

CONSUMER LEARNING EMBEDDED IN ELECTRONIC WORD OF MOUTH

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ABSTRACT

Consumers who lack personal experience with online products and virtual shops perceive a high level of risk in the ecommerce context. Consumers need to learn about online products and vendors before they make a purchase decision. Electronic word-of-mouth (eWOM) is a medium for such learning that not only includes specific recommendations about online products and vendors, but also supports social interaction among past and potential future consumers on transaction platforms. Based upon consumer learning theories and the Elaboration Likelihood Model, this study proposes a framework for the analysis of how eWOM carries consumer learning and influences future consumers. Based on the proposed framework, a large set of consumer-generated reviews of online transactions was analyzed using content analysis methodology. After the categorization of review messages with learning cues by review valence, our study examined the impact of buyers' experience levels on the development of review content. The results showed that the experienced buyers tended to deliver more social cues and the novice buyers included more transactional cues in text reviews. In addition, the results indicate that consumer learning dimensions are not independent of review valence. Our study provides insights into theoretical and practical implications.

Keywords: Consumer learning; Electronic word-of-mouth (eWOM); Review valence; Elaboration Likelihood Model; Content analysis

1. Introduction

With the advent of the Web 2.0 paradigm, Internet users have multiple tools such as customer review systems, online discussion forums, and social network sites to share their opinions and exchange information. This new form

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of word-of-mouth (WOM), electronic WOM (eWOM), is characterized as any positive or negative messages available to any Internet user that is originated by past or potential future consumers about a product, service or company [Hennig-Thurau et al., 2004]. When Internet users make purchase decisions, they tend to trust online reviews generated by consumers and regard them as more persuasive than traditional advertisement from marketers and companies, and reports from third party consumer reporting companies [Goldsmith and Horowitz, 2006]. Industry reports state that 61% of consumers consult online reviews before making a new purchase and that they are essential for ecommerce websites [Charlton, 2012]. Research studies have found that EWOMs have a significant impact on product sales [Godes and Mayzlin, 2004; Forman et al., 2008; Lu et al., 2014]. In addition to its impact on product sales, eWOMs have been examined in terms of message senders, message receivers, eWOM characteristics, and in terms of its antecedents and effects on purchase intention and sales [Hennig-Thurau et al., 2004; Liu, 2006; Park and Kim, 2008; Yap et al., 2013].

One area which has received only limited research attention is eWOM as a source of consumer learning in the ecommerce context [Chen et al., 2011; Cheung et al., 2012]. Consumers and e-retailers are physically and temporally separated on an online transaction platform such as Amazon or EBay [Lee, 1998; Gutiérrez et al., 2010]. Consumers perceive a high level of risk in online shopping because they cannot personally interact with a product to determine its characteristics before making a selection. In addition, the lean online communication medium eliminates many social cues, such as body language, that consumers can use to analyze online vendors' trustworthiness.

The process by which individuals acquire the purchase and consumption knowledge and experience they apply to future behavior is termed consumer learning [Schiffman and Kanuk, 1983]. Several consumer learning theories, including observational learning, cognitive learning and social learning, are widely studied in the marketing literature, which has found that in a traditional shopping context, consumers learn through direct experience such as the personal experience of product trial and through indirect experience such as word-of-mouth and third party consumer reports [Smith and Swinyard, 1983]. In the ecommerce context, consumers learn by observing sales volume, reviewing others' recommendations and advice in text comments, seeking information that confirms prior judgment [Mudambi and Schuff, 2010; Chen, et al., 2011; Cheung et al., 2012].

The past literature has studied observational learning (learning by observing summary sales statistics) and cognitive processing of eWOM messages in the ecommerce environment [Hennig-Thurau et al. 2004; Cheung and Lee, 2012; Yap et al., 2013]. But past studies simply treated eWOM as opinion-based comments. We argue that EWOMs reflect past consumers' learning outcomes and form a valuable pool of knowledge as more eWOMs are generated. EWOM not only includes specific recommendations about products and vendors, but also facilitates social learning. EWOM becomes a representation of what past buyers have learned on a transaction platform and a source of information for potential future consumers to learn.

Because eWOM messages are processed by potential consumers to acquire new knowledge and form attitudes, this is a process of persuasion, in which communications between a message sender and a receiver influence message processing [Park and Lee, 2009; Cheung and Thadani, 2012]. Studies in persuasion have confirmed that the effectiveness of a persuasive communication is in part a function of message content learning [Greenwald, 1968]. The Elaboration Likelihood Model (ELM) is about how an argument on an elaboration continuum (high elaboration to low elaboration) shapes its persuasiveness [Petty and Cacioppo, 1986]. Based upon the ELM, there are two distinct routes underlying the effectiveness of persuasive communication – the central route and peripheral route [Petty and Cacioppo, 1986]. Past studies consider argument quality as the central route and source credibility and quantity of reviews as peripheral cues [Cheung and Lee, 2012]. Empirical evidence shows that these routes have significant impact on message receivers' purchase intention [Cheung and Lee, 2012].

Although eWOM is often the source from which consumers learn about products and vendors, no studies in the ecommerce context have systematically examined eWOM from the consumer learning perspective. In order to understand eWOM and consumer learning, we adopt the research question "What learning cues that reflect the learning of past consumers do eWOMs carry and how do they influence potential future consumers?" Based upon consumer learning theories and the Elaboration Likelihood Model, we propose a framework to examine different cues that past consumers have learned embedded in eWOM messages by five dimensions including cognitive processing cues, information quality cues, participative cues, social cues and interactive cues. Further, we propose that the elaboration of eWOMs with information quality and cognitive processing cues is likely to trigger future consumers' cognitive learning along a central route; on the other hand, the elaboration of eWOMs with participative, social and interactive cues stimulates message processing along a peripheral route. We empirically applied the framework to examine eWOM on a transaction platform using a large dataset from a leading Chinese ecommerce website. This study will contribute to the literature by connecting consumer learning and EWOM research streams. The categorization of consumer learning cues and their roles in effective persuasion of EWOM will deepen the

understanding of how to change consumers' attitudes and lead to product sales. Scientific understanding and systematic analysis of the embedded learning cues that past consumers include in eWOM will enable future potential consumers to learn effectively and marketers to find ways to increase the attractiveness of transaction platforms and boost customer conversion rate.

The rest of the paper is organized as follows. In Section 2, we review the literature of eWOM and the consumer learning process. Section 3 presents an analytical framework of consumer learning in eWOM. Section 4 describes the procedure used for data collection. Section 5 reports a summary of the dataset, content analysis results and additional interview results to explore the practical utility of the proposed framework. Section 6 includes the discussions, implications, and contributions of this study and also provides limitations and future research direction. The paper ends with conclusions in Section 7.

2. Literature review

2.1. Electronic Word-Of-Mouth (eWOM)

In the marketing context, word of mouth (WOM) communications are defined as "informal communications directed at other consumers about the ownership, usage, or characteristics of particular goods and services and/or their sellers" [de Matos and Rossi, 2008]. Many studies consider WOM to be one of the behavioral consequences of consumers' psychological activities and observations regarding a product or service [de Matos and Rossi, 2008; Trusov et al., 2009]. WOM is measured along two dimensions: WOM activity and WOM praise [Harrison-Walker, 2001]. WOM activity includes aspects of how often the WOM communication takes place, the number of people told, and the quantity of information provided by the sender. WOM praise reflects the valence of the WOM communication (positive, negative, or neutral).

The Internet enables personal opinions and comments to reach large audiences at a low cost. As one type of user-generated contents (UGC), eWOM such as consumer reviews and messages is essentially different from traditional WOM. First, eWOM communication is different from traditional WOM because of its unprecedented scalability and speed of diffusion, as well as its wide accessibility and measurability [Cheung and Thadani, 2012]. Second, eWOM is more perceived as relevant to consumers than seller-created information. Product information and performance assessment from online vendors and manufacturers are often presented in terms of technical specifications and standards. In contrast, customer reviews focusing on product information and usage are user-oriented and generally easy to understand [Chen and Xie, 2008]. Third, consumers consider reviews made by regular Internet users (visible sources) to be more influential and trustworthy than recommendations from a third party expert [Lee et al., 2008].

Transaction platforms such as eBay provide consumers with opportunities to post their evaluations and share opinions and experiences via online feedback mechanisms, also known as reputation systems [Resnick et al., 2006]. Consumers are asked to provide a numerical rating and a text comment after a transaction is completed. Transaction platforms often provide summary review information such as the number of reviews (volume) and the percentage of positive/negative reviews (valence) for a product or a seller on a snapshot. It has been observed that purchase intention increases as both quantity and quality of reviews increase, resulting in the growth of ecommerce sites on the Internet [Park et al., 2007]. In regards to review valence, positively framed reviews highlight a product's strength and recommend the product to potential consumers. However, potential consumers place more weight on negative reviews than on positive reviews in their decision-making process [Park and Lee, 2009]. Studies have confirmed the positive causal relationship between online reviews and product sales [Liu, 2006; Forman et al., 2009].

Although summary review information is helpful for consumers, text comments provide information complementary to the abstract rating [Mudambi and Schuff, 2010]. Text comments involve previous consumers' experiences, evaluations, and opinions. Resnick and Zeckhauser [2002] summarized that consumers often look to eWOMs for transactional factors such as shipping speed, lead time and consistency between product description and the real product. In addition, comments about the service of online vendor are also of critical value in consumers' decision-making process [Andreassen and Streukens, 2009]. The literature reports that variations in the cognitive capability (expertise) of online consumers lead to different communication content [Granitz and Ward, 2006]. A proxy of consumers' expertise is the online experience level tracked by an online transaction platform. [Brucks, 1985; Luo et al., 2013]. Granitz and Ward [2006] observed that novices asked all the questions, while experts contributed over one third of the words related to product recommendations and almost half of the comments responding to others' remarks. Thus, the cognitive differences (differences in expertise) among individuals are related to each person's social role and affect the direction and content of the questions.

Consumer knowledge has also been found to affect message processing of online reviews. Park and Kim [2008] found that reviews that discuss product attributes fit consumers with high expertise and have a stronger effect on the

expert consumer than the novice consumer. In contrast, the number of reviews was found to have a strong effect on the purchase intentions of novice consumers than those of expert consumers.

In summary, eWOM is essentially different from traditional WOM. Past studies have examined the effects of different forms of eWOM (abstract summary review ratings and text comments) and the moderating role of the knowledge of eWOM composers on eWOM content.

2.2. Consumer Learning on the Transaction Platform

Past studies have identified multiple risks associated with online purchasing, including perceived vendor and product risks. Perceived product risk is defined as the degree to which individuals believe that if they purchase products or services through the Internet, they will suffer losses caused by the products or services [Lim, 2003]. It is found that the consumers are concerned as to whether or not the products received are consistent with the product description provided by the online vendor [Resnick and Zeckhauser, 2002]. Consumers are also concerned as to whether or not the products are defective or may fail to meet their needs [Bhatnagar et al., 2000; Forsythe and Shi, 2003]. Perceived vendor risk is defined as the degree to which individuals believe that if they purchase products or services through the Internet, they will suffer losses caused by Internet vendors [Lim, 2003]. Consumers look for information about vendor reputation, reliability, benevolence, competence and predictability to reduce vendor risk [Bhatnagar et al., 2000; Salam et al., 2005].

In order to minimize the product risk and vendor risk, consumers need to seek, acquire, and process relevant information before making a purchase decision [Schiffman and Kanuk, 1983]. Consumers use the newly acquired knowledge as feedback and as a basis for future behavior [Schiffman and Kanuk, 1983].

2.2.1 Observational learning

Studies have confirmed that consumers' purchase decisions are influenced by observing sales volume and by reference to others' eWOMs [Chen et al., 2011; Cheung et al., 2012]. Observational learning occurs when consumers observe the actions of others and make the same choice that others have made [Chen et al., 2011; Cheung et al., 2012]). When there is little or no information available to substantiate the wisdom of a purchase decision, people tend to observe past customers' purchase actions and place significant weight on them in guiding their final purchase actions [Simpson et al., 2008; Ye et al., 2013]. Past study reports that positive observational learning information (a high sales volume) significantly increases sales, but negative observational learning information (a low sales volume) has no effect [Chen et al., 2011].

2.2.2 Cognitive learning

Consumers also learn by observing others' opinions, recommendations and the underlying logic embedded in online text reviews [Chen, et al., 2011; Cheung and Thadani, 2012]. Others' opinions and reasoning can reduce consumers' cognitive processing efforts and energy expenditure and improve the purchase decision process [Mudambi and Schuff, 2010]. Consumers also accrue trust towards the e-retailers because their concerns with web security and online store reputation are alleviated. Consumers believe they can predict online purchasing success and product quality based upon the cues embedded in online reviews. The existing literature provides empirical support that negative WOM has a greater impact on consumers' decisions than positive WOM [Cheung and Thadani, 2012].

2.2.3 Social learning

Consumer learning is an active, social learning process. Social capital from multiple sources in an online community was found to facilitate consumer learning, leading to consumers' behavior outcomes [Hung and Li, 2007]. In addition to quality arguments, consumers look for online interactions, recognition and a sense of community through frequent website visits and participation [Brown et al., 2007; Yoon, 2012]. Social cues and background information are of critical value to message receivers when they evaluate the appropriateness of the message for themselves. Chen and Xie [2008] argue that consumer reviews tend to examine product performance from the aspect of its ability to match consumers' usage situation.

Despite differences among learning approaches, learning theorists in general agree that basic elements of learning include motivation, cues, response and reinforcement [Schiffman and Kanuk, 1983]. Online consumers are motivated to learn because they have the need to shop online and the goal to minimize the potential risks of online shopping. EWOM contains various cues related to products, transactions and socialization to direct consumers to fulfill their needs. The online reputation system on transaction platforms provides consumers with an opportunity to give feedback based on their newly acquired knowledge and actual experience by rating the completed transaction and composing a text comment (eWOM). The accumulation of individual buyers' product knowledge and shopping experiences are realized on a transaction platform. Text comments often include various cues, stimulate learning and trigger favorable responses from message receivers. The Elaboration Likelihood Model (ELM) of persuasion is considered appropriate in explaining the persuasiveness of text comments (eWOM) and predicting responses from the message receivers [Cheung and Thadani, 2012].

2.2.4 Elaboration Likelihood Model

The ELM is about message elaboration and persuasiveness [Petty and Cacioppo, 1986]. Based upon the ELM, two distinct routes underlie the effectiveness of persuasive communication [Petty and Cacioppo, 1986]. The central route of information processing requires people to scrutinize a message. If the message is highly elaborated, it is often well constructed and convincing. An attitude congruent with the message's position tends to result from the elaboration process. In the ecommerce context, reviews with high elaboration (persuasiveness and completeness) often provide relevant and valuable information about products and transactional processes. Messages containing comparisons and inferences about product attributes and transactional factors are perceived as convincing and helpful [Mudambi and Schuff, 2010; Yap, et al., 2013]. When message receivers learn message contents, they develop a basis for alternatives and make inferences about product characteristics at the cognitive level. This cognitive learning of message contents is an important factor in potential consumers' acceptance of the message and formation of the same attitude as the message delivers [Greenwald, 1968].

The peripheral route involves less cognitive processing, and triggers relatively primitive affective states associated with the attitude objects. The peripheral route is a mental shortcut which accepts (or rejects) a message based on external cues [Petty and Cacioppo, 1986]. In the ecommerce context, peripheral cues of the text messages include abstract summary statistics, number of text reviews, length of each text review, and source credibility. In the observational learning approach, consumers may observe the abstract summary information, quickly conclude that the vendors are reliable, and make the same choice as others did [Cheung et al., 2012; Yap et al., 2013]. Source credibility is another important peripheral cue. In the social learning environment, when an expert on a transaction platform makes a recommendation (eWOM), message receivers tend to form an attitude in line with what the message delivers because the message is from an expert [Dou et al., 2012].

ELM also posits that message senders vary in their ability and motivation to elaborate on a message's merit [Petty and Cacioppo, 1986]. When message senders have a high level of expertise and motivation to elaborate on a message, review messages often have more discussion on product attributes and recommendations [Kim et al., 2012]. In the ecommerce context, message senders are motivated by the desire for self-enhancement and social benefits, by concerns for other consumers, by the desire to help the product company, and to vent negative feelings [Yap, et al., 2013]. The motivations of message senders are found to affect the characteristics of eWOM messages [Yap, et al., 2013]. According to the ELM, a message receiver's education and experience with the topic at hand affect his/her susceptibility to persuasion [Petty and Cacioppo, 1986]. When message receivers have a low level of ability and motivation to engage and interpret the presented messages, the effect of central routes decreases and peripheral cues play a more significant role in the attitude formulation. In the ecommerce context, potential readers have a diverse range of abilities and motivations to read text messages. Sweeney et al. [2008] found that the potential for eWOM to have an impact on perceptions or actions depends not only on the richness and strength of the messages, but also on the personal and situational factors. Consumers with high motivation to process information were found to spend more time on the task of decision-making [Gupta and Harris, 2010].

The literature has shown that eWOM contains multiple cues that consumers look for in the process of learning about products and vendors on a transaction platform. A single text message may just reveal one or two aspects of an individual consumer's learning process. The repository of historical online reviews presents a large amount of experience and knowledge shared by past buyers and reflects various aspects of consumers' learning process. When message receivers pick up learning cues in text messages, the elaboration of eWOM messages plays a critical role in their information processing. EWOM messages with high elaboration have stronger effects on message receivers' purchasing intention than do eWOMs with low elaboration [Cheung and Thadani, 2012]. Based upon consumer learning theories and the ELM, we propose next an analytical framework to explore consumer learning embedded in eWOM on a transaction platform.

3. A Framework for Consumer Learning Embedded in eWOM

Web 2.0 technologies enable consumers to socialize, interact with other consumers with similar interests and express their own opinions on a transaction platform. Consumers report the outcomes of their learning about the products, transactional processes and the online vendors by engaging in eWOM activities. EWOM has become a focal object in potential consumer's learning and purchasing process. Future potential consumers take different approaches to learn about online products and vendors on a transaction platform, including observational learning, cognitive learning and social learning with various levels of involvement. Based upon consumer learning theories, we propose to analyze consumer learning embedded in eWOM on five dimensions: cognitive processing cues, information quality cues, participative cues, social cues and interactive cues (see the proposed analytical framework in Table 1). Each dimension of the framework produces an impact such as engaging customers, enabling consumer learning, and increasing the informational value to customers.

Table 1: An analytical framework based upon the ELM

Dimensions	Definition	Indicators	Role in consumer learning
Central Routes			
Cognitive	Statement exhibiting knowledge and skills related to the products	Statements that show the stating of questions and making inferences about products	To show cognitive processing of product characteristics disclose the learning process and outcomes of past buyers and stimulate critical thinking of potential buyers.
Information Quality	Statements exhibiting knowledge related to the informational factors	Statements that provide conclusions, and make comparisons and inferences about transactional processes, including comments on service attitude and evaluation of product quality.	To show the lessons and feedback of past buyers and alleviate future buyers' concerns.
Peripheral Routes			
Participative	Length of each message with valid content	Number of characters in each message, as calculated automatically by a computer program	May indicate the reviewer's attitude. Longer reviews usually have high argument quality and strong logic, providing valuable information to potential consumers.
Social	Statement or part of the statement not related to formal content of the subject matter	Statements that include self-introduction and background information	To provide additional information and help future buyers match the experience described with their own need.
Interactive	Statement or part of the statement that is directed toward third-parties, including buyers and sellers	Statements that show interactivity with other buyers or with sellers, including "Tips to other buyers", or "For the beginners..."	To engage potential consumers and directly address their concerns.

The cognitive dimension refers to statements exhibiting knowledge and skills related to the product. The occurrence of past consumer' learning is indicated in text messages by the way questions are stated and the way inferences are drawn about products. Therefore, cognitive cues embedded in text messages provide critical information for potential buyers. A consumer's knowledge level plays an important role in his or her selection of reviews and interpretation of review content [Park and Kim, 2008]. Review readers can match their own knowledge and experiences with the situations described in reviews and estimate their own learning curves. Such matching and estimation play an important role in making purchase decisions. Our cognitive analysis makes it possible to identify the skills linked to critical reasoning, and then to evaluate the level of information processing applied by consumers. Some consumers with a high level of product knowledge may even manifest metacognitive learning by comparing and contrasting the products with competitive brands.

The information quality dimension refers to statements that exhibit knowledge and skills related to informational factors such as service attitude, the extent of consistency between real products and product descriptions, and shipping or product packaging. Resnick and Zeckhauser [2002] analyzed eBay.com reviews and found that reviews are generally related to the transactional process on the ecommerce platform. Potential buyers particularly look for reviewers' previous experience with transactional aspects. Consumers thus save information search costs by reading online reviews, and mitigate the risks by observing consumer reviews on intangible factors such as seller's service quality, order fulfillment time, and typical shipping issues.

The participative dimension refers to the length of each message with valid content for each transaction [Henri, 1992]. If an accurate picture of customer feedback is needed, it is not sufficient merely to measure the length of the review [Mudambi and Schuff, 2010]. However, message length can be useful for understanding the attitude of the reviewer. Park and Kim's [2008] study showed that people who are highly involved with the products or community tend to produce reviews with high argument quality; these reviews are generally long and contain strong logic.

The social dimension is defined as a "statement or part of a statement not related to formal content of the subject matter" [Henri, 1992, Page 126]. For the social dimension, we limit ourselves to identifying the expression of social factors. Social cues include a self-introduction or background information. Background information and signs of socialization can provide additional information to other buyers and enable them to match the experiences described with their own situations. People are motivated to shop online, not only by convenience and variety seeking, but also by membership in a group and by social interaction with others with similar interests [Dennis et al., 2009]. Social presence is an important feature that interactive Web 2.0 platforms try to include [Cyr et al., 2007; Hassanein and Head, 2007]. A high level of perceived social presence positively impacts perceived usefulness, trust, and enjoyment of online shopping, leading to favorable consumer attitudes to the online transaction platform and e-retailers [Hassanein and Head, 2007].

The interactive dimension refers to statements that are directed toward third-parties, including past and future buyers. Social interactions between consumers can be observed in the consumer reviews when text messages are directed to potential consumers. Another type of interaction in the online reputation system is between the seller and the buyer. Sellers are allowed to respond to buyers' comments, which may include questions or negative comments. The analysis of interactivity reveals whether consumers actively share information and engage other consumers at the e-retailing platform.

In addition to multiple dimensions of message content, the persuasiveness of eWOM messages plays a critical role in impacting the attitude change of message readers. The effectiveness of a persuasive communication is in part a function of message content learning [Greenwald, 1968]. Based upon the Elaboration Likelihood Model (ELM), we propose that the elaboration of eWOMs with information quality and cognitive processing cues are likely to trigger message processing on a central route [Cheung and Thadani, 2012]. On the central route, eWOM message receivers cognitively learn about product attributes and online vendors, compare with prior judgment, and relate to personal involvement to form or change an attitude (Petty and Cacioppo, 1981). On the other hand, the elaboration of eWOMs with participative, social and interactive cues stimulates message processing on a peripheral route. On the peripheral routes, eWOM message receivers often rely on the message length and interactive and social cues to decide whether to accept the message or not. The existing evidence shows that a person's attitudes can change based upon aroused affect or matched needs in the communication [Petty et al., 1991]. Consequently, the elaboration of eWOM message content and learning cues of message contents are critical for future consumer's message processing.

EWOM messages often have multiple cues which require information processing on both central and peripheral routes. A large dataset from Taobao.com, a popular e-business website in China, is used to empirically test the consumer learning in online reviews at Taobao.com. According to the ELM theory, message senders differ in ability to elaborate the message merits. The effect of buyer experience level on eWOM composition is also examined. EWOM is shown in both abstract summary statistics and text messages. Since text messages are often used as a supplement to the abstract summary, we examine the relationship between each dimension and review valence.

Finally, message senders' ability and resulting differences in information selection, processing and inference are studied. Analysis can indicate how past buyers (message senders) at different experience levels differ along each dimension of consumer learning embedded in eWOM.

4. Research Methodology

Taobao.com is one of the largest online shopping websites in China (<http://www.taobao.com/about/intro.php>). The Taobao Company leads the Chinese electronics market, with more than 70% of market share. Taobao's online transaction volume demonstrates many properties similar to those on eBay, with some distinguishing features such as a faster growth rate but a lower concentration trend [Li et al., 2008]. The major transaction mechanism on Taobao.com is online transactions rather than auctions. Its online feedback system is similar to that of Amazon and eBay. To participate in ecommerce at Taobao.com as either buyer or seller, people register by providing their name and contact information. Buyers and sellers can leave comments about each other after transactions, but are not required to do so. Each review can consist of a numeric rating of +1 (positive), 0 (neutral), or -1 (negative), and a paragraph of text comments. Each feedback is tied to a transaction; that is, only the seller and buyer can leave feedback about each other. When posting reviews for a transaction at Taobao.com, consumers are asked to write a paragraph describing their experiences and the rationale for their ratings. Based on different consumer postings, Taobao.com gives an average customer rating for each shop. The customers' overall ratings of an item description, service attitude, and delivery speed are averaged and reported in each seller's profile.

This study focuses on digital cameras. Product type has a moderating effect on the relationship between review characteristics and the perceived usefulness of reviews [Mudambi and Schuff, 2010]. Previous literature has explored reviews of products such as MP3 players, music CDs, PC video games, cell phones, digital cameras, and laser printers [Johnson et al., 2004; Park and Kim, 2008; Mudambi and Schuff, 2010; Chen, et al., 2011]. In this study, the digital camera is selected for several reasons. First, the digital camera is a type of search good, meaning that consumers can obtain information on product quality prior to purchase. The perceived product quality of cameras involves objective attributes more than subjective factors [Mudambi and Schuff, 2010]. Second, in the Taobao context, digital cameras are in the medium price range and involve a significant risk for potential online shoppers. Therefore, digital camera buyers usually conduct research on the product and online vendors before making a purchase decision. In addition, digital camera buyers are more likely than buyers of other products to provide reviews after the transaction. The Nikon digital camera is selected to narrow the product category and control some factors such as brand, consumer segment, and product life cycle.

A computer program was created to automatically visit the Taobao website and retrieve specified information as instructed. Our primary dataset consists of transactional data from Taobao.com for Nikon cameras from June 7, 2009 to December 7, 2009, as well as feedback data up to the end of December 2009. The dataset includes shop information, product information, and buyers' and sellers' information and transactional records. Each transactional record includes the shop ID, buyer ID, time, review type, review content, and product information. In total, there are 9229 transactions in the dataset.

5. Data Analysis

5.1. General Characteristics of the Dataset

Sellers and buyers

The dataset is drawn from a subset of the 10,291 shops on the Taobao platform, including 115 shopping malls (1.12%) as well as individual sellers conducting consumer-to-consumer (C2C) sales. On Taobao.com, each shop (or each seller) receives one credit for a positive review of a transaction, zero credits for a neutral review, and minus one credit for a negative review. Buyers accumulate credits in accordance with a similar rule. Therefore, the total seller credits (or buyer credits) represent the past performance in their respective roles. Although each individual can be both a seller and a buyer, the dataset shows that sellers and buyers are relatively distinct, since the average seller credit score of 635.85 is far higher than the average buyer credit score of the sellers at 88.45. Most sellers are not frequent buyers. The dataset contains 1217 distinct sellers and 7738 distinct buyers. About 50% of sellers received 2 to 10 reviews. In addition, 89.8% of buyers only purchased once at Taobao.com, 6.7% of buyers purchased twice and 3.5% of buyers purchased three times or more.

Taobao system review valence and manual-coded review valence

Among the 9229 transactions in the dataset, there are 595 B2C transactions and 8634 C2C transactions. The review types of Taobao's credit system include well, bad, neutral and NA. Review type is NA when B2C reviews have no review type but meaningful review messages. For the C2C transactions, customers can give good, neutral, or bad as the review type, and leave a message. If a buyer does not provide a review type after a transaction, the reputation system in Taobao gives the seller a default positive review. In total, there are 8604 (99.7%) positive and default positive reviews in the 8634 C2C transactions. While the high proportion of positive reviews imparts a good first impression to potential consumers, text messages provide complementary and detailed information to the abstract rating [Mudambi and Schuff, 2010].

Several steps were taken to narrow the focus to valid text messages only. First of all, B2C transactions without text messages are coded as NA. The 1873 default positive comments in the C2C transaction category that do not have any words are also coded as NA. Second, 3715 positive comments with one word (e.g., "good", "ok", "thanks") were excluded because this study focuses on eWOM content. Finally, three independent raters read the remaining 3438 text reviews carefully, and coded them as good, neutral, bad, mixed, and irrelevant [Liu, 2006]. The messages classified as positive or negative either show a clear overall assessment of the product and service or provide direct recommendations. A message is classified as mixed if it expresses positive opinions about some aspects of the transaction but negative opinions about other aspects, or if there is no clear overall assessment. A message is classified as neutral if it talks about the transaction but does not provide any positive or negative comments. Messages that are not related to the transaction itself are classified as irrelevant. The manual coding of the valence shows a different pattern compared to the summary statistics (in terms of review type) provided by the system.

Table 2 shows a cross table of system-provided review types and manually coded review types for the 3438 comments. These results indicate that some customers are not happy about some aspects of the transaction but still give a positive rating at the overall level. Customers usually reveal their concerns in the text messages, as neutral and negative feedbacks are more valued by online shoppers than positive reviews [Park and Lee, 2009].

Consistent with a past study by Granitz and Ward [2006], a buyer's experience level (indicated by their credit score, which is highly correlated with their total number of transactions in Taobao) does not have statistically significant impact on review valence (see Table 3). The chi-square analysis indicates that buyers' experience is independent of review valence (chi-square=11.08, df=12, p=0.522).

Table 2: Cross Table of System-Provided and Human-Coded Review Types

Human-coded review type	System review type			Total
	Good	Neutral	Bad	
Good	2586 ^a	3	0	2928
Neutral	49	2	0	58
Bad	29	9	10	53
Mixed	308	5	1	355
Irrelevant	44	0	0	44
Total	3016	19	11	3438 ^b

a. From the original 6301 good reviews, we removed 3715 that had one-word comments.

b. After removing 1873 default good reviews, 3715 one-word good reviews, and 203 NA reviews with no review content.

Table 3: Effect of Experience Level on Valence of Online Reviews

Buyer experience level/Valence	Good	Neutral	Mixed	Bad	Irrelevant	Total
1–10	255 (83.3%)	8 (2.6%)	35 (11.4%)	4 (1.3%)	4 (1.3%)	306
11–35	626 (86.3%)	12 (1.7%)	68 (9.4%)	12 (1.7%)	7 (1.0%)	725
36–100	728 (85.3%)	11 (1.3%)	92 (10.8%)	14 (1.6%)	8 (0.9%)	853
100+	803 (87.1%)	8 (0.9%)	85 (9.2%)	11 (1.2%)	15 (1.6%)	922
Total	2412(86.0%)	39(1.4%)	280(10.0%)	41(1.5%)	34(1.2%)	2806

Note: Percentages are calculated based on the sum of each row. Buyers with missing buyer credits are excluded.

5.2. Content Analysis Results of Text Reviews

Content analysis is a generic name for a variety of textual analyses that typically involve comparing, contrasting, and categorizing a dataset [Schwandt, 1997]. According to Schwandt [1997], content analysis can involve both numeric and interpretive data analysis. Content analysis is appropriate for this particular study because we are concerned with categorization of the text messages. By using both quantitative and qualitative measures, we hope to provide a more comprehensive picture of the online customer reviews.

In all, 3438 transactional records with text reviews were subjected to content analysis. A coding form was developed based upon the proposed research framework and validated by the researchers. In the pilot coding phase, 298 reviews were randomly extracted. Three independent coders who had no knowledge of the research purpose coded the 298 reviews using the coding form. The researchers compared the coding results and clarified some ambiguous issues. The three coders recoded the text messages with inconsistent coding in the first round. After several trials of pilot coding and discussion of the coding schemes, three raters achieved a high level of coding consistency and then independently coded the 3438 reviews. The participative dimension measures the number of characters in each review message, as calculated using a computer program. Inter-rater reliability is 92.9% for the social dimension, 95.5% for the interactive dimension, 92.4% for the cognitive dimension, and 91.6% for the information quality dimension. The aggregate inter-rater reliability across these four dimensions is higher than 90%, which is acceptable [Neuendorf, 2002].

Buyers' experience level and dimensions of consumer learning in eWOM

From Table 4, we find that most of the reviews (86.4%) focus on information quality, reflecting some learning about important transactional factors in online shopping. Therefore, buyers have learned about the online purchase process, service quality of e-retailers, and other important factors such as order fulfillment time and shipping.

Table 4: Effect of Buyer Experience Level on Each Dimension in the Framework

Buyer experience level (By buyer credits)	Number of buyers	Participative dimension (Average message length)	Social dimension	Interactive dimension	Cognitive dimension	Information Quality dimension
1–10	306	49.6	10 (3.3%)	17 (5.6%)	11 (3.6%)	268 (87.6%)
11–35	725	50.4	32 (4.4%)	44 (6.1%)	43 (5.9%)	628 (86.6%)
36–100	853	53.9	54 (6.3%)	61 (7.2%)	42 (4.9%)	727 (85.2%)
100+	922	49.9	69 (7.5%)	77 (8.4%)	50 (5.4%)	752 (81.6%)
Total	2806	51.3	165(5.9%)	199(7.1%)	146(5.2%)	2375(86.4%)

Note: Percentages are calculated by dividing by the number of buyers in each row. Buyers with missing buyer credits are excluded.

Chi-square tests were then conducted to examine whether review content is different across experience levels in the five dimensions identified in our framework. We found that the reviews from buyers with different experience levels are similar in cognitive, participative and interactive dimensions (see Table 4). For the cognitive dimension,

5.2% of the consumer-generated text messages focused on cognitive information processing. The chi-square test showed that for cognitive cues the buyer experience level is not statistically significant (chi-square=2.6089, df=3, p=0.4559). In other words, buyers with different experience levels deliver about the same level of cognitive cues. For the participative dimension, the average message length of consumer-generated text comments is 51.3 characters. No pattern of review length has been identified among different buyers' groups. (One-way ANOVA was used to test whether or not review length is significantly different among different buyers' groups, and a p-value of 0.421 indicated that the differences are not statistically significant.). Interaction is a unique feature of online communication in the Web 2.0 era. For the interactive dimension, 7.1% of consumer reviews include comments representing interactivity with other buyers directly. The chi-square test shows no statistical difference in the interactive cues delivered by different groups of buyers (chi-square=4.48, df=3, and p=0.215).

Despite the similarity in cognitive, participative and interactive dimensions, reviews from buyers with different experience levels were found to be quite different in transactional and social dimensions. For the information quality dimension, the chi-square test indicated that there is a statistically significant difference across different groups of buyers (chi-square=11.17, df=3, p=0.011). It was observed that experienced buyers delivered fewer transactional cues than did novice buyers.

For the social dimension, the chi-square test indicates that there is a statistically significant difference in the number of social cues across different groups of buyers (chi-square=6.96, df=3, and p=0.073). It is observed that 5.8% of consumer reviews contain some social cues, and the more experienced the buyers were the more social cues they delivered in the text messages.

In summary, experienced buyers allocate more review length to social cues, while novice buyers dedicate more review content to the information cues in their reviews.

Dimensions of consumer learning in eWOM and review valence

For the participative dimension, the average length of non-positive reviews is 89.9 characters, and the average length of positive reviews is 44.6. Thus, negative reviews tend to have more information, argument, and emotional expression.

A chi-square test of independence was carried out to examine whether or not each of the four dimensions in the framework is independent of the review valence. To simplify the coding process, we use only two types of valence here, i.e., positive and non-positive. Table 5 shows that 2928 (85.2%) of 3438 messages are coded as positive reviews, and 510 (14.8%) are coded as non-positive reviews (including neutral, mixed, or negative reviews).

Table 5: A chi-square test of independence of the Learning Dimensions and Review Valence

Cognitive Dimension			
Valence	0-Non-cognitive cues	1-With cognitive cues	Total
0-Non-positive (coded)	431 (13.2%)	79 (45.7%)	510 (14.8%)
1-Positive (coded)	2834 (86.8%)	94 (54.3%)	2928 (85.2%)
Total	3265	173	3438
Information Quality Dimension			
Valence	0-Non-information quality cues	1-With information quality cues	Total
0-Non-positive (coded)	98 (17.9%)	412 (14.3%)	510 (14.8%)
1-Positive (coded)	451 (82.1%)	2477 (85.7%)	2928 (85.2%)
Total	549	2889	3438
Social Dimension			
Valence	0-Non-social cues	1-With social cues	Total
0-Non-positive (coded)	466 (14.4%)	44 (22.2%)	510(14.8%)
1-Positive (coded)	2774 (85.6%)	154 (77.8%)	2928 (85.2%)
Total	3240	198	3438
Interactive Dimension			
Valence	0-Non-interactive cues	1-With interactive cues	Total
0-Non-positive (coded)	489 (15.3%)	21 (9.1%)	510 (14.8%)
1-Positive (coded)	2717 (84.7%)	211 (90.9%)	2928 (85.2%)
Total	3206	232	3438

Note: Percentages are calculated based on sum of each column.

For the reviews with cognitive cues, the chi-square analysis indicated that the presence or absence of cognitive cues is not statistically independent of the review valence (chi-square = 137.057, df = 1, p-value = 0.000). It is observed that where cognitive cues are absent, the review has a high likelihood of being positive. At the same time,

the percentage of non-positive reviews is comparatively higher when cognitive cues are present. This indicates that when consumers are not satisfied, they tend to deliver more cognitive cues.

For the reviews with transactional cues on the information quality dimension, the chi-square analysis indicated that the presence or absence of the information quality dimension is not statistically independent of the review valence (chi-square = 4.705, df = 1, p-value = 0.030). Positive reviews dominate when the information quality dimension is present. In other words, when consumers are satisfied, they tend to deliver more information quality cues.

For the social dimension, the chi-square analysis indicated that the presence or absence of social cues is not statistically independent of the review valence (chi-square = 9.077, df = 1, p-value = 0.003). It is observed that the absence of social cues is more associated with the positive reviews. This indicates that when consumers are not satisfied, they tend to deliver more social cues.

For the interactive dimension, the chi-square analysis indicated that the presence or absence of interactive cues is not statistically independent of the review valence (chi-square = 6.585, df = 1, p-value = 0.01). It is observed that the absence of interactive cues is more associated with non-positive reviews. In other words, when consumers are satisfied, they tend to deliver more interactive cues.

In summary, the chi-square test results showed that these four dimensions are not independent of review valence. When consumers are satisfied (giving positive reviews), customers tend to deliver more information cues and interactive cues. On the other hand, when customers have non-positive evaluation, they tend to deliver more cognitive and social cues.

5.3. Additional Interviews to Explore the Utility of the Research Framework

Since eWOM only reflects past buyers' attitudes and arguments, review readers' (message receivers') responses to eWOM and changes in purchasing intention are still unknown. Further, in order to understand the practical use of the proposed framework, expert interviews with ecommerce buyers and sellers were conducted. The purpose of the interview was to investigate how a buyer (seller) perceives each dimension embedded in eWOM and how these cues in text reviews affect purchasing intention. The first two authors of this paper developed a set of open-ended interview questions for sellers and a set of similar questions for buyers. Several typical comments in each dimension were selected to explain the meaning of each dimension. Interviewees are general ecommerce participants. In order to test the generalizability of this framework, interviewees were not limited to online buyers or sellers of digital cameras. A Convenient sampling method was used for the interviews, which involved 28 buyers and 14 sellers.

It is also relevant to determine whether buyers have ever written any reviews online and how they composed reviews to deliver their attitudes. Among these 28 buyers, 10 buyers frequently write review comments after online transactions; 12 occasionally leave review comments; and 6 have never completed an online review. When buyers write a review, they consider both the sellers and future buyers as the audience. Some buyers claimed that they just want to express their true feeling about the transactional experience [Söderlund and Rosengren, 2007]. The comment length depends on review valence, personal mood and the author's satisfaction level. Most of the contents are related to products, service attitude, store reputation and the transactional process.

It is observed that both buyers and sellers agree that review valence and review volume are critical for consumers' final purchase decisions. (See Appendix for the comparative responses from buyers and sellers.) The interview results show that eWOM messages with informational cues and cognitive cues trigger message receivers to closely examine the message contents. Both the buyers and sellers agree that text reviews with informational cues carry the highest value and impact future transactions. Buyers like the reviews with cognitive cues, which motivate them to look for other sources of information if necessary. In contrast, it is hard for the sellers to judge the impacts of reviews with cognitive cues of products.

It is also observed that eWOM messages with social cues and interactive cues do not change potential consumers' attitudes. Most of the buyers do not place great weight on these social cues in their purchase decision-making process, while the sellers like positive reviews with social cues. Buyers cautiously treat reviews with interactive cues as an indicator of non-negative review valence. In contrast, the sellers believe that text reviews with interactive cues directly stimulate customers' purchase intentions. The findings from these additional interviews add practical meanings to the proposed framework.

6. Discussion and implications

This study proposes an analytical framework to reflect the cognitive processing and social interaction in the consumer learning process embedded in online reviews. There are five dimensions in the framework, viz., the participative, social, interactive, cognitive and information quality dimensions. Content analysis methodology was adopted to identify patterns among reviews with cues in each dimension.

6.1. Main Research Findings

The general characteristics of the Taobao dataset are consistent with past studies [Resnick and Zeckhauser, 2002; Chevalier and Mayzlin, 2006]. Sellers and buyers are distinct in this ecommerce context. Most of the transactions are between strangers and are one-time deals. In regards to review valence, the manual coding of text messages reveals that the percentage of positive reviews is not as high as indicated by the summary statistics generated by the transaction systems.

The content analysis of text reviews shows supporting evidence for the proposed framework. The results show that most of the reviews consist of transactional cues on the information quality dimension (86.4% in total shown in Table 4). Several important transaction aspects have been identified in the transactional category during content analysis, including service attitude, consistency between product description and real products, order fulfillment time and shipping. The results showed that experienced buyers delivered fewer transactional cues than novice buyers. This is consistent with past findings [Park and Kim, 2008]. It was found that 5.2% of the cognitive cues embedded in a text review (see Table 4) reveal the reviewer's cognitive processing of information related to products, sellers or transactional processes. For the participative dimension, despite different levels of buying experience, online shoppers participate actively and leave reviews of similar length (number of characters). In addition, 5.9% of text reviews were found to have social cues, and 7.1% of text comments were found to have interactive cues. No obvious pattern was found between a buyer's experience level and the number of cognitive and interactive cues in the text reviews. The test results also showed that experienced buyers tend to deliver more social cues and novice buyers include more transactional cues in the text reviews. These findings are consistent with the study results of Granitz and Wards [2006]. Expert consumers contribute message contents to product recommendations and comment on others' remarks [Granitz and Ward, 2006]. Therefore, expert consumers deliver more social cues in text comments. In contrast, novice buyers have less experience with online shopping and ask a lot of all the questions related to the online transactions [Granitz and Ward, 2006].

In addition, a chi-square test was carried out to examine whether consumer learning dimensions in the framework are independent of review valence. The chi-square test results showed that four dimensions are not independent of the review valence. Text messages with a positive valence were found to be associated with more information cues and interactive cues. In contrast, text messages with a non-positive valence were found to be associated with more cognitive and social cues. These findings may be explained by the various motivations of message senders [Yap et al., 2013]. Yap et al. [2013] empirically found that for positive eWOM messages, personal self-enhancement, social benefits, and advice seeking are positively linked to the message's rational components related to products attributes and affective components related to the message depth and intensity. The empirical results from Yap et al. [2013] also suggest that, when message senders try to warn others in the negative text comments, more cognitive cues are included in the comments.

Lastly, the findings of the expert interviews strengthen the practical relevance of the proposed analytical framework and supplement the content analysis results. The interview results show that eWOM messages with informational cues and cognitive cues activate the message receivers to carefully process information on a central route (see Appendix). On the other hand, it is observed that the text comments with social and interactive cues do not change potential consumers' attitudes.

6.2. Contributions

This study contributes to the literature in several respects. First of all, this study proposes that eWOMs are a representation of past consumer's learning process and outcome. This study argues that eWOM not only accumulates past buyers' opinions but also acts as a repository of past buyers' learning outcomes. The historical eWOM can reveal the learning process of past buyers and stimulate learning and decision-making of potential buyers.

Second, this study proposes an analytical framework of the consumer learning in eWOM. This framework enables both researchers and practitioners to understand how and what consumers learn. The framework can serve as an effective tool for observing what the past consumers have learned about the products, the e-retailers, and the online shopping process, and how they learn through social interaction.

Third, this study sheds light on the relationship between each dimension of consumer learning and review valence. Potential buyers observe the behaviors of past buyers by correlating the summary review statistics with review contents. This correlation and integration of quantitative and qualitative information provide a more comprehensive picture and stimulate stronger purchase intentions in potential buyers.

Lastly, this study adopts a content analysis approach to examine consumer reviews in online reputation systems. Content analysis is objective, systematic, and quantitative, and can present a more comprehensive picture than can a single method approach. The application of this methodology in eWOM research may be of value for future studies in this arena.

6.3. Limitations

The study has several limitations. First of all, the consumer-generated reviews of the online reputation system at Taobao.com may not be the best choice for testing the proposed research framework. Taobao.com is an e-business platform with both B2B and B2C stores. Consumers are only allowed to post a review after each transaction. The eWOM in Taobao may have limitations in testing some dimensions in the framework. For example, the cognitive process embedded in eWOM at Taobao may be limited because Taobao is a transaction-oriented platform and online shoppers also use other information sources to learn about products. In addition, the interactive dimension may have limited findings because of the system constraints.

The product choice in this study may be a second limitation. Although multiple past studies have used digital cameras and their online product reviews as study objects [Johnson et al., 2004; Chen et al., 2011; Mudambi and Schuff, 2010], choosing the camera product and Nikon brand bring limitations in terms of market segments and customer attributes. Although the follow-up interviews reduce this concern, future research studies using other products are encouraged.

Third, the results herein may be unique to the Chinese e-business environment, which faces the challenges of low concentration and of providing localized market service. These challenges may constrain the reviewers' evaluations of the online shopping experience. For example, because of problems in providing localized service, novice reviewers in China may tend to include more transactional cues in the text comments.

Finally, there is reason for concern about possible puppet buyers and fake comments. The interviews with buyers reveal the same concern. Taobao.com has its own protection mechanisms of buyers and sellers. Each review is tied to a transaction. Since the dataset in this study was collected over five months in 2009, fake comments may affect the findings over a short period.

Despite the limitations, the empirical results may be generalized to other ecommerce platforms and other products. Past eWOM studies have used beauty product forums [Hung and Li, 2007; Cheung and Thadani, 2012], WOM at Amazon.com and Barnesandnoble.com [Chevalier and Mayzlin, 2006; Chen, et al., 2011], and consumer-generated reviews on ebay.com [Resnick and Zeckhauser, 2002]. The dataset from Taobao has general characteristics similar to eBay [Resnick and Zeckhauser, 2002]. The framework focuses on what and how consumers learn in eWOM instead of the platform or the product itself. Our additional interviews confirmed that buyers of other products pay attention to the various dimensions of the text reviews. Reviewers share similar motivations to write review texts at various online platforms. Therefore, we regard the research findings as generalizable.

6.4. Managerial implications

The research findings of this study have some noteworthy implications for ecommerce practitioners. First, Ecommerce practitioners could carefully observe past consumers' learning through eWOM. Strategies could be created to help consumers learn at an ecommerce platform. Online reviews represent a repository of individual consumers' knowledge that reveals the process of consumer learning. Ecommerce practitioners should encourage past consumers to provide quality reviews that reflect their learning of the products and online stores. For example, some ecommerce sites allow past buyers to provide follow-up reviews after a period of using the product. This practice engages past buyers to come back and improves review quality. More product usage experience and learning outcomes of past consumers can be included in the follow-up reviews.

Second, e-retailers should consider how to organize past text reviews and what reviews should be presented first. For example, reviews with interactive cues should be presented to engage customers at an eye-catching place on a webpage. Reviews with positive interactive cues reinforce the messages delivered in the reviews, and stimulate buyers' purchase intention. Therefore, if reviews can be sorted by different criteria, e-business owners may think about presenting reviews with interactive cues to future buyers on the top of the review list.

Third, ecommerce practitioners should adopt the overall framework by considering all the dimensions, not simply focusing on any single dimension. Zhang and Watts [2008] demonstrate that online community members process information from online communities in a highly contextual manner. For example, a text review with social cues sets the context for the discussion of transactional factors, adding to the review's credibility in the view of the eWOM receivers.

Finally, text messages may be selected corresponding to a buyer's experience level. When the buyer's experience level is low, eWOM with transactional cues and cognitive cues associated with positive ratings should be provided.

6.5. Theoretical Implications and Future Research Directions

The findings of this study raise several issues about consumer learning and eWOM that could inform future research directions. First, one could examine how each learning approach of online consumers' impact online sales. The existing literature has examined the sales effects of observational learning (by examining sales volume and

review volume) [Chen et al., 2011; Cheung et al., 2012]. It remains to answer how consumer learning in eWOM impacts the sales. Second, one could explore how consumer learning in online reviews impacts the various stages of the online consumer's process of making a purchasing decision. For example, how will the learning dimensions in eWOM impact need recognition, information search, and evaluation of alternatives? Third, future research may choose some other ecommerce platforms and other products to test the proposed framework. The generalizability of the framework will be improved by testing it in other e-business platforms with other products. Lastly, the underlying consumer psychology of generating eWOM and its relation to the consumer learning process could be studied. Future research may examine this issue by taking an interdisciplinary view from communication and consumer psychology literature.

7. Conclusion

This study examines consumer learning in eWOM. EWOMs on transaction platforms are no longer simply consumers' opinions and recommendations but have become a knowledge repository of consumers' impressions about online stores and products. We hope that the proposed analytical framework and the empirical results obtained in this study will stimulate more research in this stream and help ecommerce practitioners understand how to help customers learn and generate online sales.

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Appendix: Additional Interviews – Practitioners’ Views on the Framework

	Sellers	Buyers
Demographic information	14 sellers participated in the interviews, in which one didn't provide the demographic information. Out of 13 sellers, there are 8 females and 5 males. They are 5 online storeowners and 8 customer service staffs. The average work experience in the current online store is 3 years. 10 sellers are less than 25 year old and 3 are between 26 and 35. Five sellers have the high school diploma or associate degrees; eight sellers have the Bachelor degrees or above. For their online stores' seller credits, 9 have credits less than 5000 and the rest 5 are more experienced ones with seller credits equal to or more than 5000.	Among the 28 buyers interviewed, 25 buyer interviewees are less than 25 year old and 3 buyers are between 26 and 35. There are 22 male and 6 female. 13 have a Bachelor degree and 15 have a Master degree or higher. There are 12 students and 16 full-time work professionals. Regarding their buyer credits, 2 have completed less than 10 online purchases; 5 have shopped 11-35 times; 9 have purchased 36-100 times, 7 have purchased more than 100 times; 5 buyers' didn't provide this information.
Central routes		
Cognitive	For the cognitive dimension, 8 out of 14 sellers treat these comments with cognitive cues as neutral. The sellers tend to treat these comments as signals to provide more customer service. It is hard for sellers to predict these comments' impacts on sales. The sellers think that new buyers or buyers with certain product knowledge or rational buyers tend to comment using cognitive cues.	For the cognitive dimension, 18 out of 28 buyers treat the reviews with cognitive cues as useful. Among these 18 buyers, 8 indicated that they would do some further research about the products. 8 out of 28 buyers think the reviews with cognitive cues have no impact on their purchase intention.
Informational Quality	For the transactional cues on information quality dimension, all sellers think that the text messages with transactional cues are of the most value to future buyers. These comments provide access of intangible factors such as product quality, service attitude and store reputation, etc. to review readers. Online reviews with transactional cues directly impact future store sales.	For the transactional cues, 14 out of 28 think reviews with the consistency of product descriptions with real products are "very important" for their purchase decision; 9 rate it as "important" for the final purchase decision; 3 generally use these comments as "reference"; 2 generally do not read text comments. For the comments with service attitude information, 11 out of 28 think they are very important for the final purchase decision; 6 only pay attention to negative reviews about service attitude; 14 rate these comments as neutral impact on final purchase decision; 4 reply that these comments have no impact on their purchase decision. Most buyers do not worry about order fulfillment time and shipping as long as they are generally acceptable.
Peripheral routes		
Participative dimension	For the participative dimension, 12 out of 14 seller respondents agree that the review volume (the number of reviews) and review valence are of the most importance for the online store sale. One seller interviewee roughly estimates that about 70% buyers read text comments. Sellers generally do not reply to buyers' comments unless there are negative reviews or questions about after-sale service. It is a general belief that review length should be reasonable. A long review may raise the doubts of puppet reviews. A short review or a system default review cannot provide useful information for future buyers.	For the participative dimension, 14 out of 28 buyers read text review messages. 2 out of 28 mention that they only pay attention to review valence. 4 out of 28 only care the number of reviews in an online store. 2 express that the number of review or review length does not have influence on their purchase intention.
Social dimension	For the reviews with social cues, 12 out of 14 sellers believe that text reviews with social cues have a positive impact on store reputation and future sales. Sellers believe that usually experienced buyers tend to leave comments with background information. Sellers also believe that past buyers treat text comments as a communication channel with other buyers. The sellers think that the reviews with social cues look more authentic and trustworthy.	For the social dimension, most of the buyers pay little attention to social cues because they look for more direct transaction-related information. 21 out of 28 think reviews with social cues have no influence on their purchase intention. 2 out of 28 indicate positive impacts on their purchase intention. 5 out of 28 tend to link this kind of reviews with puppet reviews.
Interactive dimension	The comments with interactive cues have a direct impact on future buyers and stimulate their purchase intention. 10 of 14 sellers agree that positive reviews with interactive cues have a positive impact on store sales. Two raise the concern that buyers might treat them as puppet comments. Experienced buyers tend to make this kind of comments. Buyers who love sharing personal experience and joy of shopping with others may leave reviews with interactive cues.	For the interactive dimension, 8 out of 28 buyer respondents answer that they treat these reviews with interactive cues as positive reviews while 7 think they are neutral reviews. At the same time, 4 out of 28 buyers replied that these reviews with interactive cues have no influence on the purchase decisions. 6 buyers think the reviews with interactive cues are bogus.