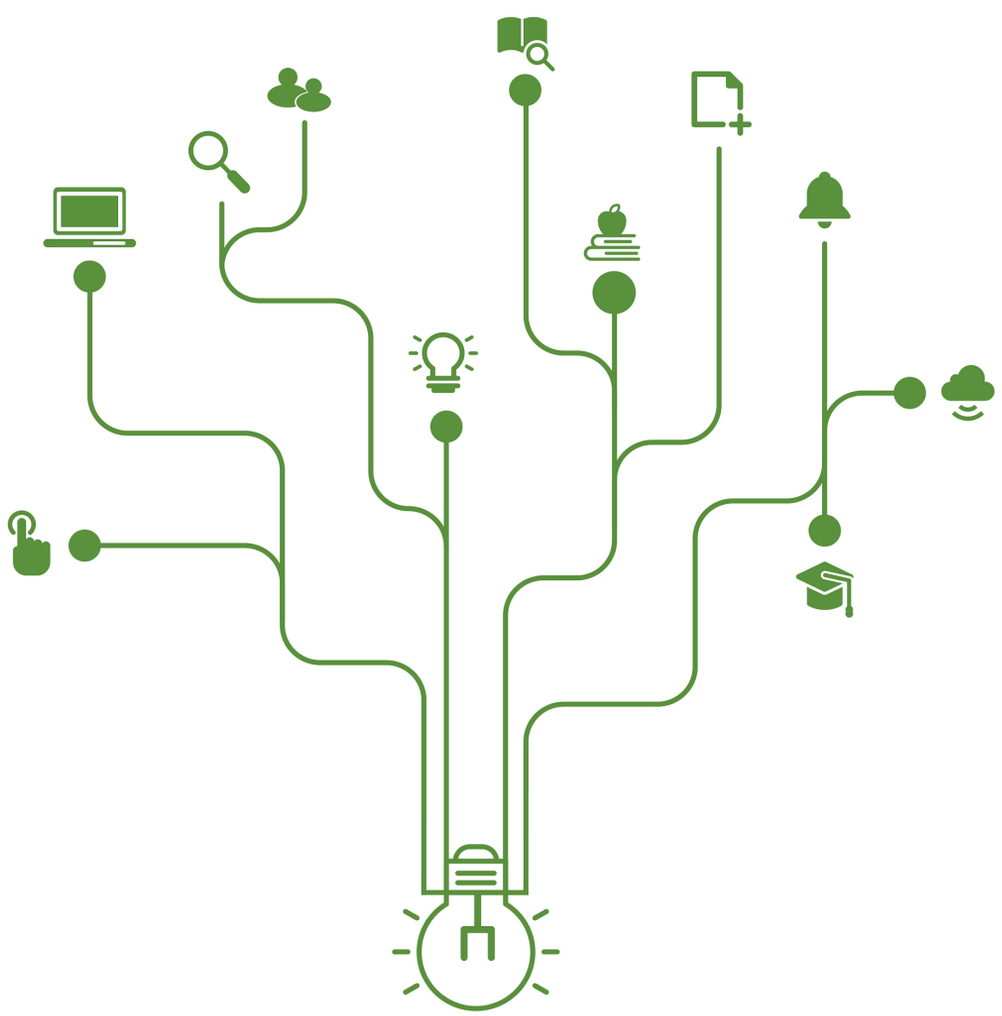
Development Studies Series 19

The Effect of Information Type (Inforgraphic vs. Text) on an E- Government Site on User's Attitudes and Responses to the Site: Moderating Roles of User Information Processing Tendency (Visual vs.Verbal) and Information Literacy



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INTRODUCTION

Recently, the rate of people using e-government sites has been increasing. It is expected that acquisition and delivery of government policies and administrative work through e-government sites will be developed consistently (Security News, 2018.03.05). However, the usage rate of government websites by old people is still low. Old people tend to visit public offices to acquire administrative information and seek an administrative help from public officials rather than using e-government sites. According to the 2017 report of Ministry of Public Administration and Security, 65% of administrative service used by people aged over 50 is performed by visiting public offices and the rate is 82.9% for people aged over 60. The use rate of e-government sites or administrative process via email is very low (people 50 +: 31.2% and 60+: 11.1%). The main reason is that old people tend to that believe offline visit rather than online process expedites the administrative service and they can get an appropriate help and guide from public officers. The rate of awareness and use of e- government sites for people aged over 60 is 62.4% and 54.3% respectively and the reason for such low rates is that old people are not familiar with the e-government sites and prefer offline administrative service to online service. Out of people aged over 50 who have not used e-government sites, less than 30% have a motive for e-government site use (Ministry of

Public Administration and Security, 2017). Although uneasiness and low motive to use online administrative service by old people have not caused serious problems so far, a demand for old people to utilize online service is increasing with constant developments in online administrative service due to the advent of sophisticated knowledge based society and regional inequity.

Online administrative service is also important for younger people because administrative services such as tuition loans, aid for living expenses, and support fund for younger people are processed online in e-government sites. Therefore, competence to understand and utilize public information in e-government sites is also required for younger people.

A low level of online public information use results in problems such as a lack of access to and utilization of useful health information for young people as well as old people (Kim, Choi, & Park, 2018; Hardie, Kyanko, Busch, LoSasso, & Levin, 2011; Jiang, & Beaudoin, 2016). Previous research asserts that inappropriate health information or improper use of online health information may be a major cause of avoidance of health decision making and information overload, which eventually leads to negative behaviors including inaction or degraded health interest. Therefore, utilization of online public information is related to behaviors (e.g., healthy eating and observance of medical guide) as well as acquisition and comprehension of online public information. That is, inappropriate online public information affects citizen behavior and public relation of government for an effort to improve online public information negatively. Recently, according to Ministry of Environment, an inadequate way of providing information makes people feel confused and avoid information (Dailian, 18.03.12).

If information is provided in an improper way, however valuable it may be, it causes confusion especially for those who are less able to process information in e-government sites. Old people are prone to a lack of online information use because they are less able to use e- government sites. On the contrary, more than 95% of people aged less than 40 who are more competent in computer technology utilize e-government sites, because they believe that e-government sites make it easy to process administrative inquiries anytime when they need. Although e-government sites are convenient, old people are reluctant to use them because of their lack of knowledge and experience of IT technology. Therefore, it is necessary for government to remove barriers to use e-government sites for old people. For young people, their lack of experience to process administrative inquiry, difficulty of administrative jargons, and complexity of

administrative services may make them avoid to use e-government sites. In relation to this, recent research finds that infographics is a useful format of presenting huge online information for people understand and process information easily and in an effective way (Otten, Cheng, & Drewnowski, 2015).

Recently, although more and more websites use simple ways to convey policy information such as card news, there are few studies to examine the effects of various information formats on information processing and the relationship between information format and psychological characteristics. In terms of the psychological characteristics of information processing, one of the reasons for reluctance to use online administration site may be related to the format of information provided by the site. People with low ability and low experience to use new technologies may have difficulties in processing information, and the difficulties of decision-making caused thereby can lead to decision-making avoidance (Anderson, 2003). The reason why decision making is difficult is that more information is entered than information that can be processed by individuals with different levels of information literacy and information processing strategies. Information overload is a situation in which more information is entered than information that can be handled by the user, making it difficult to handle cognitive and reactive processes such as judgment and decision making (Eppler & Mengis, 2004, p. 326).

Information overload in the course of information acquisition or decision making can reduce information processing capabilities and reduce interest in achieving goals (David, 2011; Klapp, 1986). Anyone who lacks information on policy or administrative experience may experience information overload for information that is new or information about administrative procedures, and it is necessary to prevent them from avoiding decision-making or leading to non-action. In other words, it is necessary to study how people respond to different types of information presentation (e.g., text or inforgraphics) and how an information nudge strategy works, which will prevent decision-making avoidance and improve our understanding of how people accommodate their behavior as information is presented. In this study, we conducted research to identify how users respond to different types of information provided by the e-government sites and how user's information processing tendency (visual vs. verbal preference) and information literacy moderate the relationship between information overload and user attitudes and responses to e-government sites.

LITERATURE REVIEW

The effects of information presentation type: Visual vs. verbal information

Pictorial (visual) information and textual (verbal) information are the most basic elements in consumer information use. Especially, visual and verbal information are the most prominent factors when there is no direct interpersonal contact such as in advertisement or online shopping. In today's online information circumstances where direct human contact does not happen all the time, how to express information with visual and verbal elements or a mixture of the two becomes more important to improve communication goals. Information on the websites is provided with various types of information such as pictures, images, sound, characters, and a mixture of these elements.

In the field of consumer and advertising research, a few studies have been conducted to examine whether picture and text information is used as two effective ways of providing information online. Among them, studies on the effects of pictures and textual information on consumer memories (Guenther, Klatzby, & Putnam, 1980; Lutz & Lutz, 1977; Shepard, 1967; Starch, 1966) or studies on the effects of pictures and textual information on consumer judgments and attitudes (Childers & Houston, 1984; Edell & Staelin, 1983; Hirschman, 1986; Holbrook & Moore, 1981; Kisielius & Roedder, 1983) are representative. Previous studies show that pictorial information is superior to textual information in terms of information recall and recognition. According to Starch's (1966) study, participants recalled more information in ads with pictures than in ads without pictures. Shepard (1967) also found that pictorial information in ad was memorized and recognized by people for a longer time, and related studies (Hirschman & Solomon, 1984; Guenther et al., 1980) supported the same result.

Studies on the effects of pictorial and textual information on information processing have confirmed that the more similar or related the two pieces of information are, the easier it will be remembered by the people (Childers & Houston, 1984; Son, Reese, & Davie, 1987). Another research direction related to this is to find the attitude toward pictures and text information (Holbrook, 1985; Mitchell & Olson, 1981). According to Mitchell and Olson (1981), participants tend to have a more positive attitude the ad with pictures than ad using textual information and ads with pictorial information was more persuasive than those without pictures. They argue that visual information is more effective in changing consumer attitudes than textual information.

Different types of information are subject to different types of information processing(e.g., dual coding hypothesis by Paivio, 1971; left-right hemisphere specialization by Geschwind, 1979; sequential vs. simultaneous processing modes by Das, Kirby, & Jarman, 1975). For example, picture information is processed by the image information processing while language information is processed by the discursive information processing (Kim & Lennon, 2008). Previous studies related to this process include a study of how language and numbers are handled in working memory (Bettman, 1979), and more recently, a study of how images are processed (Childers & Houston, 1982, 1984; Childers, Houston, & Heckler, 1985; Rossiter & Percy, 1983; Smith, Houston, & Childers, 1984). Image information processing is triggered by perceived stimuli and uses various senses such as visual, olfactory, and auditory sense. On the other hand, text information processing is handled separately from internal sensory experience (MacInnis & Price, 1987). As a result, text information processing is less specific than image information processing and affected less by sensory experiences (MacInnis & Price, 1987).

As with previous studies on image and text information, two types of information have been studied in the consumer research field, and it has been confirmed that image information is superior to text information (Cautela & McCullough, 1978; MacInnis & Price, 1987). According to MacInnis & Price (1987), both information processing types can be triggered by the information presented, and what kind of information is presented has a major impact on problem solving. For example, in the context of brand evaluation, textual information summarizes internal and external attributes of the brand and image information leads to an overall and integrated evaluation of the brand. In addition, image information processing makes it easy to recall decision making results and images are more realistic and have greater expectations than text information (MacInnis & Price, 1987).

Cautela and McCullough (1978) found that image information processing is more effective language information processing in increasing purchase intention. In the study of Staats and Lohr (1979), image information causes emotional reaction. Image information affects positive emotions that induce approach behaviors as well as negative emotions that induce avoidance behaviors. MacInnis and Price (1987) argued that image processing can cause greater emotional responses, which eventually lead to higher purchase intentions. In addition, image information processing can reduce decision-making avoidance, and the sensory experience while performing image information can lead

consumers to greater pleasure, satisfaction, and actual purchasing behavior (Holbrook & Hirschman, 1982; Lindauer, 1983). Kim & Lennon (2008) also confirmed the difference between image information and text information in the online environment. According to their study, if the level of the text information is insufficient, the purchase intention may decrease. In other words, despite the positive effects caused by image information, if the amount of text information is not sufficient, it affects purchase intention negatively.

Therefore, this research is performed to explore how different types of information presented on e-government sites (visual vs. verbal information; image, graph, text etc.) affects attitude and cognitive and affective responses toward public policy information in e-government sites and how individual factors such as information processing styles (inclination to process information visually or verbally) and information literacy and information processing moderate the effect of online information in e-government sites on user responses.

The Effect of Information Overload

The general concept of information overload deals with the situation in which more information is presented than the amount of information that can be processed by an individual (Eppler & Mengis, 2004, p. 326). In other words, people have their own limitations on the amount of information they can process for a specific time. In addition, according to David (2011), information overload occurs within a specific area, diminishing people's concentration and work efficiency. Information overload can be divided into two types, one is objective information overload and the other is subjective information overload (Eppler & Mengis, 2004; Malhotra, 1984). Objective information overload means the nature of the information itself that can cause information overload. It includes the amount of information, the time to process the information, and the level and intensity of the information complexity. Objective information overload has been actively addressed in consumer and marketing areas (Merz & Chen, 2006). On the contrary, subjective information overload means perceived overload of information and it leads to confusion, cognitive stress, and dysfunctional responses from the information users.

Studies on information overload have mainly dealt with the effects of information overload in work environments (Schultze & Vandenbosch, 1998), but it becomes more important to understand the general phenomenon of information overload in this online environment. From the perspective of social psychology, Klapp (1986) asserts that

excessive information is perceived as noise, insufficient understanding of meaning and interest in information. In the context of information overload, people can experience negative reactions such as negative feelings, dissatisfaction, boredom, and distraction.

Information overload can also be affected by a number of factors. According to Jackson and Farzaneh (2012), information overload is influenced by two factors, which can be divided into intrinsic and extrinsic factors. Intrinsic factors are the main sources of information overload, which include the amount of information that a user can handle, information processing capabilities, and the amount of time available for processing information. On the contrary, external factors affects information overload indirectly but they

have a direct impact on intrinsic factors. Extrinsic factors include the nature and the quality of the information, the performance of the task, and the processing procedures. While both intrinsic and extrinsic factors in information overload affect individual information processing and information acquisition, intrinsic factors affect information overload more directly than extrinsic factors. For instance, Jackson and Farzaneh (2012) have argued that personal factors have a direct impact on information processing abilities and information overload cannot be accounted for except for such personal factors. Information overload in such situations as online information processing and online learning may evoke different responses depending on user's ability or disposition. One of the advantages of online environment is that is not restricted by time and space and therefore it is appropriate to explain information overload by subjective information overload rather than objective pressure of time and space.

According to normative theory, the consumer considers all accessible information in decision making and chooses the best option among the given alternatives. However, normative theory has limitations in that it does not consider consumers' limited cognitive ability, and consumers often use heuristics and simple decision-making rather than using all available information (Simon, 1956). For example, many laboratory studies have shown that consumers do not consider all available information (Jacoby, Chestnut, & Fisher 1978; Lurie 2004; Malhotra, Jain, & Lagakos 1982). Instead, consumers construct preferences under given alternatives, minimizing cognitive effort and improving accuracy (Bettman, Luce, & Payne 1998; Payne, Bettman, & Johnson 1993). In other words, consumers tend to perceive and process information that can reduce perceived uncertainty in decision-making situations (Jacoby et al., 1994; Moorthy, Ratchford, & Talukdar, 1997). Even in the context of online information presentation, consumers may want

to search for information to a level that

reduces uncertainty about what they are trying to select rather than using all available information. In this regard, Currim, Mintz, and Siddarth (2015) found that it is important for consumers to find the information they need, rather than considering all possible information, and to present appropriate information for consumers to choose from. Compared with the offline environment, the online environment is easier to compare and provide information tailored to each consumer. Therefore, it is important to present information so that consumers can make decisions, and eliminating unnecessary information will reduce decision avoidance. Messner and Waenke (2009) reveal that presenting various alternatives may satisfy consumers' desire to search for information but information overload due to the given information may reduce satisfaction and appropriate evaluations of the alternatives. Their research confirmed that, in the situation where deliberate and complicated processing is performed, less information is better than more information. In other words, it is possible to increase consumer satisfaction by presenting more alternatives in a simple decision making situation. However, it is necessary to present information clearly and efficiently in cases where individuals perform online policy search, administrative processing, civil appeal settlement, or tax payment. In addition, information overload in specific areas is studied and according to recent research on information overload of health information, information overload can have a negative impact on information seekers (Bawden, Holtham, & Courtney, 1999; et al., 2007; Misra & Stokols, 2012; White & Dorman, 2000). Like health information, policy information seeking requires similar competencies for individuals. Simple problems can be solved by information search or simple prescription, but the more complex the problem is, the more the expert's help and the search for professional information are required. That is, the more complex the problem to solve, the more users have to search for more information, and the process of searching for more information can lead to information overload. Such overloading of information on the Internet is seen in various areas such as education (Hong, et al., 2017), health (Swar, Hameed, & Reychav, 2017), shopping (Currim et al., 2015), feeding (Spiteri Cornish, & Moraes, However, the impact of information overload on online government areas such as policy information and online complaints has not yet been addressed. In this study, we investigate the effect of information overload caused by different types of information delivery in e-government sites on user's reaction and behavior.

Cognitive and Affective Responses to Websites

Consumer expectations of the physical design or aesthetic elements that people have in traditional offline stores can also be applied in evaluations of website pages or configurations (Eroglu et al., 2001; Rosen & Purinton, 2004). According to previous studies on online website design, the design of a website has a significant effect on perception of the services provided by the website (Koufaris, 2002). Online website design has to be considered more important than the design in traditional stores, and the effect of design on website evaluation is also increasing (Hasan, 2016). The impact of website design on website evaluation influences not only the quality of service provided but also the motivation to use it (Zhang & von Dran, 2002). In addition, users are more motivated to visit sites with better website design (Mithas, Ramasubbu, Krishnan, & Fornell, 2007). In other words, website design not only affects trust in the site and motivation for continuous use (Cheung, Chan, & Limayen, 2005; Karimov et al., 2011) and evaluation of service quality and communications with the website users (Wells et al., 2011). Thus, it can be said that how to design a website to satisfy users has a significant influence on the overall evaluation and use of the site (Ahn, Ryu, & Han, 2007; Chang & Chen, 2009). In addition, the design elements of the website influence the cognitive and motivational factors of the use of the website, and eventually affect users' positive evaluation and trust in the website (Chen & Wells, 1999; Manganari et al., 2009; Mithas et al., 2007; Wells et al., 2011). A variety of studies have been conducted in this regard and it was found that website design affects user trust of the website (Gao, Koufaris, & Ducoffe, 2004), user satisfaction (Cyr & Bonanni, 2005), the quality of service (Wells et al., 2011), attitude (Chen & Wells, 1999), pleasure (Childers et al., 2002), affective response (Koo & Ju, 2010), the quality of the website (Ha & Stoel, 2008), and intention to use (Ganguly, Dash, Cyr, & Head, 2010). However, research on the negative impact of website design on user evaluations is largely lacking (Huang, 2008). Recently, Hasan (2016) confirmed that various design elements of website influence of user's negative evaluation and user-friendly design lowers the negative evaluation of website design.

In terms of cognitive processing, cognitive failure is a personal judgment of attention failures (Forster & Lavie, 2007; Tipper & Baylis, 1987). In addition, cognitive failure is related to cognitive processing ability and memory of the individual (Schmidt, Neubach, & Heuer, 2007). In other words, cognitive failure reflects the decreasing effectiveness of selective attention. Those who suffer from cognitive failure have difficulties in

concentrating on cognitive tasks, feel irritability, and react negatively to cognitive tasks. Especially in the context of learning, this phenomenon can be seen more easily (Staats, Kieviet, & Hartig, 2003).

However, the relationship between cognitive failure and learning in an online situation has not been thoroughly examined (Authors, 2014; Liu, 2005). Zhang, Patel, Johnson, Malin, and Smith (2002) discussed the use of information design as a human-centered approach in the study of service delivery contexts. Recent research shows that users' learning abilities can be improved when they are provided in accordance with the user's information processing awareness (Coursaris & van Osch, 2016). In terms of learning through online media, the cognitive desire may lead to different results for individuals depending on the service content or HCI provided (Mayer, 2005). In addition, psychological research on information processing has shown that there is a significant correlation between cognition and context (Thelen, Schoner, Scheier, & Smith, 2001) Cognitive failure that occurs in Internet use affects the learning effect (Hong, Hwang, Liu, Ho, & Chen, 2014).

In addition, the user's reaction can also appear emotionally. Discomfort, displeasure, and anger that the user feels are negative evaluations in usage, and they occur in the situation where user's interaction with the event, the message, and the service is out of user expectation (Ducoffe, 1996). Perceived irritability in online situations can be triggered by unarranged designs or unsatisfactory service delivery methods (Lim & Ting, 2012), and many studies have shown that the user's perceived negative emotional response affects their behavior (Lim, 2013; Lim and Ting, 2012; Luo, 2002; Xu, Oh, & Teo, 2009). Specifically, prior research has shown that perceived negative emotional response has negative effects on attitude, satisfaction, convenience and intention of using online consumers (Hausman & Siekpe, 2009; Huang, 2008; Jere & Davis, 2011; Thota, 2012). In addition, perceived negative emotional responses have been found to negatively affect positive factors such as trust, competitiveness, and veracity (Gao & Wu, 2010).

Psychological Characteristics of Website Users

· Information Literacy

Information literacy means correct understanding and processing of accessible information (Bormuth, 1975). This processing ability can vary from individual to individual, affecting the processing and recognition of various information or stimuli encountered in daily life. It is one of the most important factors in consumer research

where studies on vulnerable populations such as low-income consumers have been increasing (Alwitt, 1996; Andreasen, 1975; Hill, 1991) but studies on their information literacy have not been conducted much(Adkins & Ozanne, 2005). Exceptionally, a study done by Viswanathan et al. (2005) addresses characteristics of consumers with low cognitive ability and finds that they are less able to relate abstract thought. In other words, consumers with low processing ability may be aware of one piece of information, but are less able to relate it to other information.

Studies of information processing ability focus on the effect of differences in working memory levels on understandability of information. Working memory is a memory for storing and processing information and can only process limited information (Daneman & Carpenter, 1980). Working memory combines processed information with a sentence structure and helps the reader understand the overall content (Perfetti, 1983). Poor readers are limited in their ability to interpret characters, requiring greater effort to understand and process information. On the other hand, well-understood readers have excellent vocabularies and are more able to understand text information quickly and accurately (Lewellen, Goldinger, Pisoni, & Greene, 1992). People with greater readability are less cognitive burden on processing text information through working memory and lead to better information acquisition and cognitive processing (Perfetti, 1983, 1985). A recent consumer study on the effect of information literacy found that low literacy consumers have a lower level of working memory (Jae, 2006; Viswanathan, Sridharan, Gau, & Ritchie, 2009; Viswanathan, Torelli, Xia, & Gau, 2009). In a study done by Jae (2006), low-literacy consumers should make greater efforts to process text information, and limited working-memory processing led to lower levels of information acquisition and understanding. On the other hand, high-literacy consumers are able to better understand and acquire information while less effort is required to understand information through working memory.

Graphic information, such as picture information, helps users understand and remember information (Levie & Lentz, 1982), and can improve information delivery (Levin, 1989).

Research on retrieval capability and consumer decision making has shown that low-literacy consumers are more dependent on image information (Adkins & Ozanne, 2005; Jae & DelVecchio, 2004; Viswanathan et al., 2005). They often process and make decisions through images rather than dealing with actual text information (Viswanathan, Sridharan, Gau, & Ritchie, 2009; Viswanathan, Torelli, Xia, & Gau, 2009; Viswanathan

et al., 2005). But using too complex images can lead to negative effects (Jae & Viswanathan, 2012). Among these processing capabilities, information literacy is considered one of the key capabilities in a technologically developing and evolving society and is the ability to leverage digital and new scientific information (De Meulemeester, Buysse, & Peleman, 2018). Literacy also leads to studies of its effects on processing many areas such as health (Hardie, Kyanko, Busch, LoSasso, & Levin, 2011) and finance (Huston, 2010) as well as reading comprehension (Viswanathan et al., 2005). Informational literacy is an important factor to be addressed in relation to online administration, because decision-making processing in which information is recognized and processed online requires individuals to understand and recognize information on the websites. Thus this study is performed to specifically identify the effect of individual differences in the ability to process website information. In recent years, digital and ICT devices have served as a significant barrier to information exploration and utilization (Bruno, Esposito, Genovese, & Gwebu, 2010; Van Deursen, van Dijk, & Peters, 2011) and many have explored ways to improve ICT utilization skills. In this study, digital literacy refers to an individual's perceived ability to navigate information and solve problems through ICT, and this ability or effect will affect an individual's ICT use behavior (Bertot, Jaeger, & Grimes, 2010; Click & Petit, 2010). That is, media experience and ICT use behavior may depend on the individual's ability, such as digital literacy. Low digital literacy users who are less able to utilize ICT can cause technostress, which may be considered unsuitable for them and may gradually be avoided (Yu, Lin, & Liao, 2017).

· Effect of Information Processing Type of the User- Visual vs. Verbal Processing

Research on image (visual) and text (verbal) processing indicates that brain imaging devices identify that the processing of information in both areas appears in different areas. Analysis shows that verbal information is processed through criminal hemisphere, and visual information is processed through the right hemisphere (Townsend & Kahn, 2013). Processing at a higher cognitive level (e.g., memory, attention) activates brain activity in the area of experience-related memory processing. Studies on experience-related information processing show that verbal and visual information differ in their effect on information processing (Khateb, Pegna, Michel, Landis, & Annoni, 2002). Paivio's dual coding theory (Paivio, 1971, 1986) describes two distinct types of information as being interconnected. In addition to their differences in activating different areas in the brain,

the two types of information also affect information processing in different ways. Visual information is processed more quickly and automatically than verbal information. Carr, McCauley, Sperber, & Parmelee (1982) conducted a study where they found that visual information can evoke the meaning of that information faster and more automatically than verbal information, and verbal information can conjure up the definition of that information faster than visual information. In addition, prior studies have shown that visual information can be processed in a more emotional way compared to verbal information (Hsee & Rottenstreich, 2004; Lee, Amir, & Ariely, 2009; Lieberman, Gaunt, Gilbert, & Trope, 2002).

This automatic process often makes a difference in terms of interpreting information. Verbal and numeric information is processed sequentially or in a fragmented manner, and visual information is processed as a whole at a time (Hart, 1997). In addition, in Paivio (1986) studies, it is also confirmed that visual processing can be done in parallel and verbal information can be processed sequentially. However, according to Sharps & Nunes (2002), it was emphasized that distinguishing between the two types of information in a separate way is not appropriate and should be recognized as a continuous process. The overall processing of visual information can be faster and easier to process than slow and sophisticated verbal processing (Holbrook & Moore, 1981; Veryzer & Hutchinson, 1998). To make information more attractive to users, service providers need to deliver it in a more diverse and attractive way, but need to minimize the complexity in the delivery process to reduce the negative impact. This is because as complexity increases, negative reactions in processing information can result in information overload. Meta studies of optional overloads by Scheibehenne, Greifeneder & Todd (2010) have shown that different studies may result in different overload phenomena. In this regard, a study by Chernev, Böckenholt & Goodman (2010) shows that it is important to identify which situations or conditions can cause an information overload rather than why the overload occurs.

RESEARCH QUESTIONS

Depending on the amount of information provided, users may be aware of information overload. Information overload may have a negative impact on cognitive and emotional responses and be perceived to be of low usefulness. According to Davis' (1989) technology acceptance model, attitudes and usefulness perception of users toward

websites can affect their website intention. To identify the impact of information on e-government sites on users' attitudes and usefulness perception, this study looks at the cognitive and emotional responses to information overload. Information overload is a major factor that has a negative impact on user information processing and this study will look at the informational and structural dimensions of the site design as a cause of information overload. Information overload can affect usability, reliability, and information recognition of a site through cognitive and emotional assessments.

Recently, Swar, Hameed & Reychav (2017) have addressed the impact of information overload on individual information processing. A study by Swar et al. (2017) found that users with online information overload have negative reactions to it, which have a negative impact on their use and interest in information. That is, if online information is presented in an excessive way, users will experience information acquisition failures and negative reactions (Hall & Walton, 2004). As information available online increases, those who seek and navigate online information should make greater efforts to utilize it. In other words, users' efforts to process information can have a negative physical, emotional, and social impact due to limitations in their ability to process information (White & Dorman, 2000).

As such, information overload on the site may affect user's judgment, decision making and intention to use the site. Users' judgments about the usefulness of the site can be measured through a value recognition of its usefulness. If the user's willingness to use is driven by perceived value (Levy, 1999), the government needs to understand what value users are demanding in using the government site (Holbrook, 1999). Value recognition through usability recognition should be addressed as an important factor (Wigfield & Eccles, 2002, pp. 159-184). Usefulness recognition that users feel is influenced by their current goals and affects their future choices (Eccles, 2005) and is sometimes used as a tool to determine future plans for individuals' choices (Vekiri, 2013). The usefulness reflects how much information is available to help users perform their actual tasks and also reflects the efficiency of the knowledge gained in their work environment (Johnson & Sinatra, 2013). It also reflects user experience who uses an actual site (Parasuraman & Grewal, 2000). This view could also be taken into account the impact of user process of administrative service through government sites and the burden of cognitive processing in site usage. The intention of the user to decide to keep using is referred to as the intention of continuous use (Bhattacherjee, 2001) and is affected by the user's satisfaction (Lee, 2010). When users are satisfied with the design

or content of websites, they try to process information in a way that improves cognitive processing efficiency and increases the effectiveness of learning (Sung & Mayer, 2012). The content and design offered in online learning will improve learning effectiveness (Falloon, 2013), and the increase in user satisfaction will improve the value of learning content and increase the continuous use intent (Hong, Tai, Hwang, Kuo, & Chen, 2017). Therefore, this study will address the following research questions about 1) how information presentation types on e-government sites affect user attitude and responses to the sites, 2) how user's information processing type and information literacy moderate, and 3) how user cognitive and cognitive responses mediate the effect of information overload on e- government sites influence user attitude and evaluation of the site.

RQ 1. Will users have different cognitive and affective responses depending on the type of information presented on the e-government sites (text vs. infographics)?

RQ 2. Will the level of information overload that users perceive vary depending on the type of information presented on the e-government sites (text vs. infographics)?

RQ 3. Will the effect of the information presentation type be moderated by user's psychological factors such as information processing tendency (visual vs. verbal preference) and information literacy?

RQ 4. How will the interaction between information presentation types and users' psychological factors affect users' perceived information overload, attitudes and responses toward the e-government sites?

STUDY 1: The Effect of Information Presentation Type of E-Government Sites on Usefulness Recognition: Mediation Effect of Information Overload Recognition and Moderating Effect of User Information Processing Type

In Study 1, we intend to conduct a study to identify differences in the recognition of information depending on the type of information presented (Infographics vs Text) and the consumers' tendency to process (visual vs. verbal) it. If the complexity of presenting information increases, users may experience information overload in the processing of the information received (Townsend & Kahn, 2013), which may lead to avoidance of selection or degradation of assessment. The overloading that users perceive depends on the conditions (Scheibehenne, Greisener, & Todd, 2010), and it is important to consider how information is presented (Chernev, Böckenholt, & Goodman, 2010). Therefore, we examine the effect of information presentation method between infographic information

and text information on information overload. Next, we try to confirm the difference of reaction according to the two information processing tendencies proposed by Childers, Houston & Heckler (1985). Users with relatively high image processing propensity will be aware of greater information overload due to information that does not match their processing propensity when text information is presented, and users with higher text processing propensity will be less likely to be aware of information overload than image processing propensity under text conditions.

Nevertheless, text information cannot be completely ignored in image information. Kim and Lennon (2008) confirmed the difference between image information and text information in the online environment. According to these studies, it is confirmed that the purchase intention may be decreased if the level of the text information is not sufficient despite the importance of image information. In other words, despite the positive effects caused by image information, if the sufficient amount of text information is not supported, it means that the effect can be diluted.

MEASUREMENTS

Information processing type

The information processing tendency of the users is measured in Korean by 20 items of the personal tendency confirmation used in Childers et al. (2010). A total of 20 items consisted of 10 items which confirm visual information processing and verbal information processing tendency, respectively.

Perceived information overload

Through the items used in Study 1, we intend to conduct an information overload operation check according to the type of stimulus presented in Study 2. The information overload is measured items used in Swar et al. (2017). After the presentation of the stimulus, the information overload is measured to confirm the individual difference due to the stimulus.

Perception of site usefulness

The usefulness of policy information is measured by modifying and adapting the emotional response items used in Gao and Wu (2010). The scale consisted of a total of 3 items such as ‘The information on the online site is confusing.’, and ‘The site is inconvenient.’

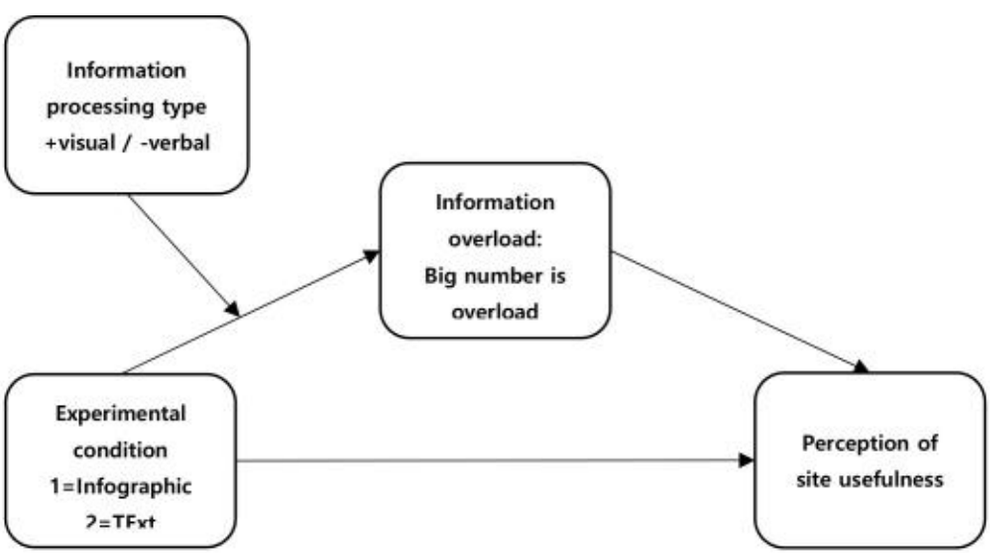


Figure 1.
The mediating effect of information overload and the controlled mediating effect of information processing type on the effect of experimental conditions on site usefulness

RESULTS

To confirm the moderation effect of information processing type, we used model 7 of SPSS PROCESS MACRO(Hayes, 2017). The results for the moderation effect of information processing type on the relationship between experimental condition and information overload are firstly reported in Table 1. From Table 1, we see clearly that the interaction term between experimental condition and information processing type is significant as 95%CI does not contain zero (0) (β = .38, SE = .12, 95%CI [.14, .62]). Specifically, there are a difference in the experimental condition according to the type of information processing (Table 2). From Table2, the verbal information processing type (information processing type -1sd) show no significant difference in information overload perception (p= .353) according to the text experimental condition(M = -0.20) and infographic experimental condition(M = -0.12). On the other hand, the visual information processing type(information processing type +1sd)

show statistically significant in information overload perception(p <.001) according to the text experimental condition(M = 0.29) and infographic experimental condition(M = -0.03). Simple slopes, plotted in Fig. 1 also suggest that, for people who are visual information processing type, text condition is more positively correlated with information overload perception than infographic condition. This means that there is a difference in how information displayed in text or infographic on the e-government websites. It is found that the people who are the verbal information processing type do not find any difference in the information overload perception according to the type. But the people who are the visual information processing type perceive more information overload in text information presenting than infographic information presenting. In other words, people who are visual information processing type show negative reaction in information presented by text alone, which means that information overload recognition can occur.

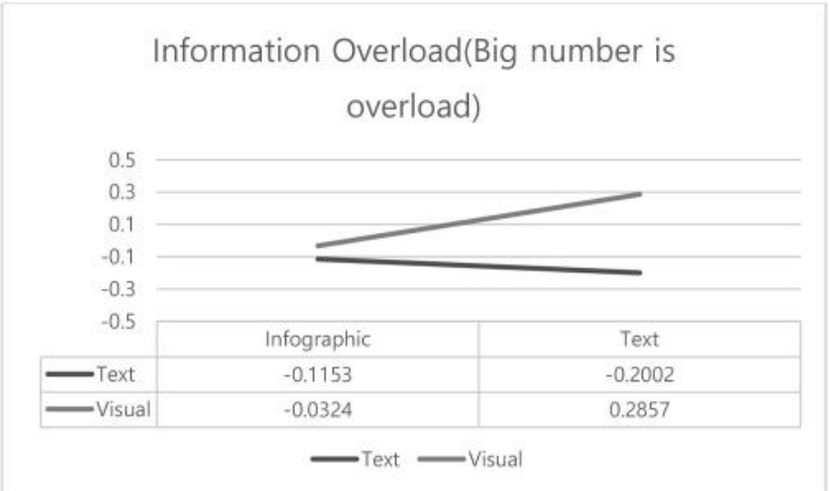


Figure 2. Analysis of interaction between information processing type and experimental condition on information overload recognition

Table 1. Analysis of interaction between information processing type and experimental condition on information overload recognition

	b	se	t	p	LLCI	ULCI
Constant	-0.02	0.03	-0.49	0.63	-0.08	0.05
Experimental Condition	0.12	0.06	1.83	0.07	-0.01	0.24
Information Processing Type	0.27	0.06	4.43	0.00	0.15	0.39
Interaction	0.38	0.12	3.14	0.00	0.14	0.62

Table 2. The significance of the difference between experiment groups according to the level of control effect

Information Processing Type	b	se	t	p	LLCI	ULCI
Text	-0.084	0.090	-0.930	0.353	-0.260	0.093
Visual	0.297	0.086	3.443	0.001	0.128	0.466

In addition, to confirm the moderation effect of information processing type on the relationship between experimental condition and perception of site usefulness via information overload, we used model 7 of SPSS PROCESS MACRO ver 3.1(Hayes, 2017). The moderating effect is also significant (β = -.14, bootSE = .06, 95%CI [-.26, -.04]) (Table 3). Specifically, Table 4 reports the mediation effect at different levels of information processing type. From Table 4, the mediation effect of verbal information processing type show no significant (β = .03, bootSE = .04, 95%CI [-.04, .11]). On the other side, the mediation effect of visual information processing type show statistically

significant (β = -.11, bootSE = .04, 95%CI [-.18, -.04]). In summary, users who mediate the perception of site usefulness under experimental condition do not find statistically significant indirect effects when the type of information processing is of verbal processing, and statistically significant indirect effects are identified for visual information processing. That is, the former is no significant difference in the recognition of information overload due to experimental condition. The latter show significant differences in perception of information overload due to experimental conditions, and the higher the information overload, the lower the perception of site usefulness. These findings may have a negative impact on information overload perception in site usefulness recognition. Information overload does not appear for verbal information processing type, but differences in visual information processing type is found. Research has shown that presenting information as an infographic may be effective to reduce the overload of information in people who are types of visual information processing. In addition, the controlled mediator model found in the study is significantly validated in both its impact on site usefulness recognition, site reliability, and site information recognition (Tables 5 and 6).

Table 3. The indirect effect of controlled mediator model on site usefulness awareness

	b	BootSE	BootLLCI	BootULCI
Information Processing Type	-0.1439	0.0558	-0.256	-0.0354

Table 4. The indirect effect of the mediation model according to the level of information processing on site usefulness awareness

Information Processing Type	b	BootSE	BootLLCI	BootULCI
Text	0.0316	0.0381	-0.0414	0.1091
Visual	-0.1123	0.0359	-0.1828	-0.0417

Table 5. The indirect effect of controlled mediator model on the site trust

Information Processing Type	b	BootSE	BootLLCI	BootULCI
Text	0.0227	0.0281	-0.0298	0.0792
Visual	-0.0808	0.0262	-0.1327	-0.029

	b	BootSE	BootLLCI	BootULCI
Information Processing Type	-0.1036	0.0408	-0.1857	-0.0246

Table 6. The indirect effect of controlled mediator model on the perception of site information

Information Processing Type	b	BootSE	BootLLCI	BootULCI
Text	0.0281	0.0342	-0.0382	0.0956
Visual	-0.0997	0.0316	-0.1626	-0.0385

	b	BootSE	BootLLCI	BootULCI
Information Processing Type	-0.1277	0.049	-0.2253	-0.0293

STUDY 2: The Effect of User Cognitive and Emotional Response on Website Evaluation: Path Analysis between Information Presentation Types in E-Government Sites

In Study 2, we verified a model to see how information is presented in the use of the website affects the user's perception and emotional response, and to confirm whether it is possible to change the attitude of the site. The design and aesthetic elements may affect the user's evaluation of the website. (Eroglu et al., 2001; Rosen & Purinton, 2004), and may have a significant effect on the perceptions of the services provided (Koufaris, 2002).Research has been conducted that the aspects of presenting information or services should be addressed more significantly than using images in offline store (Hasan, 2016), which may affect the motivation and quality of service assessment. (Zhang & von Dran, 2002). User perceptions like these can lead to cognitive and emotional assessments, and a variety of studies cover the areas of cognitive (trust, satisfaction, and quality assessment) and the areas of emotional evaluation (Childers et al., 2002; Cyr & Bonnie, 2005; Gaufaris & Duchfe, 2004; Koo & Ju, 2010; Wells et al., 2011). Therefore, in Study 2, a model verification study was conducted and a model comparison verification study was conducted to verify the impact of the user's cognitive and emotional responses to the site's assessment by using infographic and presentation of text information.

The usefulness perceived by users in terms of websites or ICTs may affect their intention to use.

This model structure can be explained by technology acceptance model by Davis (1989) , that users' attitudes and usefulness affect their intention use. In order to identify the impact on user attitudes and usability, this study looks at the cognitive and emotional responses to the presentation of site information. Although prior research regarding the use of websites mostly looks at factors that cause a positive response, there is already a negative attitude toward the use of online government administration

services by the elderly in Korea and it is necessary to check the structural impact of negative attitudes. That is, if the information presented online is presented in online is presented as unhandling or excessive, users will experience information acquisition failures and negative reactions (Hall & Walton, 2004). The more information loads online, the more effort people must make to explore and use it. In other words, users' efforts to process information can have physical, emotional, and social negative effects due to limitations in their ability to process information (White & Dorman, 2000).

These effects on site use may affect the user's judgment, decision making and intention to use.

Users' judgments about the usefulness of a system can be measured through a value recognition of its usefulness. If the user's willingness to use is driven by perceived value (Levy, 1999), the government needs to understand what value users are demanding in using the information site (Holbrook, 1999).

To ensure a successful performance, value recognition through usability recognition should be addressed as an important factor (Wigfield & Eccles, 2002, pp. 159-184). The usefulness that users feel is affected by their current goals and affects their future choices (Eccles, 2005) and is sometimes used as a tool to determine future plans for individuals' choices (Veki, 2013). The usefulness reflects how much information is available to help you perform your actual tasks, and also reflects the efficiency of the knowledge gained in your work environment (Johnson & Sinatra, 2013). It also reflects the user experience using the actual system (Parasuraman & Grewal, 2000).

From this point of view, we can consider the impact of users' administrative processes on e-administration through government sites and the burden of cognitive processing on site usage.

The intention of the user to choose to continue to use is referred to as the intention of continuous use(Bhattacherjee, 2001b), which is affected by the user's satisfaction (Lee, 2010). When users are satisfied with the design or content of websites they use and learn, they try to process information in a way that improves cognitive processing efficiency in order to increase the effectiveness of learning(Sung & Mayer, 2012).The content and configuration design offered in online learning affect the improvement of learning effectiveness (Falloon, 2013), and the increase in user satisfaction improve the value of learning content and increase the continuous use intent (Hong, Tai, Hangang, Kuo, & Chen, 2017).

According to a study of Martin, Sherrard & Wentzel (2005), the way information is

presented on the website can be judged differently depending on consumer propensity and that the complexity of verbal and visual information can be a major impact. Also, Lei, Sun, Lin & Huang (2015) revealed the impact of verbal and visual cognitive style on learning through video stimulation. As such, websites can provide information in variety of ways, and representative information is verbal and visual information. Accordingly, in this study, in terms of infographic conditions, the policy information, which is a representative method of language and image information delivery, was presented in form of the text stimulus and infographic stimulus.

MEASUREMENTS

Cognitive and Emotional Responses to Information

The cognitive response to information was measured by modifying and translating the perception of usefulness used in the studies of Hong, Tai, Huang, Kuo, & Chen (2017)., which consists of 4 items five-point scale and main item is 'information obtained online is useful to me '. To measure emotional response we modified and translated emotional response items used in the study of Gao & Wu (2010).

There were three items including 'Information on online site is confusing', 'Online sites are inconvenient.'

Evaluation of Information

The evaluation of the information was measured by modifying and translating the value perception scale used in the study of Hong, Tai, Huang, Kuo and Chen (2017). It consists of a total of four questions, a five-point scale, and main item is 'The information I get online is valuable to me.'

Website Credibility

To measure website credibility, we adapted scale used to measure credibility in the study of Gangley, Dash, Cyr & Head (2010). Seven items were measured, and the main items are 'I think administrative processing through online sites is safe' and 'Administration through online sites is reliable.‘

Usefulness Recognition

Assessment of usefulness for policy information was measured by modifying and translating the emotional response questions used in the studies in Gao and Wu (2010). There were three questions, including 'information on online sites is confusing' and 'Online sites are inconvenient.‘

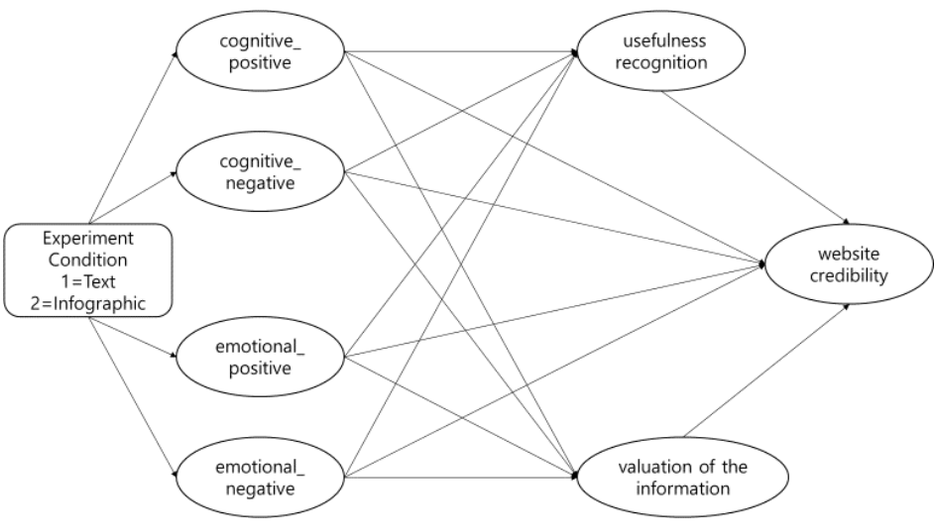


Figure 1. SEM Research model

The goodness of model fit was assessed for structural equation model and has been verified as statistically significant ($\chi 2(df=414) = 1724.428$, $p < .001$).Since the chi-square value is sensitive to the number of cases, additional indices of fithave been used to verify the fit of the structural equation.

Verification of the model fit through CFI, TLI, RMSEA, and SRMR indicates that CFI, TLI, and .90 or higher and meet criterion, while RMSEA and SRMR are under .08 validated significant model fit. To identify the relationship between the latent variable and the measure variable, checking the goodness-of-fit values of the indicators verified all the path coefficients that latent variables have on the measure variable is significant.

Table 1. Model fit results

	χ2	df	p-value	CFI	TLI	RMSEA [90% CI]	SRMR
Research Model	1724.428	414	<.001	0.941	0.934	0.056 [.054, .059]	0.050
Model Fit				above 0.9	above 0.9	under 0.08	under 0.08

Table 2. Verifying the significance of the path between the latent variable and measure variable

Measu re Variable	orientati on	Latent Variable	B	S.E.	C.R.	p-value	beta	Compos ite Reliability	AVE
Q2s1	←	cognitive_positive	1				0.852		
Q2s2	←	cognitive_positive	0.947	0.03	31.096	***	0.819	0.863	0.677
Q2s3	←	cognitive_positi	0.948	0.03	29.63	***	0.79		
		ve		2	1		6		
Q2s10	←	cognitive_negative	1				0.781		
Q2s11	←	cognitive_negative	1.06	0.037	28.599	***	0.841		
Q2s12	←	cognitive_negative	0.733	0.041	18.065	***	0.576	0.871	0.578
Q2s13	←	cognitive_negative	1.051	0.038	27.618	***	0.848		
Q2s14	←	cognitive_negative	0.894	0.039	23.188	***	0.723		
Q2s4	←	emotional_positive	1				0.881		
Q2s5	←	emotional_positive	1.049	0.026	40.917	***	0.912	0.914	0.779
Q2s6	←	emotional_positive	0.989	0.027	36.044	***	0.855		
Q2s7	←	emotional_negative	1				0.843		
Q2s8	←	emotional_negative	1.126	0.029	39.432	***	0.935	0.921	0.797
Q2s9	←	emotional_negative	1.103	0.03	36.709	***	0.897		
Q3s1	←	usefulness recognition	1				0.719		
Q3s2	←	usefulness recognition	1.02	0.044	23.376	***	0.757	0.916	0.609
Q3s3	←	usefulness recognition	1.055	0.043	24.402	***	0.792		
Q3s4	←	usefulness recognition	1.102	0.046	24.004	***	0.774		
Q3s5	←	usefulness recognition	1.125	0.045	24.769	***	0.807		
Q3s6	←	usefulness recognition	1.107	0.045	24.8	***	0.812		
Q3s7	←	usefulness recognition	1.12	0.046	24.336	***	0.796		
Q4s1	←	credibility	1				0.789		
Q4s2	←	credibility	0.951	0.035	26.931	***	0.761		
Q4s3	←	credibility	0.809	0.039	20.799	***	0.62		
Q4s4	←	credibility	0.806	0.042	19.135	***	0.584	0.883	0.523
Q4s5	←	credibility	0.895	0.039	22.932	***	0.679		
Q4s6	←	credibility	0.987	0.037	26.918	***	0.775		
Q4s7	←	credibility	1.026	0.035	29.009	***	0.819		
Q5s1	←	valuation of the information	1				0.85		
Q5s2	←	valuation of the information	1.007	0.03	33.352	***	0.855	0.874	0.699
Q5s3	←	valuation of the information	0.939	0.031	30.266	***	0.802		

Table 3. Model Estimate

Hypothesis path	B	S.E.	C.R.	p-value	beta
cognitive_positive → usefulness recognition	0.408	0.042	9.606	0	0.443
cognitive_positive → usefulness recognition	-0.027	0.031	-0.89	0.373	-0.034
emotional_positive → usefulness recognition	0.318	0.033	9.634	0	0.409
emotional_negative → usefulness recognition	0.051	0.028	1.813	0.07	0.069
cognitive_positive → valuation of the information	0.735	0.046	15.954	0	0.739
cognitive_negative → valuation of the information	-0.021	0.031	-0.686	0.492	-0.025
emotional_positive → valuation of the information	0.097	0.033	2.965	0.003	0.115
emotional_negative → valuation of the information	-0.049	0.029	-1.72	0.085	-0.062
cognitive_positive → credibility	-0.061	0.051	-1.194	0.233	-0.069
cognitive_negative → credibility	0.072	0.024	2.977	0.003	0.092
emotional_positive → credibility	-0.009	0.026	-0.325	0.746	-0.011
emotional_negative → credibility	-0.027	0.022	-1.226	0.22	-0.038
usefulness recognition → credibility	0.406	0.037	10.874	0	0.419
valuation of the information → credibility	0.606	0.053	11.432	0	0.675

To separate the results of the verification according to the experimental conditions, the metric invariance verification was performed. Identification of the measurement equivalence of the two conditions of the research model indicates that the CFI, TLI, and RMSEA values are still significant, thus verifying the measurement equivalence. Following this, the relationship between the latent variables and the measure variable in the two groups was statistically significant ($\Delta x2 = 77.71$, $p < .001$), changes in CFI and TLI and RMSEA values were not significant ($\Delta CFI = .002$, ΔTLI .000, $\Delta RMSEA = .000$). In addition, the verification of the measurement invariance with constraints on the mean of latent variables found that the chi-square variation was significant ($\Delta x2 = 84.83$, $p < .001$), CFI, TLI, and RMSEA values still did not show significant differences. This can be said to have validated the measurement invariance of the model as constraints on the research model divided into two groups did not identify significant changes in its fit.

Table 4. Result of Measurement Equivalence Verification

	chi-square	df	x2/df	Δx2	p-value	CFI	TLI	RMSEA
Configural Invariance *(Equal form)*	2248.700	828	2.72			.937	.929	.059
Metric Invariance	2312.842	852	2.71	64.141	<.001	.935	.929	.059
Scalar Invariance *(Equal intercepts)*	2369.653	883	2.68	56.812	.003	.934	.931	.058

The difference between the two groups' path coefficients resulted in significant between-group differences in the pathways in which positive and negative cognitive responses affected the perception of usefulness, while the differences between the other paths were not statistically significant.

Specifically, the magnitude of the path coefficient on the perception of usefulness was significantly greater in text condition (p = .026) than that of the infographic condition (p=.022), and the effect of negative cognitive responses on usability recognition was found to have a greater impact on text conditions than the infographic conditions (p = .022).

Table 5. Analysis of the difference between groups of path coefficients based on multi-group analysis

Hypothesis	B	S.E.	z-value	p-value	beta
cognitive_positive → usefulness recognition	-0.179	0.08	-2.228	0.026	-0.226
cognitive_negative → usefulness recognition	0.145	0.063	2.295	0.022	0.17
emotional_positive → usefulness recognition	-0.042	0.061	-0.69	0.49	-0.051
emotional_negative → usefulness recognition	0.057	0.056	1.024	0.306	0.078
cognitive_positive → valuation of the information	0.057	0.105	0.547	0.584	0.069
cognitive_negative → valuation of the information	-0.019	0.054	-0.356	0.721	-0.025
emotional_positive → valuation of the information	0.066	0.048	1.368	0.171	0.08

Hypothesis			B	S.E.	z-value	p-value	beta
emotional_negative	→	valuation of the information	0.025	0.045	0.551	0.581	0.036
cognitive_positive	→	credibility	-0.134	0.086	-1.557	0.12	-0.129
cognitive_negative	→	credibility	0.088	0.066	1.328	0.184	0.109
emotional_positive	→	credibility	-0.098	0.063	-1.573	0.116	-0.114
emotional_negative	→	credibility	0.097	0.058	1.692	0.091	0.12
usefulness recognition	→	credibility	-0.001	0.103	-0.006	0.995	-0.049
valuation of the information	→	credibility	0.035	0.069	0.499	0.618	0.038

STUDY 3: The Influence of User's Literacy Level on Perception of Text Information Overload and Site Reliability: Focusing on the Dual Mediation Effect of Information Overload and Site Utility Recognition

Study 3 was performed to confirm the user's reaction according to the literacy ability (Bormuth, 1975), which means user's information processing, utilization and understanding possibility. According to the findings of Viswanathan et al.(2005), users with low literacy abilities are more likely to have different information and information provided It was confirmed that the connection ability was poor. Users with a high literacy can recognize text information more quickly because of their excellent vocabulary (Lewellen et al., 1992), and cognitive load is relatively low (Perfetti, 1983, 1985), and working memory is also superior (Viswanathan et al., 2009). In the modern society where the importance of information literacy is increasing more and more, we want to conduct research in order to confirm that the recognition of the information provided according to the user's level of processing ability may be different, and in order to discuss the effective countermeasures. We also want to conduct an empirical study that verifies the dual mediation effect of information overload and utility recognition, which may have a negative impact on user’s site reliability.

MEASUREMENTS

Information literacy

Information literacy was measured through the items used in the study by Serap Kurbanoglu, Akkoyunlu & Umay (2006). The questionnaire consisted of 17 items and was adapted and revised.

Site Reliability

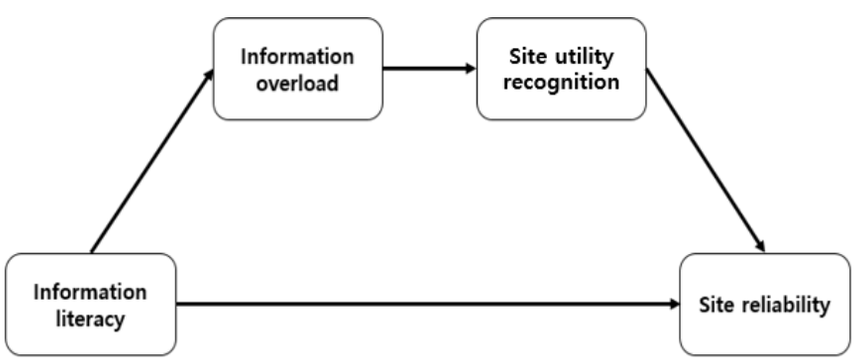
Reliability of the site is measured by modifying and adapting the items used to measure reliability in the study by Ganguly, Dash, Cyr & Head (2010). Site reliability is measured by 7 items and the main items are composed of items such as 'Administrative processing through the online site is safe', 'Administrative processing through the online site is reliable', and so on.

Site Utility Recognition

The utility recognition of policy information is measured by modifying and adapting the emotional response items used in the study by Gao & Wu (2010). It consists of 3 items such as 'The information on the online site is confusing,', 'The online site is inconvenient.', and so on.

Perceived Information Overload

As with Study 1, the questions of Swar et al.(2017) were used to measure perceived information overload after the presentation of the stimulus and identify the individual differences according to the stimulus.



Analysis

This study was analyzed using SPSS 21.0 program. Specifically, correlation and descriptive statistics were first obtained. In accordance with the procedure proposed by Hayes (2012), SPSS PROCESS model 6 was used to analyze whether information literacy influences site reliability through information overload and site utility recognition. In this study, the bootstrapping sampling was set at 5,000 and 95% confidence interval was used.

RESULTS

Correlation and descriptive statistics between variables

Table 1 summarizes descriptive statistics and correlation values between measured variables. As a result of correlation analysis, all measured variables showed a significant correlation at significance level .01. Specifically, information literacy and information overload (r = -. 168, p <.01), information overload and site utility recognition (r = -. 527, p <.01), information overload and site reliability (r =. 436, p <.001) were negatively correlated. Information literacy and site utility recognition (r = .396, p <.01) and Information literacy and site reliability (r = .471, p <.01), site utility recognition and site reliability (r = .746, p <.01) were positively correlated.

Table 1. Correlation Coefficients and Descriptive Statistics between Variables (N=1000)

	1	2	3	4
1. Information literacy	-			
2. Information overload	-.168**	-		
3. Site utility recognition	.396**	-.527**	-	
4. Site reliability	.471**	-.436**	.746**	-
M	3.814	-.006	3.438	3.571
SD	.602	1.022	.734	.637

** p<.01

Verification of the dual effect of information overload and site utility recognition inrelation to information literacy and site reliability

Table 2 shows the results of the analysis of the path coefficient of the research model. Specifically, the direct effect of information literacy on site

trust was confirmed (B= ??, p<.001). The path from information literacy to information overload was negatively significant (B= -.27, P<.001), and the path from information overload to site utility recognition was negatively significant (B= -.32, p <.001).

Table 2. Path coefficient of Information literacy, information overload, site utility recognition and site reliability. (N=1000)

Path	B	SF	β	C.R
Literacy → Site Reliability				
Literacy → information overload	-0.27***			
information overload → utility recognition	-0.32***			
utility recognition → Site Reliability	0.57***			

*** p<.001

Table 3 shows the results of verifying the bootstrap of the indirect effect. When interpreting the bootstrap results, the indirect effect is significant if there is no '0' between the lower and the upper of the 95% confidence interval (Bollen & Stine, 1992). The indirect effect of information literacy on site reliability via information overload is not statistically significant, since it includes 0 in the 95% confidence interval (-0.1, .02). On the other hand, the indirect effect of information literacy on site reliability via site utility recognition is statistically significant, since it doesn't include 0 in the 95% confidence interval (.15, .28). First of all, the indirect effect of information literacy on site reliability via information overload and site utility recognition is statistically significant. Because it does not include 0 in the 95% confidence interval (.19, .34). Therefore, it can be seen that information overload and site utility recognition are dual-mediated in information literacy and site reliability.

Table 3. Bootstrap verification result of indirect effect (N=1000)

Path	Effect size	SE	95% CI	
			LCI	UCI
Literacy → information overload → Site Reliability	0.0035	0.0065	-0.0088	0.0178
Literacy → utility recognition → Site Reliability	0.2153	0.0333	0.1514	0.2808
Literacy → information overload → utility recognition → Site Reliability	0.0498	0.0171	0.0177	0.0857
Total indirect effect	0.2687	0.0371	0.1943	0.3402

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