviews that could be managed to positively impact consumer responses are not evident.

From a review of previous studies, we noted several factors that could impact consumer responses and their intentions to purchase the product, including: 1) online review characteristics (Clemons, Gao and Hitt, 2006; Park et al., 2007); 2) reviewer characteristics (Forman et al., 2008); 3) product characteristics (Mudambi and Schuff, 2010; Zhu et al., 2006); and 4) consumer characteristics (Park et al., 2007). There are no investigations, to the best of our knowledge, on the impact of the visual medium of an online review. Some studies have examined virtual product descriptions posted by the vendors themselves, but not consumer-generated online reviews; moreover, these studies involve interactivity, a feature not yet used in video-based online reviews (Jiang et al., 2007).

Figure 1, excerpted from actual online reviews, highlights the difference in the presentation mode of online reviews, ranging from pure text, to text with image, to the most visual presentation mode, video (readers can hear the piano in the video review by clicking it with pressing the ctrl key). Intuitively, it may seem that online reviews that use image and video, instead of text, will present information in a more vivid manner, and thus evoke more positive consumer responses. But such a conclusion is hasty and could be incorrect. Prior HCI research indicates that the dynamic elements in animated videos, could be attention-diverting, rather than attention capturing, and may not lead to intended effects of increased involvement, and attention from users (Hong et al., 2004; Vessey, 2006; Zhang, Craciun and Shin, 2010). Researchers also caution about naïve realism, a situation where people find seemingly realistic presentations as useful, although in reality, their ability to extract information could be worsened (Smallman and John, 2005).

| a) Text-based review | b) Image-based review | c) Video-based review |

Figure 1. Samples of Online Reviews in Different Presentation Modes

Therefore, as Tufte and Weise Moeller (1997) argue, evaluation and testing should take place to guide the choice of an appropriate visual mode to present elements of our, multi-dimensional, multivariate world on the flatlands of our computer screens.

RESEARCH FRAMEWORK

This study investigates the effects of the presentation modes in online reviews on consumer responses via the elaboration likelihood model (ELM) and the dual coding theory (DCT), and explores the moderation effect of product type upon the existing frameworks for product classification.

Presentation Mode

Online product reviews, from the vendors' perspective, are not just about providing additional product information, but in actuality, it is an advertising strategy to persuade the consumer to believe in the product because of statements from other consumers. To examine whether the presentation mode of online reviews may influence the level of persuasion of consumers, we turn to the ELM (Petty and Cacioppo, 1986). According to the ELM (see Figure 2), in the central route, the recipient of a

message gets persuaded, by elaboration and evaluation by the sheer logical arguments in the message. In the "peripheral route," the recipient gets persuaded based on superficial qualities of the message. Peripheral route processes rely more on environmental characteristics of the message, like the perceived credibility of the source, the way in which it is presented, the attractiveness of the source, or catchy slogans that deliver the message. Online reviews are said to have some base-line credibility, because these are "objective" statements from actual consumers. Using a more visual mode to present the same message will enhance its persuasiveness, because as per the peripheral route, the color, motion and sound, makes the message more attractive and credible.
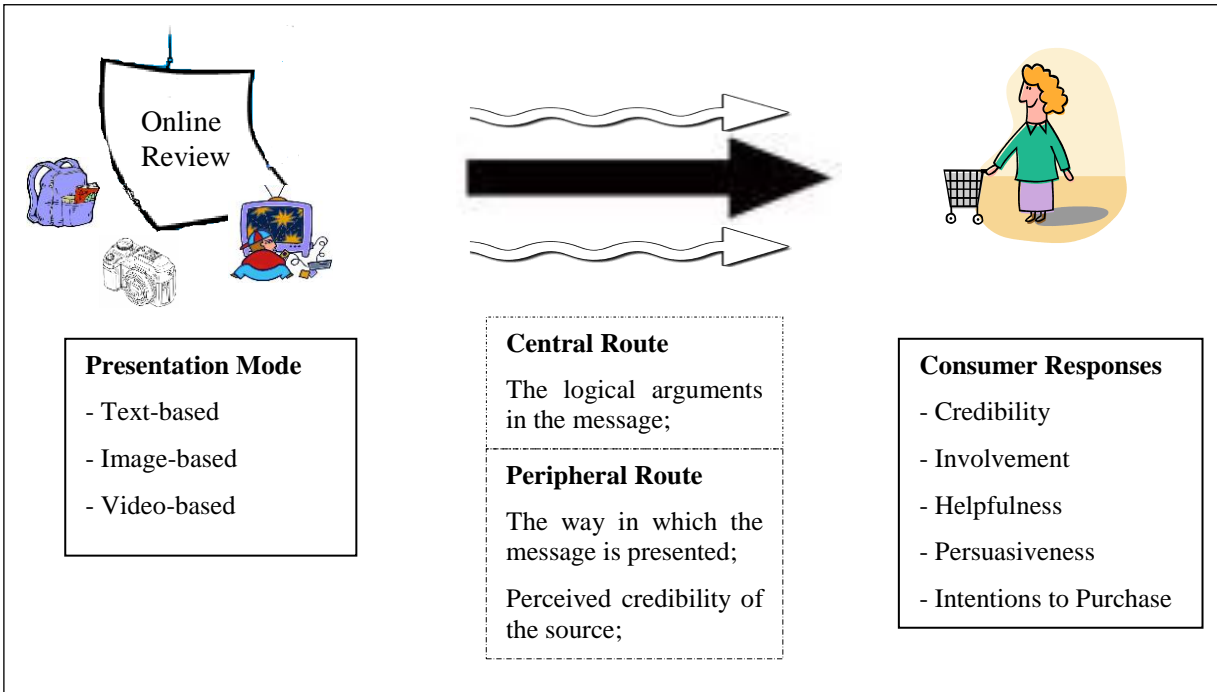

Figure 2. Product Reviews are Perceived by Consumers through Two Routes, as Defined by the ELM

There is also support for this expectation from the DCT (Paivio, 1990, 1991), which assumes an orthogonal relationship between symbolic systems and specific sensorimotor systems. It suggests that when messages are presented in several modes, such as in visual and audio mode, the recipient will pay greater attention, and process them better. Although some caveats have been added to this theory, researchers agree that presentation in multiple modes will lead to more attention and involvement of the user (Mayer, 2002; Sadoski and Paivio, 2001). A text-based online review, is the most common format as shown in Figure 1, and has only one mode of presentation. An image-based online review has one or more images of the product, and a video-based online review includes sound and images and provides the message through several modes. In addition, the video-based review provides depth and spatial cues.

As per the ELM and DCT, moving from text-based to video-based reviews increases the levels of peripheral cues and attractiveness, involves more modes of presentation and will thus lead to increasing effectiveness of the message. Based on the above, we hypothesize:

H₁: *Video-based online reviews generate more positive consumer responses compared to text-based online reviews.*

H₂: *Image-based online reviews generate more positive consumer responses compared to text-based online reviews.*

H₃: *Video-based online reviews generate more positive consumer responses compared to image-based online reviews.*

Product Type

The visual mode effects may not be similar for all products, but due to the limited research, we are not able to precisely anticipate effects for specific product types. Research on visual media in IS, and related disciples, indicates that video and other multiple media format for presentation are most effective in situations when the information content involves several dimensions, dynamic processes, or spatial relationships (Mayer, 2002; Tufte et al., 1997; Tversky, Morrison and Betrancourt, 2002). In other contexts, it is not as useful and could even be distracting (Hong et al., 2004; Smallman et al., 2005). One could anticipate that a video-based online review of a book, will perhaps increase the attention of the consumer, but may not be any more persuasive or credible than a text based review. A book is only one among thousands of products, and to anticipate specific effects, a product classification that can categorize and distinguish products based on its physical dimensions, spatial layout and other features is necessary. Currently, such a classification does not exist.

In the marketing literature, products are referred as being either search or experience goods, or hit or niche products (Dellarocas et al., 2010; Girard and Dion, 2010; Nelson, 1970). Search and experience goods describe the extent of availability and costs to a consumer to obtain information on the product. Goods such as books, are search products on which consumers can easily, and with certainty, obtain information on their attributes, such as price and quality, while experience goods, such as music albums and video games, are products on which information cannot be known without direct experience (Girard et al., 2010; Mudambi et al., 2010). Attributes of experience goods are subjective, and there is a need to use "one's senses," to evaluate the product (Mudambi et al., 2010). This classification does not always hold true, because most goods have some level of search and experience good characteristics and some products, such as cameras, are classified, both as a search good (Mudambi et al., 2010) and an experience good (Girard et al., 2010). One the other hand, product classifications of "hit" or "niche" products speak to the market popularity of a product and not the information content.

Hence, because of no clear framework or theory to guide expectations on product type influence, we explore the effects by using three products in this study in order to determine the relationship between visual mode and product type. These three products fall into different locales on the scale of the search/experience goods classification (Girard et al., 2010; Mudambi et al., 2010).

RESEARCH METHOD

To provide a more visual and novel presentation of our experimental procedures, we have created a YouTube video available at http://www.youtube.com/watch?v=RB5ZPlcT8xo.

Design and Measurement

We used a factorial experimental design with repeated measures to test our hypotheses.

The independent variables consisted of 3 presentation modes ranging from least visual to most visual media. They are: a) text, b) image with text, and c) video, we used three products: backpack, digital camera and videogame. These were chosen because a backpack is considered a search good, a camera is viewed as a search and experience good, and a videogame is seen as more of an experience good (Girard et al., 2010; Mudambi et al., 2010). We felt that by using these broad variations in the characteristics of product type, we could test our hypotheses in a robust way and obtain some initial information on whether product type matters.

We chose a broad range of dependent variables to evaluate consumer responses from prior research in e-commerce and HCI research. *Involvement* refers to the extent of time, thought, energy and other resources consumers devote to the purchase process. The measure of involvement was adapted from Hess, Fuller and Mathew (2006). *Credibility*, refers to the extent a recipient of a message believes that it is true, objective, trustworthy and reliable and this was adapted from Hilligoss and Rieh (2008). *Helpfulness* of a review, sometimes referred as diagnosticity, refers to the extent to which a peer-generated product evaluation facilitates the consumer's purchase decisions and its measure was adapted from Jiang and Benbasat, Mudambi et al. (2004; 2010). *Persuasiveness* refers to the extent a review is perceived as convincing and helpful and its measure was taken from Zhang et al. (2010). *Intentions to purchase* refers to the extent a consumer is willing to purchase the product in the near future and was adapted from Pavlou and Fygenson (2006). The number of items for each dependent variable is: involvement (5), credibility (5), helpfulness (3), persuasiveness (4), and intentions to purchase (3).

In addition, we also measured participants' demographic characteristics such as gender, age, GPA, computer skills, online shopping experience, and experience with online product reviews.

Experimental Procedure

We collected data in a specially designed computer laboratory, with a computer and headset for each participant, in an independent cubicle, so that participants do not disturb one another. The online reviews were prepared by adapting actual online reviews of each product posted on Amazon.com.

Because prior studies show that review length and content might influence consumer response (Mudambi et al., 2010), each online review in each presentation mode was prepared to convey the same information and to be the same length. This also ensures that the central route messages in all presentation modes were the same. The text condition had only textual content, the text with image condition had two additional images, and the video treatment presented the same information in a video with moving images. Because prior research has shown extremity of reviews matters (Clemons et al., 2006; Mudambi et al., 2010), highly negative/positive words, if any, were removed to avoid confounds. Undergraduate business students from a state university in the US volunteered, and were given participation credits. Based on the pilot test on 20 subjects, we reduced the length of each review to about 400 words, or 2.5 minutes of video playing time, modified our questionnaire, and fine-tuned our procedures.

In our experiment, we randomly arranged such that each participant received reviews on all three presentation modes, one for each product. So, a participant may get one review on the backpack in text, one review on camera in text with image, and one review on videogame in video. When participants reported to the session for the experiment, they were welcomed and provided with general instructions. Because our experiment was conducted online, all participants were asked to start on their work by clicking on the shortcut displayed on the computer screen. After they answered the background questionnaire, all participants read a product description given by the vendor, then read/saw the online review (in the randomly generated medium) and then answered the questionnaire capturing their responses on the dependent variables. This was repeated for all three products. In the experiment, before the video-based online review was played, participants were reminded to put on the headset, which had be checked and adjusted to an appropriate volume.

Overall, the total experiment lasted about 30 minutes. After completion, participants were asked to fill out an open-ended opinion survey.

Participants

We had a usable sample of 67 from 71 participants. We eliminated 4 subjects, who did not answer manipulation check questions correctly or didn't go through the experiment intently such as using their cell phones.

Participants' average age is 22.3 years old with a standard deviation of 4.5, a high of 51, and a low of 19. Their average self-reported GPA is 3.25, ranging from 2.3 to 4. The sample consisted of more males (80.6%), than females (19.4%). On average, they spent 3.7 hours per day on computers, and most of them (98.5%) have used computers for 2-5 years. They are very familiar with web surfing and E-Mail. Furthermore, most of them have online shopping experience (88.1%) and read online consumer reviews when they shopped online (85.1%). Because all participants responded to all three modes of presentation, individual differences were experimentally controlled.

FINDINGS

Reliability and Validity

As shown in Table 1, the Cronbach's Alpha and composite reliability for each construct are above 0.9, indicating good scale credibility. The lowest item loading of each construct is greater than .70, and all AVE (Average Variance Extracted) values were greater than 0.5, demonstrating high convergent validity. The square root of the AVE (diagonal elements) is greater than the correlations (off-diagonal elements) between the constructs, demonstrating high discriminant validity. All these values above show that our measures, adapted from prior studies, have high reliability and validity in the context of online reviews.

Hypotheses Testing

Because we didn't find significant correlation between control variables and dependent variables, we conducted ANOVA procedures followed by the Tukey multiple comparison tests among treatment conditions. Our results strong support that consumer responses are significantly different across presentation modes. First of all, compared with text-based reviews, video-based ones lead to more positive consumer responses (see Table 2), and therefore, H_1 is strongly supported. However, we find no significant difference on all the five consumer response variables between image-based and text-based online

reviews, so H_2 is not supported. The difference between video-based online reviews and image-based reviews is a little bit complex. For the first four dependent variables (i.e. credibility, involvement, helpfulness, and persuasiveness), we find very significant difference between video-based and image-based reviews. However, for intentions to purchase, we find no significant difference between the two presentation modes on intentions to purchase. Thus, H_3 is partially supported.

Overall, our results reveal that presentation modes of online reviews generate different consumer responses. Compared with text-based and image-based reviews, video-based reviews generate more positive consumer responses in that participants perceived it to be significantly more credible, helpful, persuasive, and providing a greater sense of involvement. Video-based reviews also generate significantly higher intentions to purchase than the text-based, although there is no difference between video-based and image-based on the construct. Accordingly, consumers seem to perceive video presentation mode as more useful than the other two modes in the context of online reviews. Surprisingly, no significant differences have been found between text-based and image-based reviews on consumer responses.

Factor	Mean	Std. D	The lowest factor loading	Cronbach's Alpha	CR	AVE	Correlation Matrix				
							F1	F2	F3	F4	F5
F1: Credibility	5.45	1.21	.858	.922	.927	.810	.900				
F2: Involvement	4.47	1.54	.710	.904	.916	.734	.378	.857			
F3: Helpfulness	4.74	1.64	.866	.962	.935	.827	.772	.467	.909		
F4:Persuasiveness	4.28	1.62	.828	.927	.928	.764	.709	.438	.860	.874	
F5:Intentions to purchase	2.92	1.80	.982	.985	.986	.972	.361	.360	.472	.585	.986

Note: Std. D denotes Standard Deviation; CR denotes Composite Reliability; AVE denotes Average Variance Extracted; Diagonal elements on correlation matrix display the square root of AVE.

Table 1. **Descriptive Statistics, Reliability, Validity, and Correlation Matrix**

Factor	Mean (SD)			ANOVA Alpha	Multiple Comparison (Tukey HSD)
	Text-based (T)	Image-based (I)	Video-based (V)		
Credibility	4.68 (1.13)	4.92 (1.14)	6.01 (0.94)	.000	V > I** = T
Involvement	3.84 (1.48)	4.33 (1.37)	5.24 (1.44)	.000	V > I** = T
Helpfulness	3.95 (1.66)	4.50 (1.52)	5.77 (1.17)	.000	V > I** = T
Persuasiveness	3.56 (1.61)	3.99 (1.44)	5.29 (1.25)	.000	V > I** = T
Intentions to purchase	2.52 (1.56)	2.90 (1.77)	3.34 (1.85)	.031	V > T*, V=I, I=T

Note: ** significant at .001; * significant at .01.

Table 2. Effect of Presentation Modes on Consumer Responses

Moderation Effect

To understand if visual presentation mode effects are moderated by product type, we tested interaction effect between product type and presentation modes. Here, we ignore the image-based because, as seen above, it is not significantly different from the text-based. We consider two pair of products: videogame (mostly experience good) vs. backpack (mostly search good), videogame (mostly experience good) vs. camera (search and experience good). For each pair, we first draw diagrams to show the interaction effect, and then in order to test the significance of interaction effect, we run a regression model, in which independent variables are product type, presentation mode, and the interaction between product type and presentation mode, and the dependent variable is consumer responses.

For the first pair (see Figure 3), although some consumer responses seem to show a pattern of interaction effect, the interaction effects are not significant: Credibility (p=.116), Involvement (p=.246), Helpfulness (p=.119), Persuasiveness

(p=.106), and Intentions to purchase (p=.714). For the second pair (see Figure 4), the interaction effect is much more evident. Tests of interaction reveal that the moderation effect is significant for three variables on consumer responses: Involvement (p=.030), Helpfulness (p=.011), and Persuasiveness (p=.041). However, the moderation effect is not significant for the other two variables: Credibility (p=.144) and Intentions to purchase (p=.478).
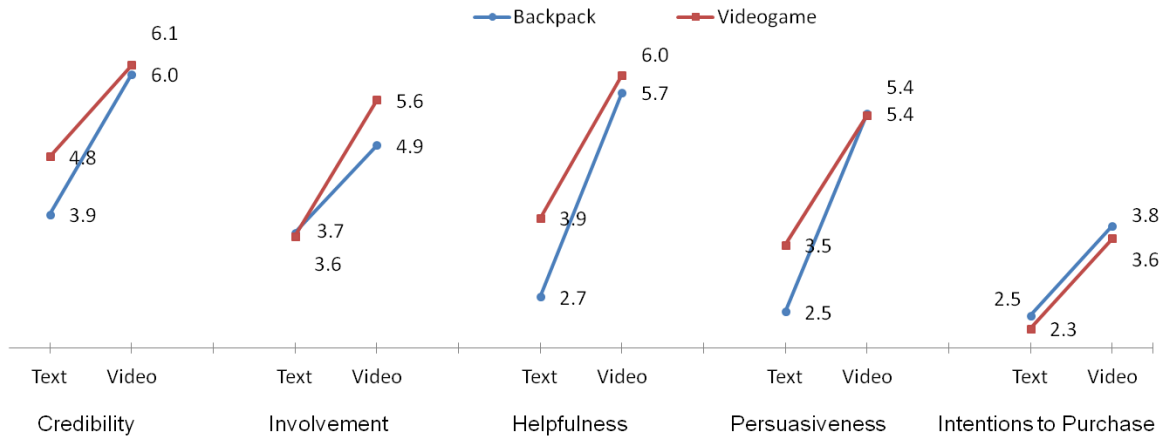

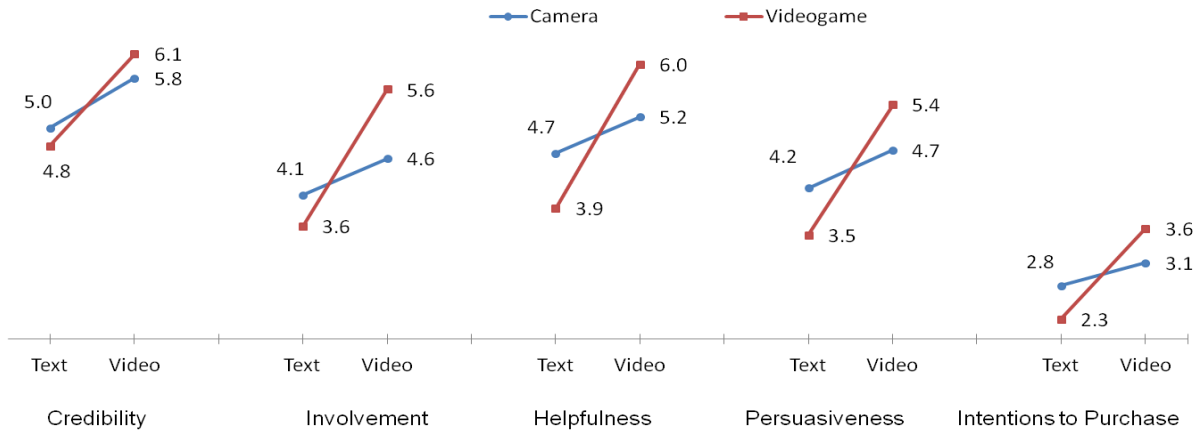**Figure 3. Interaction Effect between Backpack and Videogame**

Figure 4. Interaction Effect between Camera and Videogame

These interesting findings demonstrate that the influence of presentation mode on consumer responses is partially moderated by product type, but the moderation effect might vary with consumer responses and classification of product type. This has to be investigated and could lead to some promising future research avenues. Interestingly, even in the interaction model, we find video-based online reviews generate better consumer response than the text-based, which further adds supports to H_1.

DISCUSSION, LIMITATIONS, AND ONGOING RESEARCH

Our findings point to strong support for the use of videos in online reviews. In many other contexts, the use of multimedia has shown unexpected, even detrimental effects, in decision making and information seeking situations, but in this study, the video-based reviews have superior effects on all measures (Hess et al., 2006; Tversky et al., 2002). Perhaps the video mode is perceived as enhancing the objectivity and credibility aspects of online reviews that have made it a popular marketing tool

compared to expert reviews. Based on the ELM, video mode, as anticipated, enhances the peripheral cues of consumer-generated online reviews and it will be interesting to evaluate if video can also enhance the peripheral cues of expert reviews as well.

Posting video-based reviews take time on the part of the consumer, and our findings suggest that vendors will benefit by setting incentive schemes to encourage consumers to post video-based online reviews. But whether vendors should encourage more use of video in some specific class of products is not as obvious from this study, because our findings are limited to 3 products and more research is required. From a theoretical perspective, our findings add to the message that visual media is useful, but its use has to be carefully evaluated because the effects are not easily predicted, and we observed that adding images were not as useful as videos (Hess et al., 2006; Hong et al., 2004; Tufte et al., 1997).

Our study shows that, as per the ELM, video medium, as anticipated, enhances the peripheral cues of online reviews and it will be interesting to evaluate if video can also enhance the peripheral cues of expert reviews as well.

Answers to open-ended survey questions, suggest that product types should be examined further. Participants seemed to relate to the backpack, and called the videogame "childish". Thus, our choice of the EyePet game was probably not as appealing to the college student participants. This may explain the finding that video medium had strong effects on backpack similar to the videogame, although the former is a search good, and the latter an experience good. Hence, a hit or niche product type classification, or classifications based on social influence, or buyers' prior expectations could be investigated.

This study, similar to other experiments, has several limitations, including the artificial setting. We set up an online purchasing scenario. But all participants experienced all three presentation modes, and underwent a similar, albeit artificial setting; thus, the observed superior effects of the video cannot be discounted. Also, we had more male participants, reflecting our student population, and this has to be monitored in future studies.

As a first study on presentation modes, this points to many issues that should be addressed. We could study participants' initial intentions to purchase and attitudes toward a product, and study whether a presentation mode plays a role in changing these initial levels. We could measure other consumer responses, such as attitude, perceived product quality. We could also find how media affects and interacts with other aspects of online reviews that have been found influential, such as consumer ratings, message valence, reviewer identity etc. Yet another aspect that has to be examined is the quality and the tone of the video. One can anticipate that the tone and gender of the person giving the message will have some influence.

Thus, there are a host of issues relating to the new trend of using visual media in online reviews that necessitates more investigations, provides an intriguing and exciting area of inquiry in e-commerce and HCI.

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