LEARNING FROM NEWS: IS ONLINE BETTER THAN PRINT?

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ABSTRACT. This study compares the process of learning from news between print and online news environments. The study adopts the framework of Cognitive Mediation Model that treats surveillance motivation as the cause of news orientation and news elaboration which in turn are the causes of knowledge acquisition. To identify the differences in news learning between print and online media, a "between-subjects" experiment was used. The study tested the two models using Structural Equation Modelling (SEM). The results show that both print and online models are supportive of the Cognitive Mediation Model. While most of the hypothesized relationships were supported, the study found that orientation in information space has significant effect on knowledge level of print but not online readers. This result suggests the disadvantages of Web non-linearity on learning outcome. The study also found that the mediating role of news orientation was only supported in the print model. The higher R^2 value for print compared to online model suggests the influential role of traditional print in news learning.

Keywords: Cognitive Mediation Model, surveillance, orientation, elaboration, learning from news, medium effects

INTRODUCTION

Research in communication has paid considerable attention to the benefits of news media in building a well-informed public. Investigation of audience learning from news media has, therefore, become a traditional theme in mass communication research, particularly in the field of political communication. Many studies have focused on the extent to which the public learns about political or public knowledge (e.g., Eveland, 1997; W. P. Eveland, Jr., 2001; Tewksbury, 1999; Tewksbury & Althaus, 2000). Some focus on the learning of current issues in general (e.g., D'Haenens, Jankowski, & Heuvelman, 2004; Schoenbach, Waal, & Lauf, 2005). Research also focuses on the effects of different media on learning, looking at which medium is more effective for learning.

Liu and Eveland (2005) find the issue of the effects of different media on learning from news continue to be controversial. This is particularly true as the Internet has now become a powerful news medium. News on Web sites can be audiovisual messages or written messages. As audiovisual messages on the Internet and on television share the same format and structure, the difference in learning from the Internet and television has not yet captured researchers' attention. Researchers have addressed effects of multimedia in the forms of picture, audio and video downloads (Sundar, 2000) and source attribution (Sundar 1998) on processing and perception of online news. Written news, on the other hand, has received considerable attention in mass communication research. The point of difference is that hypertext pages on the Web are organized in a nonlinear manner, whereas text pages in newspapers are arranged and numbered according to a linear pattern. This is theoretically interesting because

the difference in text organizations – nonlinearity versus linearity – suggests different ways of manipulation or navigation, which in turn prospectively leads to differences in learning outcomes.

LITERATURE REVIEW

Past research (such as Eveland, 2001, 2002; Beaudoin & Thorson, 2004) used Cognitive Mediation Model to examine the process behind learning from news. Integrating streams of research in psychology and communications together with news information processing and political knowledge, Eveland (2001) created a model called "the cognitive mediation model". The cognitive mediation model suggests that "motivations for news use influence the processing to which the information is put, and that this processing is the proximal determinant of learning" (Eveland, 2002, p.26). The role of information processing is to mediate the relationship between motivation and knowledge.

Being motivated to seek news is considered as the first step towards learning from news. Motivation can be described as that which can give "impetus to action" (Deci & Ryan, 1985, p. 3) – that which provides both energy and direction to action. The energy involved is related to need – and direction deals with the processes and structures that give rise to action by positing a need for the action (Deci & Ryan, 1985; Reeve, 1997). Scholars originated from Uses and Gratification approach have classified needs into various categories. These include "cognitive needs" – *acquiring* information, knowledge, and understanding (Katz, Gurevitch & Haas, 1973, p. 166). A more popular term used to describe these cognitive needs is "*surveillance*" which generally denotes gaining information about things that might affect someone or will help someone to do or accomplish something (McQuail, Blumler & Brown, 1972, p. 140). Surveillance is a need in the form of information seeking, and has been identified as the most common gratification sought for the use of news media (Becker, 1979; W. P. Eveland, Jr., 2001; Eveland, 2002; McLeod & McDonald, 1985).

The tradition of examining the direct impact of motivation on knowledge has been challenged by many psychologists. Craik and Tulving argue that the "operations carried out on the material, not the intention to learn, as such, determine learning" (1975, p. 269). Similarly, Anderson (1980) argues that "whether or not one intends to learn or not really does not matter. What matters is how one processes the material during its presentation" – motivations or goals are not considered the direct determinant of knowledge acquisition. Rather, it is the processing of information that is considered the more immediate cause of learning. Many studies suggest that motivations can influence information processing (e.g., Burnkrant, 1976; Sadowski & Gulgoz, 1996; Wyer & Srull, 1986). Educational psychologists (e.g., Salomon, 1983; Weinstein & Stone, 1994) claim that motivations can only have an impact on learning through an activation of information processing behaviors.

Information processing refers to "the general act of movement or manipulation of information in memory" (Eveland, 2002, p. 28). The role of information processing – as the cognitive mediation model suggests – is to act as a mediator, a third variable that mediates the relationship between motivations and knowledge. Information processing is measured in terms of attention and elaboration. Eveland describes news attention as "a process through which a subset of information which is available to the senses is selected for processing" (2002, p. 28). News attention in the first stage of processing new information. In this study, attention is excluded from examination and measure "orientation" instead. A lack of a precise conceptual definition of the general concept of attention (Eveland, 1997) is the main reason for its exclusion. The most cited work on attention by Chafee and Schleuder (1986) has identified several categories of attention to news: (1) attention to particular media, (2) attention to general classes of content, and (3) attention to specific news events. These categories, however, are not

mutually exclusive. The measure of attention can be in any combination. Problem of theoretical clarity, therefore, implies a methodological shortcoming: a subsequent reason for the exclusion of attention in this study. This study replaces attention with orientation in the information space.

Orientation is a process of understanding the content and structure of the information space. It denotes a "routine process" of using a medium to understand its content and structure. In contrast, news attention is a rather "short-term" process through which information available to the senses is selected for processing. Thus in the case of news reading that involves routine media use, news orientation suits a study of the present kind better than news attention. In addition to its suitability, this study argues that examining orientation in the context of news reading is of significant research interest because news reading, both from print and online media, involves a navigating process to find news and understand its content. Such navigation denotes the process of orienting oneself in the information space. Orientation, therefore, emerged as a key research focus in the current study.

It is important to note that studies have shown that there are other types of information processing that can affect learning. Eveland and Dunwoody (2002) investigate the role of selective scanning and elaboration as mediators of learning from the web and print. Beaudoin and Thorson (2004) test the cognitive mediation model using news reliance and elaboration as information processing variables that mediate the relationship between motivations and knowledge. In proposing an interactive information processing model, Tremayne and Dunwoody (2001) place rehearsal, elaboration and orientation in the cognition phase. Examining information processing on the World Wide Web, Eveland and Dunwoody (2000) study four types of information processing – maintenance, orientation, elaboration, and evaluation. These studies suggest that elaboration – as a process of connecting and associating new information to other information stored in memory – is central to the processing of information, whereas other types of information processing are somewhat less dominant. Since news elaboration is considered the most dominant type of information processing, its role remains to be examined in the current study.

The hypothesized cognitive mediation model proposed by Eveland (1997) has seven expected paths – six hypotheses of direct effects and one hypothesis of indirect effect. In addition to these hypotheses, the current study compares models for print and online news conditions. Based on the review of literature, the study aims to test the following hypotheses:

H1:   Surveillance motivation has significant effect on news orientation
H2:   Surveillance motivation has significant effect on news elaboration
H3:   News orientation has significant effect on news elaboration
H4:   Surveillance motivation has significant effect on knowledge
H5:   News orientation has significant effect on knowledge
H6:   News elaboration has significant effect on knowledge
H7:   Surveillance motivation has significant indirect effect on knowledge controlling for news orientation and news elaboration

METHOD

Using a "between-subject" experimental design, this study exposed participants to two conditions; an exposure to print and an exposure to online newspapers. Malaysia's national daily newspapers, *Berita Harian* dated 24 April 2014, the day that the experiment was conducted, was used as reading materials in both conditions. Participants are students volunteers recruited from one of the public universities in Malaysia. The random assignment was used as

a control technique to ensure that individual participant variables – such as age, gender and status – are distributed randomly across groups. Participants assigned to the print group (*n* = 147) were asked to read the traditional print version of *Berita Harian* in designated class-rooms while participants in the online group (*n* = 150) were asked to read *Berita Harian* online in computer laboratories. There was no direction given on news selection and reading duration. Participants were free to read the newspaper as they normally do in natural settings. Then a questionnaire was administered to the two groups. The current study utilized existing measures of constructs and variables found in previous studies. The study follows the re-search design of Tewksbury and Althaus (2000) and Eveland et al. (2004) with some modifi-cations made to suit the purpose of this research. The testing of research hypotheses involved "structural equation modelling" (SEM) which has the benefit of minimizing measurement errors and simultaneous reporting of indirect effect based on the initial presence of total ef-fect. Beaudoin and Thorson (2004) employed SEM to retest Eveland's model, and so does the current study. This study used Smart PLS version 4.0 to test the model in two conditions; print vs online.
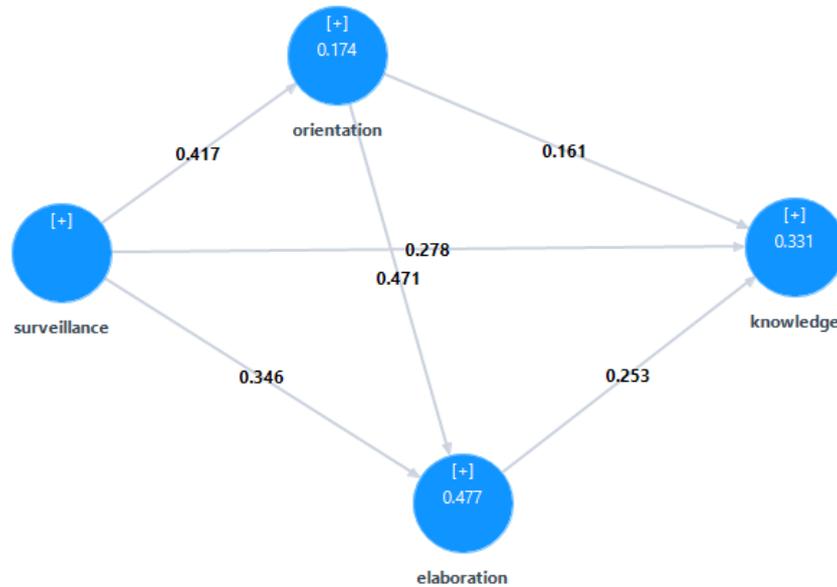
RESULTS

The results of hypothesis testing were presented in online structural model (Figure 1) and print structural model (Figure 2). The testing of measurement model was excluded in this study. Figure 1 shows the results of hypothesis testing for the online condition.
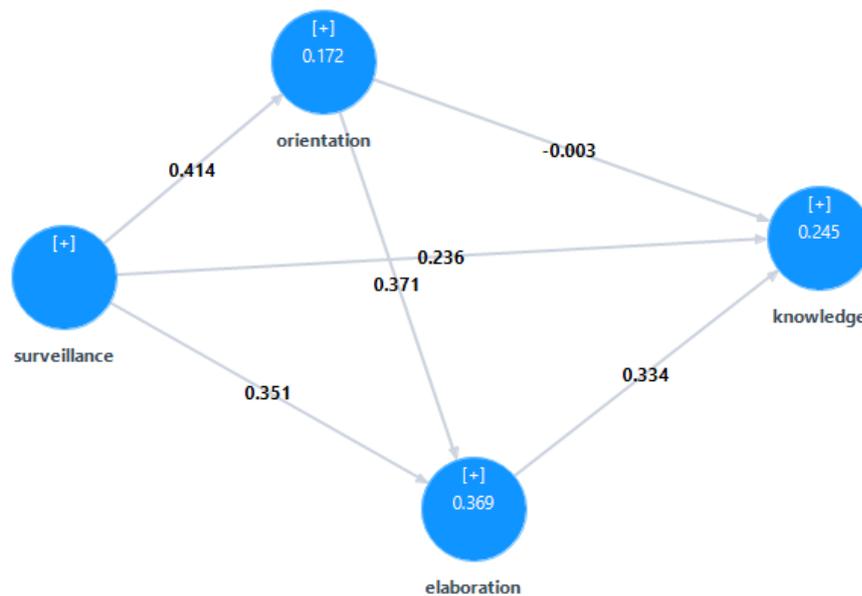
Figure 1. Structural Model of Online News Learning

In the online model, all hypothesized relationships were found significant except for the relationship between news orientation and knowledge (*β*= -.003, *p* = .988). Orientation in the cyberspace has no significant effect on knowledge. Hypothesis 5 was rejected while the other direct relationships in the online model were accepted. The results also show that surveillance

motivation explains about 17% of variance in news orientation, while almost 37% of variance in news elaboration was explained by both surveillance motivation and news orientation. The overall model for online condition was significant, suggesting that 24.5% of total variance in knowledge (R^2) was explained by motivation and information processing variables

Figure 2. Structural Model of Offline (Print) News Learning

The print structural model shows almost similar results with the online model. The point of difference would be on the relationship between news orientation (β = .161, *p* =.058, *t-statistics* = 1.899). Because *t-statistics* for this relationship was above 1.64 (*one-tailed*), H5 for print model was considered significant. Thus, all hypothesized relationships in the print model were supported. The overall print model was also significant (R^2 = .331), indicating a higher variance explained for in the print model (33%) as compared to the online model (24.5%).

Table 1. Significance Analysis of Path Coefficient with the Mediator (Orientation)

	Direct effect		Indirect effect
	Surveillance to Orientation	Orientation to Knowledge	Surveillance to Knowledge
Surveillance to Knowledge (Online Model)	.424 (.000)	.265 (.003)	.050 (.286)
Surveillance to Knowledge (Print Model)	.419 (.000)	.224 (.008)	.119 (.002)

This study hypothesized that surveillance motivation has significant indirect effect on knowledge controlling for news orientation and news elaboration (H7). Table 1 shows no support for indirect relationship in online model (p= .286). However, news orientation was found to be a significant mediator to the relationship between surveillance and knowledge for the print model (p=.002), indicating a partial mediation (*VAF* = 0.248). There was a mixed support for H7 when treating news orientation as the mediator.

Table 2. Significance Analysis of Path Coefficient with the Mediator (Elaboration)

	Direct effect		Indirect effect
	Surveillance to Elaboration	Orientation to Elaboration	Surveillance to Knowledge
Surveillance to Knowledge (Online Model)	.512 (.000)	.452 (.000)	.166 (.001)
Surveillance to Knowledge (Print Model)	.541 (.000)	.375 (.000)	.185 (.000)

Further analysis shows that the role of news elaboration as a mediator to the relationship between surveillance motivation and knowledge was significant in both online (p= .001) and print (p= .000) models. H7 was supported in the case of news elaboration. The strength of the mediation for online model (*VAF* =.406) was slightly higher than print model (*VAF* = .383). The results of *Variance Accounted For* (*VAR*) suggest partial mediation in both conditions.

CONCLUSION

This study found support for most of the hypotheses in the cognitive mediation model. The only insignificant result found in this study was the relationship between news orientation and knowledge in online condition. This finding can be explained with reference to previous research examining medium effects on learning. Research shows that Web nonlinearity gives considerable control to the users in deciding what content to read and in determining the pace and order of navigation. The use of layers and links in digital online news affects readers' decision on the extent that they want to read a news story (Vargo et al., 2000). Given the Web's non-linearity, new media produce disorientation among users. Lee (2005) explains that the experience of becoming lost in hyperspace – not knowing where one is or where to go next – is not the only type of disorientation. Users can experience disorientation when they have difficulty achieving coherent understanding of the content because of cognitive load – also known as cognitive disorientation. Cognitive load is defined as "the amount of mental effort required to locate specific information and understand how this information is oriented within a larger information source" (Eveland & Dunwoody, 2001, p. 56). Many studies agree that excess cognitive load inhibits learning (e.g., Eveland & Dunwoody, 2001; Macedo-Rouet, Rouet, Epstein, & Fayard, 2003). In most cases, disorientation and cognitive load effects coincide. The effects suggest that using hypermedia systems reduces learning by increasing cognitive load and producing disorientation. These possible effects could not be ruled out to explain the insignificant result found in this study.

The finding also suggests the effectiveness of print media – characterized by its linear structure – in the learning of news facts. This is because linearity has been praised as means to assist readers to follow the author's reasoning and extract ideas from a text (Dillion, 1994). Linearity frees readers from the experience of disorientation and cognitive overload associat-

ed with Web use. Much research examining different media effects in learning has found greater learning among print readers than online readers (Eveland & Dunwoody, 2002; Schoenbach et al., 2005; Tewksbury & Althaus, 2000) and among linear Web design users than non-linear Web design users (Eveland, Cortese, Park, & Dunwoody, 2004; Eveland, Marton, & Seo, 2004). Although new media mimics the process of human learning, where "bits of information are organized through their connection with each other" (Eveland & Dunwoody, 2001, p. 55), the claim that learning is better under Web rather than print conditions is often not supported thus far; including in the present study. This claim, however, continues to have the logical appeal for future research.

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