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DO UTILITARIAN/HEDONIC SUBJECT AND PERSONAL RELEVANCE MATTER IN USERS' CHOICE OF BEST KNOWLEDGE IN ONLINE QUESTION-ANSWERING COMMUNITY?

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Abstract

This study investigates how people conduct elaboration and develops confidence in healthcare and travel knowledge in Yahoo! Kimo Knowledge+, the most popular online question-answering community in Taiwan. A context analysis based on the Elaboration Likelihood Model shows that people seeking for healthcare knowledge rely on both central route and peripheral route cues to choose best knowledge (answers), while those seeking travel knowledge rely more on peripheral route cues. In addition, personal relevance influences the amount of central route cues for those seeking for travel knowledge. Further analysis shows that hyperlinks play a critical role in people’s choice, reflecting the increasing importance of the Internet as the primary form of transactive memory. Implications to the design of online knowledge platforms are discussed.

Keywords: Transactive memory, Question-answering community, Hyperlink-information offering, ELM, Elaboration Likelihood Model.

1 Corresponding Author.
1 INTRODUCTION

Recently, the emergence of the Internet has changed the way people find things they want to the extent that it has become a primary form of “external or transactive memory, where information is stored collectively outside ourselves” (Sparrow et al. 2011, p.1). Hence, Internet platforms that facilitate the creation and sharing of both first-hand experience and second-hand information have gained recognition as the critical Web 2.0 applications (Kane & Fichman 2009). For example, Wikipedia, a self-organizing, self-correcting, never-finished online encyclopedia, has more than one million articles in English and hundreds of thousands in dozens of other languages, all freely available. In addition, online question-answering communities like Yahoo Kimo Knowledge+, Yahoo Answer, Answerbag, ChaCha, WikiAnswers, Baidu Knows, iThome, Sina Iask, etc. allow people to interactively pose questions, search for answers, learn and even offer their own experience and/or knowledge online. The pro-social behaviors, motivated by reciprocity or altruism, have made it easier for people to help one another (Gu et al. 2007; Kankanhalli et al. 2005).

However, people’s reliance on the Internet has also spawned concern if the Internet has made people stupid because they may just “take in information the way the Net distributes it” (Carr 2008). Then there is another issue of cognitive in-equality: people may end up with a head full of nonsense if they do not have the expertise of using the Internet or asking the right questions (Drum 2012). The Internet may, unfortunately, become “a major driver of the growth of cognitive inequality.”

Thus, our main interest in this study is if differences in search subject and personal relevance influence how people conduct elaboration and develop confidence in Yahoo! Kimo Knowledge+ (http://tw.knowledge.yahoo.com), which is the most popular online knowledge question-answering community in Taiwan. With the emergence of the Internet, people have relied more and more on searching for either first-hand life experience (LE) or second-hand information they have read or/and heard from others to make decisions (Rieh & Belkin 2000; Wilson 1983). In particular, online travel communities are an increasing phenomenon that offers exchange of knowledge and experience to today’s consumers (Casaló et al. 2011; Jensen 2008). For example, a study by eMarketer (2008) shows that, in the context of vacation planning, search engines serve as the number one online information source for American families. Another study by the Travel Industry Association of America reveals that the Internet is used by approximately 90 million American adults to plan travel during the past year (TIA 2009). This is also evidenced in Taiwan Yahoo! Knowledge+, in which travel ranks as the number one issue in leisure-hobby knowledge category in July 2012 (YahooKnowledge+ 2012b).

Similarly, many health consumers search the web for health information and knowledge online. The Pew Internet & American Life Project reported that health information was one of 2009 top-ten most searching lists in both AOL and Google (PewInternet 2009) and 80 percent of internet users look for health information online in year 2011 (PewInternet 2011). It is fair to say that Internet LE knowledge sharing systems have emerged as the key player in health information exchange, fundamentally reshaping patient decision making and even altering doctor–patient relationship (Dutta-Bergman 2003; Eysenbach et al. 2002). More important, the Science Panel on Interactive Communication and Health (SciPICH) (Robinson et al. 1998) has identified many potential advantages of interactive health communication, including improved opportunity to tailor messages to match learning styles of users, increased willingness to engage in frank discussions with health professionals, and enhanced dissemination capabilities and opportunity to keep content current. Given today’s frequent and widespread use of Internet health information, it is important for researchers to analyze the actual

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usage by people so that we can find ways to advance Internet knowledge sharing technologies related to life health knowledge exchange.

Based on the Elaboration Likelihood Model (ELM) (Petty & Cacioppo 1986), our first research question concerns if differences in search subject (healthcare vs. travel) may influence how they develop confidence in Yahoo! Kimo Knowledge+, which had 1,977,710 healthcare articles and 604,967 travel articles in July 2012 (YahooKnowledge+ 2012a, 2012b). ELM distinguishes between two routes to persuasion: the central route through which a person considers an idea logically, and the peripheral route in which people rely on preexisting ideas and/or superficial message qualities to be persuaded. Previous research suggests that consumers may rely more on the central route reasoning for products of utilitarian value, while taking on peripheral route reasoning for those of hedonic value (Johar & Sirgy 1991; Petty & Cacioppo 1986). Thus, we hypothesize that those seeking for healthcare knowledge will be more engaged in the central route reasoning, while those looking for travel knowledge may rely more on the peripheral route that attends to characteristics such as attractive or the catchy slogan of the message.

Note that unlike Wikipedia that relies on “peer editing” (Kane & Fichman 2009) to ensure the credibility and reliability of information to users, Yahoo! Kimo Knowledge+ offers two ways to determine the best answer. The first is that after answers are posted, the person who poses the question can select the best answer. Alternatively, others members, referred as surfers in this paper, of Yahoo! Kimo Knowledge+ vote for the best answer. The former represents a choice of high personal relevance, while the latter is of low personal relevance. According to Cacioppo and Petty (1982), personal relevance is an important factor that influences how people process information. Therefore, our next research question concerns if the patterns of persuasion are influenced by personal relevance, i.e., if the patterns differ between those chosen by the questioner (i.e., high personal relevance) and those by the voters (i.e., low personal relevance). Our findings can contribute to the understanding of how Internet users determine the merits of knowledge they receive through knowledge sharing communities like Yahoo! Kimo Knowledge+.

2 THEORETICAL DEVELOPMENT

The Elaboration Likelihood Model (ELM) (Petty & Cacioppo 1986) serves as the guiding framework for us to identify the argumentative patterns of healthcare and travel knowledge in Yahoo! Kimo Knowledge+. ELM is a model of how attitudes are formed and changed if an individual was persuaded by particular message. According to ELM, there are two routes to persuasion: the central route through which a person considers an idea logically (high elaboration) and the peripheral route (low elaboration) through which people rely on preexisting ideas and superficial qualities to be persuaded. The central route processes, which involve careful scrutiny of a persuasive communication such as a speech or an advertisement message to determine the qualities of the arguments, requires a great deal of evaluating informational utilization, logic, and rational thinking. They are likely to occur when the person has both the ability and motivation to conduct high elaboration (Petty & Cacioppo 1986). If the elaboration result in favourable thoughts (i.e., the direction and magnitude of attitude change), he or she would develop an attitude congruent with the message’s position. On the other hand, the peripheral route processes do not involve elaboration of message through extensive cognitive processing of the arguments presented. Rather, the individual often relies on “feeling-based evaluation” (Gardial & Biehal 1991) such as words-of-mouth or message attractiveness. In addition, some researchers have demonstrated that both the central and peripheral routes can act together processing information and changing attitudes (Homer 1990; Lord et al. 1995; Miniard et al. 1990; Montoro-Rios et al. 2008; Sussman & Siegal 2003).

Figure 1 depicts a typical question and the “best answer” of healthful foods in the healthcare category of Yahoo! Kimo Knowledge+ from our sampling cases. A questioner posts the question (questioner’s problem), “How to take the health foods in order?” The respondent proposed an answer that includes messages like “You should eat B-group and C plus E after breakfast” and “You can eat on the empty
stomach condition if bilberry is unilateral”. In terms of the ELM’s central route concept, these messages are “utilization information” that may induce high elaboration behaviour. Other messages on the second paragraph such as “Vitamin D and calcium should be taken together” and “It is enough to D at 400IU daily, it only need to increase to 800IU per day only that occurred the crisp bone disease” also persuade people to conduct logical argumentation.

--- Questioner’s problem (M-I0007 case):
How to eat these healthful foods in order? (Question issue) ---
I bought a bunch of healthful foods, but I don’t know when and how to take them. Please help me, thanks.
Vitamin World: vitamin C+E, vitamin B-group, bilberry, grape-seeds. SWANSON: milk-thistle;
OSTEOVITAL: vitamin D; Emerald: chlorella-tablets. Should I take these foods separately or mix them, which way is better? Thanks.

--- Below is the best answer that selection from the questioner ---
--- Respondent’s answer: (Persuasive message) ---
After read your healthy food products selections, I don’t know what your healthy problem is. In general, you should eat B-group and C plus E after breakfast. Grape-seeds and milk-thistle will eat on the condition of empty stomach. I don’t know your product does each type. You can eat on empty stomach condition if bilberry is unilateral, and with lutein and carotene for eating together. However, the absorption will be better that accompany with each mea to eat. Vitamin D and calcium should be taken together. Vitamin D is good for absorption of calcium, and it also preventing the bone calcium in lost. It is enough to D at 400IU daily, it only need to increase to 800IU per day only that occurred the crisp bone disease, and then add some calcium in supplement with D. It is much calcium in vitamin D; too much D will increase the burden to the liver. Chlorella-tablets suggest that to eat for good absorption under the empty stomach condition. You can visit my website for more about health food information and usage guides. References: Christine Chen (Pharmacist, Master of Nutrition Certified Natural Health Product Advisor in Canada; Certified Weight Control Consular-Society of the U.S. lifestyle weight management consultant) My website: http://www.christinesliving.com/ ➔ Hyperlink-Informational Offering (HIO)

Figure 1. A persuasive message example of LE knowledge question-answering in online technological mediated setting.

Note that the above example also provides information that facilitates the peripheral route process. According to the studies by Kim and Benbasat (2003) and Yang et al. (2006), Internet hyperlink-information can serve as peripheral cues for users. As depicted in the third paragraph of the figure 1, messages like “You can visit my website for more about health food information and usage guides”, “Christine Chen (Pharmacist, Master of Nutrition Certified Natural Health Product Advisor in Canada)”, and “Certified Weight Control Consular-Society of the U.S. lifestyle weight management consultant” etc., offer the peripheral cue. Thus, the Internet LE knowledge messages may simultaneously contain both central route argument and peripheral route information to influence recipient’s attitude.

In this research, we further adopt Toulmin’s (1958) argumentation theory to identify the central route elements embedded in the messages. In addition, words-of-mouth (WOM), attractiveness, and the hyperlink-information (LaRose et al. 2008; Liu & Shrum 2009; Nah & Benbasat 2004; Sicilia et al. 2006; Yang et al. 2006) offered in the answers are employed to analyze the peripheral route effects in this study.

2.1 Cues of Central route: Evidence and Authority (Warrants, Backing)

The argumentation theory is the study of how humans should, can, and do reach conclusions through logical reasoning. According to Toulmin (1958), an argument is a claim on our attention and belief, a view that would seem to authorize treating, say, propaganda posters as arguments. Any practical argument has three essential elements: “claim”, “evidence/grounds”, and “authority.” Argument evidence/grounds (e.g., “I was born in Bermuda.”) are prerequisite to an argument claim (e.g., “I am a
British citizen.”). The legal provision, “A man born in Bermuda will legally be a British Citizen,” must be provided as the argument authority to back/warrant the claim (Foss et al. 1991). Boller et al. (1990) suggested that the semantic structure in argumentation completeness should contain three main elements in argument claim, argument evidence and argument authority. If any one of the elements is missing, the persuasion argumentation is deemed incomplete so that the argumentation will be identified as a weak argumentation statement due to the lack of persuasive power.

Thus, information completeness is critical to decision making and choice situation (Cline & Haynes 2001; Dutta-Bergman 2003; Eysenbach et al. 2002). Furthermore, if an individual is willing and able to cognitively study the semantic elements in the message, the central route arguments will be more influential than the peripheral route since he/she will exert more cognitive effort in evaluating the logic of the content, the completeness of the arguments and the evidence/authority of the sources during the decision-making process (Petty & Cacioppo 1986; Sussman & Siegal 2003). Consider the M-I0007 example in figure 1, the Claim “vitamin D and calcium should be taken together” is supported by the Evidence sentence “it is much calcium in vitamin D”, the Warrant (the part of Authority) sentence “vitamin D is good for absorption of calcium”, and the Backing (also the part of Authority) sentence “it also preventing the bone calcium in lost”.

2.2 Cues of Peripheral Route: Words of Mouth, Attractiveness, and Information Offering

As opposed to the central route reasoning, the peripheral route involves processes that rely on secondary characteristics like the source credibility, source attractiveness, or catchy slogans. Many previous studies have found that these processes may play a more critical role in the informational influence process (Boller et al. 1990; Dutta-Bergman 2003; Petty & Cacioppo 1986; Sussman & Siegal 2003). In this study, words-of-mouth (WOM), attractiveness, and information offering are employed as measurements of peripheral cues.

WOM has been suggested by many communication theorists to be an influential power on consumers’ evaluation and decision making (Brown & Reingen 1987; Money et al. 1998). They are perceived to be more reliable, credible, and trustworthy by consumers compared to firm-initiated communications (Brown et al. 2007; Schiffman & Kanuk 2000). A recent study by Brown, et al. (2007) finds WOM communication is a major part of online consumer interactions. In travel information topic, Noor et al. (2005) have shown that WOM from other travelers is often perceived as more neutral and more trustworthy than information given by the tourism business in advertising campaign or in the web portal. The following shows an example in Yahoo! Kimo Knowledge+: “The guesthouse owner can help guest to arrange transportation vehicle, or route of travel…. I strongly recommended”.

Next, according to Baker and Churchill Jr (1977), a message’s attractiveness may influence its receiver’s attitude toward that message. This effect happens without increasing the level of his cognitive analysis of that message’s attribute (Fischer et al. 2010; Kruglanski & Thompson 1999; Shavitt et al. 1994). One way to enhance message attractiveness is through the use of humor, which may create positive affect on attention as well as the effectiveness of the persuasive power (Kuiper et al. 1995; Lyttle 2001). In addition, a message’s attractiveness can be raised through its vividness that draws attention, stimulates imagination, and encourages elaboration on the material presented (Kisielius & Sternthal 1984, 1986; Nisbett & Ross 1980). The study by Bator and Cialdini (2000) has indicated that concrete, vivid messages are perceived to be more personally meaningful, more emotionally arousing, and as a result, more influential. In another study by Rhoads (1994), messages that emphasize the main point with vivid details, without vivifying extraneous details, are rated more positively than messages that vivified irrelevant details in terms of liking, interest, and agreement (Bator & Cialdini 2000). For examples, T-C0002 states “Walking in the tea plantation trails in the early morning makes me feel very elegant and comfortable”, while T-C0001 states “Li Chuan Fish Farm is a scenic place that is very suitable for parent-child travel”.

Finally, in the Internet environment, offering of information like hyperlink, news websites, or blogs, has been shown to enhance the persuasive power. Hypertext-style links can aid explanatory power for
people (Nah & Benbasat 2004) and affect recipient’s attitude (Sicilia et al. 2006). LaRose et al. (2008) further demonstrated that spoofed URLs and trusted logos provided peripheral cues that influence user belief toward the website, while another study by Liu and Shrum (2009) discovered that when consumers were less motivated to process extensively, they were more likely to be affected by peripheral cues like the hyperlink numbers. The use of hyperlink as peripheral cues is significant in Yahoo! Kimo Knowledge+. For example, in Figure 1, the answer-provider stated: “You can visit my website for more about health food information and usage guides”, and the hyperlink information offering is: “my website: http://www.christinesliving.com/.”

2.3 Research Hypotheses

Table 1 depicts the hypotheses of the current study. Previous research has shown that both utilitarian and hedonic components of product evaluation influence consumers’ affective experiences and product satisfaction (Babin & Attaway 2000; Batra & Ahtola 1991; Mano & Oliver 1993). Indeed, to process products that are predominantly utilitarian, consumers are driven by instrumental and goal-oriented needs and focus heavily on attributes such as function, effectiveness, practicality, and necessity (Strahilevitz & Myers 1998; Voss et al. 2003). The findings suggest that consumers may rely more on the central route reasoning for products of utilitarian purpose (like healthcare), while taking on peripheral route reasoning for those of hedonic purpose (like travel). For instance, for products of utilitarian value, consumers are likely to conduct issue-relevant thinking by obtaining products’ concrete features, quality and functional benefits (Johar & Sirgy 1991; Petty & Cacioppo 1986). Moreover, the effect of perceived quality on extension evaluation may be strengthened when the utilitarian value in the product category is high (Hirschman & Holbrook 1982; Wertenbroch & Dhar 2000).

Conversely, studies (Johar & Sirgy 1991; Petty & Cacioppo 1986) have shown that to form appraisals of products of hedonic purposes, consumers may rely heavily on the products’ peripheral cues such as user imagery, value-expressiveness, brand personality, and sensory pleasure rather than using concrete attributes. Research by Hirschman and Holbrook (1982) also supported a positive correlation of hedonic value to the multi-sensory, fantasy and emotive aspects of products. Moreover, products possessing hedonic value have a higher potential for eliciting emotional responses, including like/dislike, love/hate, anger/joy, sadness/happiness, and so on (Holbrook & Batra 1987).

Thus, we hypothesize that those who seek for healthcare knowledge to improve his health will be more engaged in the central route reasoning, while those looking for travel knowledge may rely more on the peripheral route that attends to characteristics such as attractiveness, the catchy slogan of the message, and hyperlink information. Hypotheses H1a, H1b, and hypothesis H2a, H2b are therefore proposed (see Table 1).

Furthermore, in Yahoo! Kimo Knowledge+, the determination of best-answer can be by either those who pose questions (questioner) or by other members (surfers). Past research has shown that people expend more effort in processing messages when they expect the issue to have significant consequences for themselves (Petty & Cacioppo 1986; Petty & Wegener 1998). Personal relevance, referring to the “intrinsic importance” of the subjects to oneself, is generally viewed as one of the most important factors affecting the motivation to process the arguments. It is associated with the amount of effort individuals put into assessing the merits of message arguments as well as the extent to which individuals rely on simple cues (Petty & Cacioppo 1979; Petty et al. 1981). A study by Chaiken (1980) shows that high personal interest and involvement lead message recipients to employ a systematic information processing strategy in which message-based cognitions mediate persuasion, whereas low involvement leads recipients to use a heuristic processing strategy in which simple decision rules mediate persuasion. Another study by Leippe and Elklin (1987) shows that personal involvement encourages systematic processing that is sensitive to how well message arguments concur with personal standards. Recently, Petty and Brinol’s (2008) study finds that enhancing personal relevance leads people to be more affected by strong arguments, while the study by Kim and Benbasat (2009)
indicates personal relevance motivates people to form trusting beliefs by scrutinizing argument content rather than by depending on heuristic cues (e.g., an independent party’s opinion). Thus, hypothesis H3a, H3b, and hypothesis H4a, H4b are therefore proposed (see Table 1).

<table>
<thead>
<tr>
<th><strong>Utilitarian-Hedonic</strong></th>
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<tbody>
<tr>
<td><strong>Hypothesis 1</strong></td>
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<tr>
<td><strong>H1a</strong></td>
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<td><strong>H1b</strong></td>
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| **Hypothesis 2**        | There exists significant difference in the amount of cues between the healthcare topic and the travel topic. |
| **H2a**                 | For the amount of central route cues, there exists significant difference between the healthcare topic and the travel topic. |
| **H2b**                 | For the amount of peripheral route cues, there exists significant difference between the healthcare topic and the travel topic. |

<table>
<thead>
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<th><strong>Personal-Relevance</strong></th>
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<tr>
<td><strong>Hypothesis 3</strong></td>
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<tr>
<td><strong>H3a</strong></td>
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<td><strong>H3b</strong></td>
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</table>

| **Hypothesis 4**        | For the travel topic, there exists significant difference in the amount of cues between questioner-choice and surfer-choice. |
| **H4a**                 | For the travel topic, there exists significance in the amount of central route cues between questioner-choice and surfer-choice. |
| **H4b**                 | For the travel topic, there exists significance in the amount of peripheral route cues between questioner-choice and surfer-choice. |

| **Table 1. Research hypotheses** |

3 RESEARCH METHODOLOGY

In this study, we have chosen to study persuasive knowledge in two categories – healthcare and travel – in Yahoo! Kimo Knowledge+. We first used “health food & edible” and “self-service trip & planning” as the search keywords, yielding to 186 healthcare-related cases and 242 travel-related cases, out of which we eliminated those with only one answer. This resulted in 186 cases in the healthcare category, out of which 123 were chosen by the questioner and 63 by surfers; and 242 travel-related cases, out of which 134 were chosen by the questioner and 108 surfers. Based upon the message ranking given by Yahoo! Kimo Knowledge+, we selected the top 40 cases in each of the four categories for a total of 160 cases: healthcare-questioners (HQ), healthcare-surfers (HS), travel-questioners (TQ), and travel-surfers (TS).

3.1 Content Analysis

Content analysis is a method for verbal communication behaviour analysis (Tan 1994) that manifests systematic and quantitative descriptions of the messages (Ang & Slaughter 2001; Levina & Ross 2003; Sambamurthy & Zmud 1999; Slaughter & Ang 1996). According to Krippendorff (2004), content
The analysis process includes the following steps: (1) defining the analytic units, (2) defining the features, (3) testing the coding on the pre-sampling samples, (4) assessing the accuracy and reliability, (5) revising the coding rules, (6) returning to step 3 until the reliability is acceptable, (7) coding all the official sampling articles, and (8) assessing the achieved reliability/accuracy. In computer-mediated communication research, content analysis has been frequently used in analysis of online discussions (Kanuka et al. 2007).

In this study, the unit of analysis is sentence. The persuasive elements in our study are: claim (CLM), evidence (ED), authority (AUO) that encompasses two sub-elements of warrants (WAR) and backing (BAK), words of mouth (WOM), attractiveness (ATR), and hyperlink-information offering (HIO). Two coders attained skill and reliability through adequate training. To examine the reliability of this study, we evaluated stability, referring to the extent to which the results of defining elements by a certain coder are invariant over time (Weber 1990), and reproducibility, which is the extent to which defining elements produce the same results when the same sentence is coded by more than one coder. Several rounds of training practices were conducted until the reproducibility reliability of the results from the two coders exceeded 90 percent (Krippendorff 2004). Formal coding (step 7) began after the reliability index reached 90 percent. Disagreements between the coders were fully discussed. The degree of stability refers to the extent to which content classification produced the same results when there has more than one coder. In this study, the inter-rater reliability by the two respective coders were greater than 90 percent (the kappa coefficients: Claim=1.0, Evidence=0.97, Warrant=0.94, Backing=1.0, Attractiveness=0.93, WOM=1.0, Hyperlink-information=0.94), which met the stability criteria (Krippendorff 2004; Neuendorf 2002). A comparison between the two coders reveals that the respective reproducibility: Claim=1.0, Evidence=0.95, Warrant=.90, Backing=1.0, Attractiveness =0.89, WOM=1.0, and Hyperlink-information=0.90, indicating an acceptable level of reliability (Neuendorf 2002).

3.2 Results

Table 2 shows the respective frequency of the persuasive elements in all categories: Healthcare-Questioners (HQ), Healthcare-Surfers (HS), Healthcare-Total (HT), Travel-Questioner (TQ), Travel-Surfer (TS), and Travel-Total (TT). Not surprisingly, the CLM element has the highest frequency in every category, while two central route persuasive elements, EVD and AUO, appear more frequently in the healthcare category (For Healthcare Total group: EVD = 74 and AUO = 243) than they do in the travel category (For Travel Total group: EVD = 67 and AUO = 13), suggesting that the healthcare-related choices rely more on the central route reasoning than the travel-related ones. Conversely, three peripheral route persuasive elements, WOM, ATR, and HIO, appear more frequently in the travel category (For Travel Total group: WOM = 104, ATR = 152, and HIO = 649) than they do in the healthcare category (For Healthcare Total group: WOM = 51, ATR = 12, and HIO = 201), indicating the dominance of the peripheral route reasoning for travel-related choices. In addition, for the utilitarian health subject, the questioner group shows a higher frequency of EVD (48 vs. 26), AUO (155 vs. 88), WOM (28 vs. 23), and HIO (126 vs. 75) than the surfers group, while for the hedonic travel subject, the questioner group shows a higher frequency of EVD (58 vs. 9), AUO (8 vs. 5), WOM (66 vs. 38), and ATR (82 vs. 70) than the surfer group.

To test the hypotheses in this study, mean values and standard deviations are calculated using the frequency divided by the respective sampling cases. Table 3 shows descriptive statistics for different persuasive elements by utilitarian and hedonic categories.
Table 2. The frequencies of sampling cases for different persuasive elements by two categories.

<table>
<thead>
<tr>
<th>Persuasive Elements</th>
<th>Categories</th>
<th>Utilitarian (Healthcare Topic)</th>
<th>Hedonic (Travel Topic)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>HQ (n=40)</td>
<td>HS (n=40)</td>
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<tr>
<td>Central Cues</td>
<td></td>
<td>HT (n=80)</td>
<td>TQ (n=40)</td>
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<tr>
<td></td>
<td>CLM</td>
<td>TQ (n=40)</td>
<td>TS (n=40)</td>
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<td></td>
<td></td>
<td>TT (n=80)</td>
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<tr>
<td></td>
<td>EVD</td>
<td>312</td>
<td>214</td>
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<td></td>
<td>AOU</td>
<td>526</td>
<td>266</td>
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<td></td>
<td></td>
<td>191</td>
<td>457</td>
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<tr>
<td>Peripheral Cues</td>
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<tr>
<td></td>
<td>WOM</td>
<td></td>
<td></td>
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<td></td>
<td>ATR</td>
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<td></td>
<td>HIO</td>
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Table 3. The descriptive statistics for different persuasive elements

3.2.1 Test for Utilitarian-Hedonic on Central Route and Peripheral Route

The statistical results show that, for H1a, there exists no significant difference between central cues and peripheral cues for the healthcare subject (M = 3.94, SD = 5.49 vs. M = 3.3, SD = 3.85; t-value = 1.035, p > 0.05); therefore H1a is not supported. Conversely, there exists statistically significant difference between central cues and peripheral cues for the travel subject (M = 1.00, SD = 1.80 vs. M = 11.31 SD = 8.02; t-value = -11.815, p < 0.001), therefore supporting H1b. These results show people seeking for healthcare knowledge rely equally on central route cues and peripheral route cues to choose the best knowledge, while those seeking for travel knowledge rely more on peripheral route cues than central route cues.

In addition, the t-test result shows that there exists statistically significant difference between the amount of central route cues (M = 3.94, SD = 5.49 vs. M = 1.00, SD = 1.80; t-value = 4.543, p < 0.001), the same result is found for the amount of peripheral cues (M = 3.30, SD = 3.85 vs. M = 11.31 SD = 8.02; t-value = -8.066, p < 0.001), thereby supporting H2a. A similar finding is true for the amount of peripheral route cues, i.e., there exists significant difference between the healthcare subject and the travel subject (M = 3.30, SD = 3.85 vs. M = 11.31 SD = 8.02; t-value = -8.066, p < 0.001), thereby supporting H2b. These results show that the choice of best healthcare knowledge relies more on central route cues, while the choice of best travel knowledge relies more on peripheral route cues.

3.2.2 Test for Personal-relevance on Central route and Peripheral route

There is no significant difference between the amount of central cues and that of peripheral cues for healthcare-questioners (M = 5.02, SD = 6.26 vs. M = 3.88, SD = 4.42; t-value = 1.098, p > 0.05); and the same finding is true for healthcare-surfers (M = 2.85, SD = 4.42 vs. M = 2.73, SD = 3.09; t-value = 0.192, p > 0.05). There is also no significant difference between healthcare-questioners and healthcare-surfers in the amount of central route cues (M = 5.02, SD = 6.26 vs. M = 2.85, SD = 4.42; F-value = 1.819, p > 0.05); the same result is found for the amount of peripheral cues between healthcare-questioners and healthcare-surfers (M = 3.88, SD = 4.42 vs. M = 2.73, SD = 3.09; F-value = 1.819, p > 0.05). Therefore H3a and H3b are not supported, indicating that the reliance on central
route cues for healthcare-questioners is similar to that for healthcare-surfers. The same is true for the reliance on the peripheral cues.

On the other hand, there is significant difference between the amount of central cues and that of peripheral cues for travel-questioners ($M = 1.65, SD = 2.12$ vs. $M = 9.90, SD = 6.34$; $t$-value $= -9.472, p < 0.001$) as well as for travel-surfers ($M = 0.35, SD = 1.10$ vs. $M = 12.73, SD = 9.26$; $t$-value $= -8.52, p < 0.001$). This indicates that for the travel subject, people rely more on peripheral route cues than on central route cues regardless of personal relevance. Furthermore, the amount of central route cues between travel-questioners and travel-surfers is significantly different ($M = 1.65, SD = 2.12$ vs. $M = 0.35, SD = 1.10$; $F$-value $= 11.865, p < 0.01$), while there is no significant difference between travel-questioners and travel-surfers in the use of peripheral route cues persuasion ($M = 9.90, SD = 6.34$ vs. $M = 12.73, SD = 9.26$; $F$-value $= 2.533, p > 0.05$). Therefore, H4a is supported but H4b is not, indicating that in the amount of central route cues to make choice of the best travel knowledge, the high personal relevance group (travel-questioners) demonstrates a significantly higher reliance than the low personal relevance group (travel-surfers); yet, there exists no statistically significant difference in the amount of peripheral route cues between the two groups.

4 DISCUSSION

Figure 2 depicts the different patterns concerning the amount of central and peripheral cues for the health subject and the travel subject. For the healthcare (utilitarian) subject in Yahoo! Kimo Knowledge+, the amounts of central cues and peripheral cues show no statistically significant differences (H1a is not supported). This result is inconsistent with previous studies that suggest utilitarian persuasion should rely more on central cues (Johar & Sirgy 1991; Myers & Strahilevitz 1998; Petty & Cacioppo 1986; Voss et al. 2003). This finding is critical as it may reflect the increasing importance of the Internet as the “primary form of external or transactive memory, where information is stored collectively outside ourselves” (Sparrow et al. 2011) in the CMC (computer-mediated communication) environment. More analysis will be presented in the following discussion.

As for the travel (hedonic) subject, the amount of peripheral cues for travel persuasions is significantly higher than that for the healthcare subject (H2b is supported), while the amount of the central cues for travel persuasions is significantly less than that for the healthcare subject (H2a is supported). This result is consistent that of previous studies, implying that hedonic persuasions in Yahoo! Kimo Knowledge+ rely more peripheral cues than central cues (H1b is supported) (Johar & Sirgy 1991; Petty & Cacioppo 1986).

To examine the impact of personal difference, figure 3 depicts the different patterns of central and peripheral cues for the health (utilitarian) subject. As shown in figure 3, while no significant statistic difference is observed in the amount of cues between the questioner group and the surfer group (H3a and H3b are not supported), both HQ (high personal-relevance) and HS (low personal-relevance) have a higher mean score in their amount of central route cues than in the amount of peripheral cues. Again, this is inconsistent with previous findings that high personal relevance motivates people to expend effort to scrutinize the arguments and may reflect people’s increasing reliance on the peripheral cues in the Internet environment.

Further examining the amount of cues for the travel subject, the high personal-relevance group (TQ) has a significant higher mean score than the low personal-relevance group (TS) in the amount of central route cues (H4a is supported), while no statistically significant difference is observed between these two groups in the amount of peripheral cues (H4b is not supported). Figure 4 also show that there exists a significantly higher mean score in the amount of peripheral cues than that of central cues for both high (TQ) and low (TS) personal-relevance groups, indicating that users of Yahoo Kimo Knowledge+ rely heavily on peripheral cues to determine best knowledge regardless of personal relevance.
Indeed, the result that H1a is not supported is inconsistent with previous research that shows central route cues dominate utilitarian persuasion. In addition, the result that H3a, H3b, and H4b are not supported is inconsistent with the theorization that personal relevance motivates people to scrutinize qualities of the arguments rather than to depend on heuristic cues.

Do the results reflect the growing importance of the Internet in influencing users’ choice of best knowledge in Yahoo Kimo Knowledge+? That is, it is not that Yahoo! Kimo Knowledge+ users rely less on the central route cues, but that they depend more on the peripheral cues in the Internet context. To test this, we examine the effect of a specific peripheral cue, the hyperlink-informational offering (HIO), which is included in this study but rarely examined in previous studies. Table 2 indicates that
the frequency of HIO is the major part of the peripheral cues (126 freq. for HQ, 75 freq. for HS, 201 freq. for HT; 248 freq. for TQ, 401 freq. for TS, 649 freq. for TT). To evaluate the role of HIO, several tests of the differences between central route cues and peripheral route cues with and without HIO were conducted.

Table 4 shows that when HIO is included in the peripheral route cues for utilitarian (i.e., healthcare) persuasion, there is no significant difference between the amount of central cues and that of peripheral cues (t = 1.04, p > 0.05) in utilitarian subject. Yet, when HIO is excluded, the difference is statistically significant (t = 5.18***, p < 0.001), therefore supporting H1a. For hedonic (i.e., travel) persuasion, the exclusion of HIO does not change the results (with HIO: t = -11.82***, p < 0.001; without HIO: t = -7.72***, p < 0.001) that show hedonic persuasions significantly rely more on peripheral cues than on central cues. Thus, in making choice of best knowledge for utilitarian purpose, users of Yahoo Kimo Knowledge+ are influenced by the presence of HIO, but not so for the hedonic purpose.

<table>
<thead>
<tr>
<th>Utilitarian (Healthcare Topic)</th>
<th>Hedonic (Travel Topic)</th>
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</thead>
<tbody>
<tr>
<td><strong>Central Cues</strong></td>
<td><strong>Peripheral Cues with HIO</strong></td>
</tr>
<tr>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>3.94</td>
<td>5.49</td>
</tr>
<tr>
<td>t = 1.04 (p &gt; 0.05) (before remove HIO)</td>
<td>t = -11.82*** (p &lt; 0.001) (before remove HIO)</td>
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</tbody>
</table>

Furthermore, Table 5 shows that, when HIO is included, there is no significant difference in the amount of peripheral route cues between the healthcare-questioners group (HQ, high personal-relevance) and the healthcare-surfers group (HS, low personal-relevance) (F-value = 1.819, p > 0.05). When HIO is excluded, the difference remains insignificant between HQ and HS (F-value = 0.558, p > 0.05) both groups. However, for the travel subject, the exclusion of HIO leads to a significant difference in the amount of peripheral route cues between the travel-questioners group (TQ, i.e., high personal-relevance) and travel-surfers group (TS, i.e., low personal-relevance) (F-value = 15.04***, p < 0.001), while the difference between them is insignificant (F-value = 2.533, p > 0.05) when HIO is included. Thus, in making choice of best knowledge for the hedonic purpose, the impact of personal relevance is influenced by the presence of HIO, but not so for the utilitarian purpose.

<table>
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<td><strong>Peripheral Cues with HIO</strong></td>
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</tr>
</tbody>
</table>

Table 5. Testing the effect of HIO in personal-relevance (PR) difference.
Today we are said to be in the era of knowledge: we live in a knowledge society and conduct commerce in a knowledge economy. In this development, the emergence of the Internet has undoubtedly changed the ways we learn knowledge, make decisions, and take actions. As demonstrated in Sparrow et al.’s study (2011, p.4), the Internet has become a primary form of external or transactive memory and “we are becoming symbiotic with our computer tools, growing into interconnected systems that remember less by knowing information than by knowing where the information can be found.” We no longer need to memorize “it” if we believe that we can find “it” from the Internet, whereas “it” can be any fact, information, or knowledge. Yet, does this Internet make us stupid?

Our research suggests the answer is both no and yes. It is no because, excluding the amount of hyperlink-information, our subjects seem to do things more or less the same ways as those participants of previous studies. That is, when Internet influence (Hyperlinks) is not included, our finding is consistent with previous findings that central route cues dominate for utilitarian persuasions, while for hedonic persuasions peripheral route cues dominate; also, the amount of cues considered for making choice of best knowledge increases when they are making the choice for themselves for hedonic purpose. It is yes because, as people rely more and more on other Internet surfers’ suggestions, which include hyperlinks that may or may not lead to useful results, they are facing with the task of traversing overloaded hyperlinks that require both expertise and effort to find the right knowledge. Cognitive in-equality may exist if the burden of searching and authenticating the knowledge found from the Internet is placed on the user. Indeed, this finding that the Internet users, like those of Yahoo Kimo Knowledge+, rely more and more on the presence of hyperlinks to be persuaded raises the likelihood that “the internet makes dumb people dumber and smart people smarter” (Drum 2012). As virtually everyone is now a Netizen who is faced with the problem of information overload, there is embryonic need to understand the logical central route and the intuitive peripheral route processes employed by the Netizen to process the overwhelming amount of Internet bits and pieces. Our study has made contribution to the understanding of how different message contents may impact Netizen’s elaboration process. More research is certainly needed to fully explore this issue.

More important, research is also need to investigate how the Internet can be designed to facilitate balanced elaboration and rational decision-making. Our study suggests that, when information/knowledge provided by the Internet is comprehensive and readily available, the users are willing to elaborate on them just as people before the age of Internet. The burden, however, has to be shifted from the user to Internet knowledge providers. The future Goggle search engine may be a good example in this direction. According to its developer, Singhal (2012), the new engine will function like an expert, not only able to put information at users’ fingertips to reduce search effort, but also equips itself with complete knowledge graphs so that it can understand user’s intention and the world better than today’s search engine. Other Internet knowledge platforms can certainly follow this initiative and improve the quality of Internet knowledge. Sparrow et al. (2011) suggests that “losing our Internet connection becomes more and more like losing a friend.” We believe that Internet being a friend is not enough, if this friend would lead laborious work but nevertheless make people dumber. Internet knowledge providers must become friends that provide broad, inclusive information to facilitate sound elaboration behaviors.

There are several limitations of this study. First, we investigate only two subjects in Yahoo Kimo Knowledge+ and limit our source data to only best answers. Also, our evaluation of central route and peripheral route cues are limited to those included in this study. Other subjects and cues can be included in future studies to reveal a more complete understanding of elaboration behaviors in the Internet environment. In addition, other variables like trustworthiness and user experience may influence the choice of best answers. The effect of these variables can be investigated with methodologies like experiments or questionnaires. Finally, our study is conducted in Taiwan and the findings may not be generalized to other cultures and countries.


