DISSERTATION

E-SERVICE COMMUNICATIONS BETWEEN ORGANIZATIONS AND CUSTOMERS:

AN ANALYSIS OF THE SCHEMA RESONANCE MODEL

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ABSTRACT

E-SERVICE COMMUNICATIONS BETWEEN ORGANIZATIONS AND CUSTOMERS:

AN ANALYSIS OF THE SCHEMA RESONANCE MODEL

To better understand how the one-to-one online communication between an organization representative and an individual customer is conducted and to improve the organization's e-service for customer's information inquiries, this dissertation research proposed a new organization-customer communication model—the Schema Resonance Model. Schema resonance is defined as the resonance between the schemas used by the customer in the sense-making process and the schemas used by the organization representative in the sense-producing process. Hypotheses and research questions were proposed to test whether schema resonance could benefit the organization-customer e-service and to examine whether there were differences based on gender or instant messaging experience when schema resonance took place.

A post-test only 3 x 2 x 2 factorial between-subjects experimental/quasi-experimental design was used to test the proposed hypotheses and research questions. The three independent variables examined in the experiment were e-service condition (schema resonance, non-schema resonance, and failed schema resonance), gender (male and female), and instant messaging experience (low and high). A convenience sample of 423 college students participated in the experiment. Participants were randomly assigned to one of the three e-service conditions. A total of 409 participants completed the experimental session and took an online survey. A total of 389 survey entries were usable.

Individuals in the schema-resonance e-service condition gained a similar amount of knowledge about the information provided in the communication and showed a similar intent to continue using the e-service as those in the non-schema-resonance e-service condition.

Female participants in the schema-resonance e-service condition were more satisfied with the overall e-service, the communication approach used in the e-service, and the information provided in the e-service than were females in the non-schema-resonance e-service condition. Males in the schema-resonance and non-schema-resonance e-service conditions had similar levels of satisfaction with the overall e-service, communication approach, and information. In the schema-resonance e-service condition, compared to males, females were more satisfied with the overall e-service, communication approach, and information; and had greater intent to continue using the e-service.

In the schema-resonance e-service condition, individuals who had high instant messaging experience showed more intent to continue using the e-service than individuals who had low instant messaging experience. For individuals who had low instant messaging experience, those in the schema-resonance e-service condition showed more satisfaction with the communication approach and more satisfaction with the information than those in non-schema-resonance e-service condition.

Compared to individuals in the failed-schema-resonance e-service condition, individuals in the schema-resonance e-service condition showed more knowledge gain; were more satisfied with the overall e-service communication, communication approach, and information; and showed greater intent to continue using the e-service.

The success of achieving schema resonance in the simulated organization-customer e-service communication indicated that it is possible to achieve schema resonance in the real-world

e-service situation. It would be beneficial for an organization to achieve schema resonance in e-service communication to improve the efficiency of the communication and increase customer's satisfaction with the e-service. To achieve schema resonance in e-service communication, the organization representative should use one reply to provide the requested information that the customer has requested and the additional information that the customer also plans to request. It is possible to apply the Schema Resonance Model to other types of organization-customer communication, such as face-to-face communication and telephone communication.

The Schema Resonance Model proposes a theoretical framework which maps the representative's sense-making and sense-producing processes and the customer's sense-making process involved in the organization-customer communication, classifies two types of schemas (principle schema and adaptation schema) the representative may use in the sense-producing process to produce information for the customer, and suggests a new communication strategy—proactively providing additional information—that the organization representative can consider using in the organization-customer communication to respond to customer's information inquiries.

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INTRODUCTION

The organization-customer relationship has always been the interest of researchers and organization practitioners. Organizations need to understand their customers and fulfill customers' needs to survive and prosper in the competitive market (Hogan, Lemon, & Rust, 2002). Retaining current customers is cost-efficient and beneficial for organizations (Reichheld & Sasser, 1990), and consequently organizations have been focusing their marketing goals on customer retention (Grant & Schlesinger, 1995) and customer loyalty (Dick & Basu, 1994). It is assumed that organizations in service industry should strive to retain customers, enhance customer loyalty, and maintain a healthy organization-customer relationship through providing high-quality services.

Customer behaviors can reflect an organization's success. While customer purchase behaviors such as high-price product purchasing from loyal customers (Reichheld, 1996) and cross-buying of additional products from the same company over time (Blattberg, Getz, & Thomas, 2001) are supposed to reflect the status of the organization-customer relationship in terms of the length, depth, and breadth of the relationship (Verhoef, 2001), non-purchase behaviors of customers such as word-of-mouth behavior also can be influential for the business performance of organizations (e.g. Bettencourt, 1997; Hogan, Lemon, & Libai, 2002; Wangenheim & Bayon, 2002).

Bolton, Lemon, and Verhoef (2004) utilized a conceptual model (Customer Asset Management of Services) to explore how six different "marketing instruments—price, service quality programs, direct marketing promotions, relationship marketing instruments, advertising/communication, and distribution channels" influenced customer purchase behavior and the relationship between customer and service provider (p. 273), and they suggested that service quality programs can influence customer satisfaction and purchase behavior (Bolton, et

al., 2004). Similarly, services provided by an organization could also influence customers' non-purchase behaviors and customers' satisfaction. It is important for an organization to understand customers' non-purchase behaviors to maintain a healthy organization-customer relationship. One of the customers' non-purchase behaviors that would require high-quality services from an organization is information inquiry. Information inquiry is a specific non-purchase behavior a customer may perform when he/she wants to request information from an organization.

As a result of the increasing usage of Internet-based communication technologies, organizations have already provided e-service to customers and allowed customers' information inquiry activities to take place via interactive media. Internet-based communication between customers and organizations can allow organizations to acknowledge customers' needs and provide relevant information to customers in an economical way (Hanson, 1999). Customer e-service may improve customer satisfaction and help the organization remain competitive (van Mulken & van der Meer, 2005).

However, compared to traditional customer service, it is more challenging for organizations to build new customer relationships and retain customers via e-service (Boyer, Hallowel, & Roth, 2002). It might be because customers are not always satisfied with the e-service provided by the organizations. If a customer is not satisfied with the e-service provided by an organization, he/she could lose trust in the organization and may decide to not use the service or product offered by the organization anymore.

In line with research, how an organization responds to customers' on-line inquiries can influence customers' opinions of the organization (Zemke & Connellan, 2001). Organizations should strive to provide high-quality e-service with respect to responding to customers' inquiries in an effective and efficient way and to gain customers' satisfaction via the e-service.

The one-on-one interactive communication between customer and organization can allow the delivery of highly personalized service and thereby improves the relationship between a customer and organization (van Mulken & van der Meer, 2005). To provide high-quality e-service to a customer, the organization representative needs to use an effective communication strategy to guide the one-on-one interactive communication. First, the organization representative needs to understand the customer's needs and concerns. Gioia and Chittipeddi (1991) describe the process of figuring out what others want and understanding the meaning of it as "sensemaking" (p. 434). Through the sensemaking process, the organization representative can understand the needs and concerns of the customer. After knowing the customer's needs and concerns, the representative will need to provide necessary information to the customer in order to meet the customer's needs and resolve the customer's concerns. Gioia and Chittipeddi (1991) refer to the process of trying to influence how others understand or make sense as "sensegiving" (p. 443). Through the sensegiving process, the representative can give important information to the customer in response to the customer's inquiries.

The concepts of sensemaking and sensegiving have been adopted in studies on organization's communication and marketing strategies. Research on organization-stakeholder strategies (Morsing & Schultz, 2006) suggests that the stakeholder information strategy with one-way communication can only allow the organization to "give sense to its audience" (p. 327). The stakeholder response strategy with two-way asymmetric communication only involves the organization itself in the sensemaking process of the market survey and the sensegiving process, which allows the organization to show "attempts to understand stakeholder concerns" (p. 327). Morsing and Schultz (2006) also point out that, under the involvement strategy, both the organization and the external stakeholders are involved in the sensemaking and sensegiving

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processes via two-way symmetric communication to "enhance awareness of mutual expectations" (p.324). It implies that, for the mutually beneficial purpose, the organization representative should apply the customer-related schemas in both the sensemaking and sensegiving processes. The representative can use the customer-related schemas to "make sense" of the customer's needs, understand what the customer wants to know, and then use the schemas to "give sense" back to the customer by providing the customer with the wanted information. Fiske and Taylor (1991) defined schema as "a cognitive structure that represents knowledge about a concept or type of stimulus, including its attributes and the relations among those attributes" (p. 98).

Schema theory provides a model of how people process, store, and retrieve information, and it explains how individuals observe the environment, process information taken in from the environment, and make sense out of it (Axelrod, 1973). Schema theory has been used to analyze how the organization representatives utilize schemas to create messages for clients and audiences (Kuperman, 2003) and also has been applied to explain how individuals make sense of organizational culture and organizational stimuli by operating organization-specific schemas (Harris, 1994). In line with schema theory, this dissertation research conceptualizes the cognitive processes in which the organization representative uses his/her customer-specific schemas to understand customer's inquiries and produce information (the sense) to meet the customer's needs. This dissertation research also explains the cognitive process in which an individual customer uses his/her schemas to decide what information to request and uses the schemas to process the information received from the representative.

To better understand how the one-to-one online communication between an organization representative and an individual customer is conducted via e-service, this dissertation research

proposes a new organization-customer communication model—Schema Resonance Model. Schema resonance is defined as the resonance between the schemas used by the customer and the schemas used by the organization representative. Schema resonance occurs when the schemas used in the organization representative's sense-producing (sensegiving) process can successfully reflect and accurately estimate the schemas used by the customer in the sense-making process. Schema resonance allows the organization representative to use a single-communication-reply opportunity not only to respond to the customer's current inquiry but also to accurately predict and provide the additional information that the customer also plans to request.

This dissertation research explicates the Schema Resonance Model and discusses the possibility of achieving schema resonance in one-to-one e-service communication between an organization and its customer. This dissertation research aims to answer the overarching research question: "will it be beneficial to achieve schema resonance in the e-service communication?" This dissertation research also aims to find out whether schema resonance can make the e-service communication more efficient and satisfactory to the customers without compromising the effectiveness of the communication and at the same time make the customer have greater intent to continue using the e-service.

LITERATURE REVIEW

Schema Resonance Model

To understand the organization-customer interactive dynamics in e-service communication and to optimize the communication strategy for the organization to provide high-quality service to the customer, this dissertation research proposes an organization-customer communication strategy model—the Schema Resonance Model (see Figure 1).

Gioia and Chittipeddi (1991) describe the process of figuring out what others want and understanding the meaning of it as "sensemaking" (p. 434). Dervin (1983) defined sense-making as "behavior, both internal (i.e. cognitive) and external (i.e. procedural) which allows the individual to construct and design his/her movement through time-space" (p. 3). Sense-making behavior is considered as communication behavior (Dervin, 1983).

Gioia and Chittipeddi (1991) refer to the process of trying to influence how others understand or make sense as "sensegiving" (p. 443). The term "sensegiving" is commonly used in literature. The process of sensegiving could include the processes of planning, preparing, producing, delivering, and presenting the "sense" (information) to others.

This dissertation research uses the term "senseproducing" to represent the process of producing sense and to emphasize the message-production process of the organization representative. The sense-producing process could be considered as part of the entire "sensegiving" process. This model and study contribute to the sensegiving literature by explicating the sense-producing process and subjecting a portion of that process to an empirical test.

In the Schema Resonance Model, communication between an organization representative and a customer involves three cognitive processes: (1) the sense-making process of the
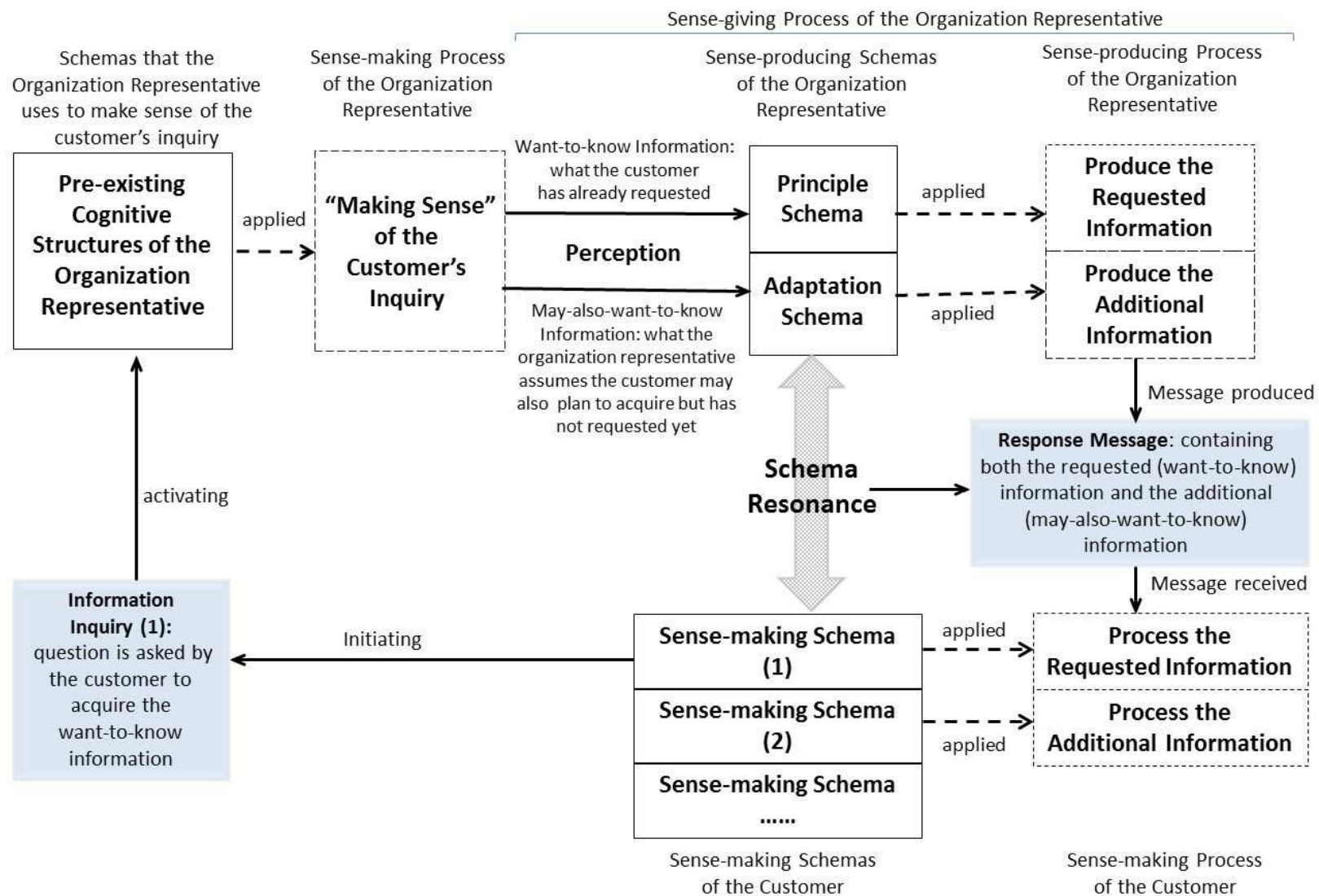
Note: Solid lines indicate activation; broken lines indicate application.

Figure 1. Schema Resonance Model.

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organization representative to understand the information inquiry proposed by the customer, (2) the sense-producing process of the organization representative to produce the messages, which contain both the requested information and the additional information, for the customer, and (3) the sense-making process of the customer to understand the information provided to him/her by the organization representative. After receiving the messages from the organization representative, the customer may have other inquiries to propose. However, such an inquiry-proposing behavior is not considered as a cognition process in the proposed Schema Resonance Model. It is only considered as the initiating point of the organization-customer communication.

The Schema Resonance Model consists of four stages: (1) the organization representative's pre-existing cognitive structures are activated by the stimulus generated by the customer (the stimulus is the information inquiry that is enacted by one of the sense-making schemas of the customer), (2) the organization representative attempts to "make sense" of the customer's inquiry and understand the customer's needs, (3) the organization representative applies the sense-producing schemas (both the principle schemas and the adaptation schemas) in the sense-producing process to produce the right messages for the customer as a reply to the inquiry, and (4) the customer receives the messages and then applies the sense-making schema to "make sense" of the information carried within the messages and to allocate the meaning of the information.

As Norman and Bobrow (1975) noted, schema could tie information of any given event together as well as specify how things fit together and the interrelationships. In the Schema Resonance Model, schemas also link the cognitive processes of both the organization representative and the customer. In the Schema Resonance Model, the customer's information inquiry is received by the organization representative as stimuli to activate the pre-existing

cognitive structures (e.g. knowledge about the customers, knowledge about customers' needs, knowledge about why the customer expresses certain needs and so forth). These pre-existing cognitive structures will guide the organization representative in the sense-making process to "make sense" of the customer's inquiry and understand the customer's needs.

When the representative understands the inquiry itself and understands the customer's need for requesting a specific information, the understanding of the customer's need will lead the representative to form perceptions about what the customer wants to know, and the perceptions will activate the representative's principle schemas (related to the representative's perception of what the customer wants to know) and the representative's adaptation schemas (related to the representative's perception of what the customer may also want to know). Because both the principle and adaptation schemas will monitor and guide the representative in the 'sense-producing' process to produce messages which contains both the requested information and the additional information as the reply to the customer's inquiry, both the principle schema and the adaptation schema are regarded as the "sense-producing" schemas of the representative. The messages produced for the customer contain the "sense" (information). After the customer receives the "sense", the customer would apply two "sense-making" schemas to "make sense" of both the requested information and the additional information. One of the two sense-making schemas is used to generate the current inquiry, and the other "sense-making" schema is the schema that the customer plans to use to propose another inquiry.

In this dissertation research, schema resonance is defined as the resonance (assimilative association) between the schemas used by the organization representative in the sense-producing process and the schemas used by the customer in his/her sense-making process (see Figure 1). To achieve schema resonance, the schemas used by the organization representative in the sense-

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producing process should accurately reflect and associate with the schemas used by the customer in his/her sense-making process. More specifically, if the representative's sense-producing schemas (both the principle schema and the adaptation schema) resonate with the customer's sense-making schemas, the representative should successfully produce the messages which contains both the requested information (what the customer wants to know and has already requested) and the additional information (what the customer also wants to know but has not requested yet), and the customer should be able to "make sense" of the requested and additional information provided by the representative. If the representative successfully selects the principle schema to produce the requested information for the customer and also successfully selects the adaptation schema to produce the additional information which the customer also plans to acquire, schema resonance could takes place. Both when the requested information provided by the representative is what the customer has actually requested and can be processed cognitively by the customer for allocation of meanings, and when the additional information provided by the representative is what the customer also wants to know and can also be processed by the customer, the representative's sense-producing schemas will resonate with the customer's sense-making schemas. At that time, a successful schema resonance can occur.

An example of schema resonance could be like this: a customer wanted to know about (1) the price of a product and (2) the nearest location to buy the product. This customer decided to communicate with an organization representative to find out the information about the price and the purchase location. After the customer only asked for the price, the representative replied by providing both the price information and the information of the nearest purchase location. While meeting the customer's need for price information, the representative's sense-producing schemas, which led the representative to provide both the price information and the purchase location

information, resonated with the customer's schemas for requesting the information about both the price and the purchase location. In this example, the representative provided both the price information and the purchase location information to reply to the customer's inquiry for price information. Since the information about the purchase location was also what the customer planned to request, the representative's schemas resonated with the customer's schemas, and schema resonance occurred.

Schema Theory

Schema theory provides a model of how people process, store, and retrieve information, and it explains how individuals observe the environment, process information taken in from the environment, and make sense out of it (Axelrod, 1973). Schema theory has been applied to explain many cognitive processes such as reading process (Brewer & Lichtenstein, 1981; Brewer & Nakamura, 1984; McVee, Dunsmore, & Gavelak, 2005), learning and memory process (Anderson, 1994; Arbib, 2003; Sherwood & Lee, 2003), and decision-making process (Larson, 1994; Offredy & Meerabeau, 2005; Schwenk, 1988). Schema theory has also been used to analyze how organization representatives utilize schemas to create messages for clients and audiences (Kuperman, 2003). In this dissertation study, schema theory is applied as a framework to conceptualize the cognitive processes of both the organization representative and the customer in a organization-customer communication.

As Brewer and Nakamura (1984) noticed, some schema theorists focused on the unconscious mental processes and often had no interest in the study of phenomenal experiences. However, Brewer and Pani (1983) suggested that schema theory should focus on both unconscious mental process and conscious phenomenal experiences. Brewer and Nakamura (1984) explained how schema theories could explicate the relationship between the

unconsciousness and consciousness by suggesting the schema structures and schema-operating processes are unconscious while the products of operating schemas are conscious. The Schema Resonance Model proposed in this dissertation research classifies several types of the "unconscious" schemas for both the organization representative and the customer and also explicates the "conscious" sense-making and sense-producing cognitive processes of both the representative and the customer.

Schema theory takes phenomenal experience seriously and addresses the relationship between schemas and phenomenal experiences such as personal memory, generic images, and procedural information (Brewer & Nakamura, 1984). Through classifying the schemas applied in an organization-customer communication and analyzing the cognitive processes of both the organization representative and the customer, the proposed Schema Resonance Model aims to describe how the behaviors of the representative and the customer could be influenced by applying schemas in cognitive processes.

Schema

Fiske and Taylor (1991) defined schema as "a cognitive structure that represents knowledge about a concept or type of stimulus, including its attributes and the relations among those attributes" (p. 98). Brewer and Nakamura (1984) defined schemas as the "unconscious cognitive (mental) structures and processes that underlie human knowledge and skills" (p. 34 and p. 42). As Arbib (2003) suggests, "a schema is what is learned about some aspect of the world, combining knowledge with the processes for applying it" (p. 4).

A schema as a cognitive structure can be considered to be a network. A schema organizes categories of information and the relationships of them (DiMaggio, 1997). Relevant knowledge and information about a concept or an aspect of the world are organized and networked within a

schema. A schema is a networked cognitive structure which organizes knowledge and information and represents the relationships and connections among the sets of knowledge and information.

Although schemas contain knowledge of an individual, schema is not the same concept as background knowledge or prior knowledge (McVee, Dunsmore, & Gavelak, 2005; Sadoski, Paivio, & Goetz, 1991). Rumelhart (1984) suggested that schemas "have variables," "can be embedded," "are knowledge at all levels of abstraction, " "are active processes," and "are recognition devices whose processing is aimed at the evaluation of their goodness of fit to the data being process" (p. 169). A schema can also be related to personal experiences. For example, schemas are considered to be "representations of experience that guide action, perception, and thought" (Mandler, 1982, p. 3) and are "developed as a function of the frequency of encounters with relevant instantiations" (Mandler, 1982, p. 3). Schemas are also related to the context/situation and the stimuli of the environment. For example, schemas are also considered as mental structures which can mediate the interpretation of the world (Kant, 1929) and can be created in the interaction with the environment in order to organize experience (Arbib, 2003). Given the diverse attributes of a schema, in this dissertation research, a schema is defined as a cognitive structure which an individual can develop through experiences and apply in certain situations to recognize, acknowledge, understand, and allocate meanings out of the existence of some events or phenomena.

Schemas can be activated by stimuli such as incoming information and events. For particular information and specific cases, if a satisfactory schema is found, the schema will be used to further specify the case and the accessibility of the selected schema will be upgraded (Axelrod, 1973). An individual could evaluate an encounter with an event against existing

schemas, and the individual's perception and understanding of the event and the environment would be determined by the interaction between the event and the schemas (Mandler, 1982). Brewer and Nakamura (1984) described how schemas can be activated and how schemas function in the cognition process by stating "At input, schemas actively interact with incoming episodic information. … at output, generic production schemas interact with new incoming information to allow appropriate responses to an indefinite number of new situations" (p. 42-43).

Relevant schemas are networked. Arbib (2003) suggested that schemas are interdependent and can find meaning only in relation to other schemas. The activation of one schema can activate another networked schema. As smaller theoretical constructs cannot explain all phenomena, larger theoretical entities should develop in order to account for some phenomena (Brewer & Nakamura, 1984). To understand certain events or information, a network of schemas will be developed by the individual, and the networked schemas will function interdependently.

According to Axelrod (1973), a schema has two values: the veridicality and the smallness of size. The veridicality of a schema is defined as "the subjective probability that a case of a specific type is in fact an instance of that schema" (Axelrod, 1973, p. 1261). This veridicality value of a schema suggests that a stimulus or event could activate a relevant schema, but an existing schema may not be activated by any random stimuli or events if the stimuli and the existing schema are not relevant to each other. The size of a schema is "the number of different complete specifications which are instances of the schema" (Axelrod, 1973, p. 1261). The smallness of size of a schema suggests that a schema could only be applicable in a specific situation where a specific stimulus or event exists. In addition, some researchers considered schemas as fixed structures (Schank & Abelson, 1977), while other researchers assumed that

schemas could have not-so-rigid structures (Kintsch, 1998). This implies that some types of schemas are more solid in terms of the cognitive structure and may not be altered easily by the new encounters with stimuli or events, while other types of schemas may have a more flexible structure and can be further developed and be adaptive to fit in the encounter situations to interact with the new and/or novel stimuli or events.

Considering the various features of a schema, this dissertation research proposes four schema-related concepts in the Schema Resonance Model: the pre-existing cognitive structure of the organization representative, the principle sense-producing schema of the representative, the adaptation sense-producing schema of the representative, and the sense-making schema of the customer. These four concepts are explained in the following sections.

Pre-existing Cognitive Structure of the Organization Representative

Similar to the practitioners of professional public relations who count on a body of knowledge and techniques to manage and build relationship with clients for an organization (Grunig & Grunig, 1992), an organization representative should also accumulate necessary experiences of handling the organization-customer relationship and reserve sufficient knowledge gained from experiences and trainings about viable aspects of the customers and the organization's products and services in order to be competent at communicating with the customers. These experiences and knowledge are stored in the representative's mind as the pre-existing cognitive structures, and these pre-existing cognitive structures can be considered as schemas which are related to the knowledge about the customers, the organization's products and services, and aspects of the organization-customer relationships.

When the customer proposes an inquiry for certain information, the inquiry is received by the organization representative and functions as a stimulus which will activate the pre-existing

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cognitive structures of the representative (see Figure 1 on page 6). When encountering the information inquiry, the relevant pre-existing cognitive structure is selected and applied by the representative in the "sense-making" process to assist the representative to "make sense" of the inquiry and understand what kind of information the customer is seeking and why the customer is requesting that kind of information. Since "schemas can activate procedures capable of operating upon local information and a common pool of data" (Norman & Bobrow, 1975, p. 125), the pre-existing cognitive structure as a specific type of schema could assist the representative in retrieving the memory and knowledge about the customer's behavioral pattern and guide the representative to process the inquiry of the customer. The outcome of applying the pre-existing cognitive structure in the sense-making process is to construct the perception about the customer's needs, and the perception would activate the representative's "sense-producing" schemas. The representative would apply the "sense-producing" schemas in the sense-producing process to provide messages which contain the requested and additional information for the customer in order to meet the customer's needs. The representative's "sense-producing" schemas include the principle sense-producing schema and the adaptation sense-producing schema.

Principle Sense-producing Schema

In this dissertation research, a principle sense-producing schema (principle schema) is defined as a cognitive structure about the organization representative's knowledge about what message to produce and how to produce the messages as a reply to the customer's specific inquiry. Similar to role schemas, which are defined as expectations of appropriate behaviors of people who are holding particular social positions (Lord & Foti, 1986), a principle schema is shared by the organization representatives who are trained to share similar perspectives and knowledge about how to respond to customers' inquiries and what kind of messages to produce

to meet the customers' specific requests. As some schemas are hard to change once they have been established (Fiske & Taylor, 1991), a principle schema reflects certain "principles" of the organization regarding what and how a representative should communicate with a customer to respond to a specific inquiry. A principle schema is not a specific piece of knowledge or information the representative has in mind about the customer and the customer's needs. A principle schema is an abstract cognitive structure which can be selected by a representative to guide him/her to use specific knowledge to produce specific information. As Arbib (2003) suggested that schemas are interdependent, relevant principle schemas could be networked and form a broader cognitive structure to guide the behavior of the representative.

Since principle schemas are related to the "principles," the principle schemas are applicable in the organization-customer communication situations to guide the representative to respond to the customer's specific inquires. As people tend to use different schemas in response to different types of activating stimuli (Fiske & Taylor, 1991; Markus & Zajonc, 1985), different principle schemas could be applied in different situations to respond to the customer's different inquires. It is important to note that if the representative misunderstands or misinterprets the inquiry of the customer, the "wrong" or irrelevant principle schema may be selected, activated, and applied by the representative to produce messages. As a result, the messages will not carry the desired information the customer intends to request, and the representative's reply to the inquiry is not successful or satisfactory.

It is also important to note that in some extreme cases the representative understands the customer's inquiry perfectly but there is no relevant principle schema to be selected and applied to guide the representative to meet the customer's unique need. In these cases, the representative has to consult the supervisors or managers in the organization, and new types of principle

schemas are constructed to allow the representative to respond to the customer's inquiry and meet the need of the customer. As Kuperman (2003) suggests, people would revise their schemas to reflect a different assessment when they encounter a stimuli that indicates an intelligence level contrary to their expectations based on existing schemas. The process of generating schemas is similar to the process of encoding. Encoding is the process of storing information into memory to gain knowledge and increase understanding (Lloyd, 1989).

Adaptation Sense-producing Schema

This research defines an adaptation sense-producing schema (adaptation schema) as the cognitive structure which is adaptable to what the customer has already requested and which is about the representative's expectations for what the customer may also want to know. As Arbib (2003) suggested that schemas are interdependent and can only be meaningful in the relation to other schemas, the application of a specific principle schema could activate an adaptation schema which is related to that specific principle schema. A schema contains both conceptual and experiential knowledge about incoming stimuli (Kuperman, 2003; Taylor & Crocker, 1981). Through experiences of communicating with the customers, the representative will form experiential knowledge and memories about what types of information the customers want to know. As some schemas can facilitate the retrieval of information from memories and allow the reconstruction of memory information (Anderson & Pearson, 1984), adaptation schemas allow the representative to retrieve memory about what the customer also wants to know if a specific piece of information is requested. After the requested information is produced, an adaptation schema will be applied by the representative to produce the additional information which the representative assumes the customer may also want to request.

As Kuperman (2003) suggested, some schemas contain both subject-specific knowledge and content-specific knowledge. Adaptation schemas are developed based on the representative's knowledge about the information the customer usually requests and the customers' behavior patterns of requesting information. Certain types of schemas have "functional properties of adaptations between persons and their physical and social environments" (Middleton & Crook, 1996, p.202) and contain generic knowledge that is abstract and can be used for forming new structures (Brewer & Nakamura, 1984). Adaptation schemas are adaptable to the representative's expectations about what else the customer may also want to know. Because some schemas are dynamic in that they accept new information and can be affected and changed by the stimuli (Markus & Zajonc, 1985) and because the stock of schemas will change if the expectations of current schemas cannot be met (Piaget, 1970), different adaptation schemas are selected and applied by the representative in different information inquiry situations to assure a fitting connection between the requested information and the additional information. As some schemas can guide "exploratory activities that make more information available" (Neisser, 1976, p. 54), adaptation schemas are the schemas that the representative will apply to proactively produce additional information which is related to the requested information based on the judgment of the customer's potential behaviors and other viable needs.

Sense-making Schemas of the Customer

In the Schema Resonance Model, the customer applies sense-making schemas to propose the information inquiry and to process the information provided to him/her. According to Axelrod (1973), people try to find the schema which will fit the available information of messages at hand or the specifications of the cases to interpret the new information or the case. In this research, the "sense-making" schemas of the customer is defined as the schemas that the

customer can apply to request certain types of information and to allocate meaning out of the received information.

Individuals make sense of organizational culture and organizational stimuli by operating organization-specific schemas (Harris, 1994). The customer uses the sense-making schemas in the organization-customer communication for two reasons: First is to request information from the representative, and second is to "make sense" of the information that is provided by the representative. A specific sense-making schema of the customer causes the customer to feel the need for requesting a certain type of information to "make sense" of that information, and to express his/her need for that type of information by proposing an information inquiry. Later, that specific sense-making schema is re-activated by the arrival of the messages produced by the organization representative, and the customer applies that specific sense-making schema to process the information provided by the representative.

Because there may be many types of information the customer wants to request to "make sense" of certain things, a customer may have several sense-making schemas in mind at the same time when communicating with an organization representative. When the organization representative provides the customer with the requested information which is what the customer has requested, the customer will apply a specific sense-making schema to process the information. When the organization representative provides the customer with the additional information which is what the customer plans to acquire but has not requested yet, the customer will apply another sense-making schema to process the information.

Cognitive Process

The four types of schemas involved in the Schema Resonance Model will be applied in the specific cognition processes of the representative and the customer during the communication.

The schema application in cognitive processes has been studied in research on organizational communications and relationships (e.g. Hopkinson, 2001; Platts, 2003; Solomon, 1997). There are three cognition processes involved in the Schema Resonance Model: the organization representative's sense-making process, the representative's sense-producing process, and the customer's sense-making process. Unlike the schemas which are the cognitive structures representing the mental plans of one individual, the cognition process is the process where an individual applies the schemas to organize mental activities and guide behaviors. The discussions on these three cognition processes are in the following paragraphs.

Sense-making Process of the Organization Representative

Research has studied how leaders/managers of the organization utilize the sense-making and sense-giving processes to scan the organization's environment and influence others' understanding of information about the organization (Bartunek, Krim, Necochea, & Humphries, 1999; Gioia & Chittipeddi, 1991; Morsing & Schultz, 2006). In the process of sense-making, managers of the organization would gain awareness of the organization's internal and external environment (Gioia & Chittipeddi, 1991; Thomas, Clark, & Gioia, 1993; Thomas & McDaniel, 1990), and they process the incoming information, construct meaning for the interpretation, and integrate the understanding into their cognitive structures for organizational change (Hill & Levenhagen, 1995; Thomas et al., 1993). Because the sense-making process is a useful method to understand communication processes (Morsing & Schultz, 2006), sense-making processes should not be limited to only the leaders and managers of the organization. It is also important for the organization representatives to conduct the sense-making process to "make sense" of the customers' inquiries when communicating with the customers. As Nijhof, Fisscher, and Honders (2006) suggest, making sense of things about an organization can take place in conducting

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conversation with others, in reading communication from others, and in exchanging ideas with others. The customers of an organization are definitely part of the "others" mentioned here. In the sense-making process, the representative can understand the customer's need through "making sense" of the information inquiries the customer proposes. In addition, the organization representative can become aware of the customer's feelings and opinions about the organization and its products/services.

In the sense-making process, the organization representative applies the pre-existing cognitive structures to "make sense" of the customer's inquiries. As Dervin's Sense-Making Methodology suggests, information is "created at a specific moment in time-space by one or more humans" (Dervin, 1992, p.63). Through the sense-making process, the representative would be able to understand the customer's needs and what specific information the customer wants to know at that specific time. The encounter with the customer's inquiry functions as a stimulus or the "triggering event" (Bartunek, Krim, Necochea, & Humphries, 1999, p.46) and activates the pre-existing cognitive structures stored in the representative's mind. The representative retrieves the relevant structures and applies these structures to process the information carried within the inquiries. It is similar to the process of decoding. Decoding is the process of retrieving information from memory to solve problems and make decisions (Lloyd, 1989).

In this sense-making process, the representative attempts to understand the customer's request, need, and also the reason why the customer has proposed such an inquiry. Once the representative completes the sense-making process, he/she would construct the perceptions about what type of information the customer is requesting and for what reason the customer wants to acquire such kind of information. These perceptions would functions as stimuli to activate the

networked sense-producing schemas (both principle and adaptation schemas) of the representative. The representative will apply the sense-producing schemas in the sense-producing process to produce messages as the reply to the customer's inquiry.

Sense-producing Process of the Organization Representative

In literature, the term "sense-giving" has been used to describe the process of attempting to influence others regarding how to interpret and construct meaning of the information about the organization (e.g. Gioia & Chittipeddi, 1991; Morsing & Schultz, 2006). However, the term "sense-producing" is proposed in this research to depict the cognitive process of deciding how to "produce" the right messages for the customer. As mentioned earlier, unlike the "sense-giving" concept which emphasizes the action-behavioral strategies of how to influence people's meaning constructions toward the preferred presentation of the organization (Gioia & Chittipeddi, 1991), the concept of "sense-producing" emphasizes the cognitive process of deciding what messages to produce, how to produce the right messages, and why to produce these messages.

As Dervin (n.d.) suggested, it is possible to design and implement communication systems and practices to respond to people's needs. The sense-producing process is the process where the organization representative designs and creates messages for the customer to respond to his/her inquiries and meet his/her needs. The organization representative would apply both the principle schemas and the adaptation schemas in the sense-producing process to produce messages which contains both the requested information and the additional information for the customer. By applying the principle schemas to the sense-producing process, the representative intentionally recognizes the sense-making schema that has been used by the customer to propose the current inquiry, and the representative attempts to produce the requested information which is what the customer wants to know. By applying the adaptation schemas to the sense-producing

process, the representative proactively predicts another sense-making schema that can be used by the customer to propose a new inquiry, and the representative attempts to produce additional information which is what the customer also plans to acquire but has not requested yet.

As Kuperman (2003) implied, sense producing could be best accomplished when the sense giver knows something about the sense-making process of the sense makers. The organization's ability to strategically build relationship depends on the degree to which the organization is able to integrate the sensemaking of others into its endeavors (Gioia, Thomas, Clark, & Chittipeddi, 1994). By attempting to provide both the information that has been requested by the customer and the additional information that the customer plans to acquire but hasn't requested, the representative intends to integrate the customer's sense-making process into his/her (the representative's) sense-producing process to produce messages which contains the information (sense) that the customer can eventually "make sense" of.

Sense-making Process of the Customer

"Information seeking and use is central to sense-making" (Dervin, 1983, p.3). The customer seeks certain types of information by proposing inquiries and uses the information to make sense of something. The sense-making process of the customer is the process in which the customer actively processes the information he/she seeks from the representative and understands the meanings of the received information. As McVee, Dunsmore, and Gavelak (2005) suggest, "schemas were necessary to explain the constitutive role of culturally organized experience in individual sense making" (p. 535). In the sense-making process, the customer will apply the sense-making schema that he/she has used to propose the current inquiry to "make sense" of the requested information provided to him/her, and the customer will also attempt to apply another sense-making schema that he/she plans to use to propose a new inquiry to "make

sense" of the additional information. Sense-making involves both interpretation and action (Weick, 1995). If both the requested information and the additional information provided by the representative can be congruent with the customer's sense-making schemas, the customer would be able to process, interpret, and "make sense" of the information provided by the organization representative. The customer would further decide what actions (request more information or end the communication) should be taken.

Occurrence of Schema Resonance

Both when the requested information provided by the representative is what the customer has actually requested and can be processed cognitively by the customer for allocation of meanings, and when the additional information provided by the representative is what the customer also wants to know and can also be processed by the customer, the representative's sense-producing schemas will resonate with the customer's sense-making schemas. Only at that time, a successful schema resonance can occur. If the messages produced by the organization representative are based on the representative's accurate recognition and prediction of the sense-making schemas of the customer, the customer should be able to process the information provided to him/her and understand the meanings of the information. As suggested by Taylor and Crocker (1981), in the sense-making process, new information will be fitted into pre-existing mental structures for the allocation of meaning. However, the process of selecting a schema to interpret a specific case does not always promise the fit between the selected schema and the current case (Axelrod, 1973). If the requested information provided by the organization representative is not what the customer has requested, or if the additional information is not what the customer plans to request, the messages will cause inconsistency in the customer's cognition, and the customer can't use the sense-making schemas to process the information carried within

the messages. In this case, the customer would experience schema incongruity. Schema incongruity occurs when the information doesn't match the schema expectations (Hastie, 1980). If either the requested information or the additional information or both can't be processed by the customer, the customer would feel confused and would re-request the information or ask for explanations.

Therefore, the occurrence of schema resonance requires both the congruency between the requested information and the sense-making schema that has been used by the customer to propose the current inquiry and the congruency between the additional information and another sense-making schema which the customer plans to use to propose a new inquiry.

Applying the Schema Resonance Model to E-Service Communication

The Schema Resonance Model suggests that the occurrence of schema resonance in the communication between an organization representative and a customer would allow the organization representative to respond to the customer's inquiry by producing the messages which contains both the requested information and the additional information which can be congruent with the customer's sense-making schemas. This assumption can be examined from the perspective of schema congruity theory. Schema congruity theory has been used to examine the consumers' perception on the effectiveness of product messages (e.g. Cheong & Kim, 2011). Schema congruity theory explains how an individual processes new information by evaluating the information based on the expectations of pre-existing schemas (Hastie, 1980). If the information matches the expectations of the schemas, schema congruity is achieved, and little cognitive processing is required for interpreting the information (Hastie, 1980). If the information doesn't match the schema expectations, schema incongruity occurs, and greater cognitive processing is needed to reconcile the information (Hastie, 1980). If applied

appropriately, the application of Schema Resonance Model in the e-service communication could make both the requested information and the additional information congruent with the customer's sense-making schemas.

Organization's e-service for responding to customer's information inquiries is conducted via one-to-one online communication between an organization representative and a customer. Internet-based communication between customer and organization can allow organizations to acknowledge customers' needs and provide relevant information to customers in an economical way (Hanson, 1999). The one-to-one interactive communication between customer and organization allows the delivery of highly personalized service and thereby improves the relationship between customer and organization (van Mulken & van der Meer, 2005).

The occurrence of schema resonance in e-service communication allows the organization representative to provide more information (both the requested information and additional information) than what the customer has requested in every communication round. Because the messages produced in the schema-resonance e-service communication contain two pieces of information and both pieces of information can be congruent with the customer's schematic expectations, the customer would be able to process the information. Such a communication strategy should not affect the effectiveness of the communication due to the fact that both the requested information and the additional information provided by the organization representative can be congruent with the customer's schemas. However, it is unknown whether this assumption is correct. Therefore, the following research question is proposed:

RQ1: Compared to the e-service users in the non-schema-resonance e-service condition, will the e-service users in the schema-resonance e-service condition show a similar level of knowledge about the information they obtain?

According to the Schema Resonance Model, the organization representative applies both the principle schema and adaptation schema to the sense-producing process to produce both the requested information and the additional information as the reply to the customer's inquiry. Because the requested information is what the customer has already requested, it is easy for the representative to provide the requested information correctly. However, the additional information provided by the organization representative may not always be the information the customer also plans to request. In this case, the representative has a wrong perception about what the customer may also want to know. The representative's adaptation schema could not resonate with the customer's sense-making schema, and the attempt to achieve schema resonance is not successful. Such an unsuccessful attempt to achieve schema resonance will cause schema incongruity for the customer, because the additional information provided to the customer cannot be congruent with the customer's sense-making schema. Although the additional information is not what the customer wants to know, the requested information provided by the organization representative is indeed the information the customer wants to acquire. It is unknown whether the customer's knowledge about the requested information should be on a similar level. Therefore, the following research question is proposed:

RQ2: Compared to the e-service users in the failed-schema-resonance e-service condition, will the e-service users in the schema-resonance e-service condition show a similar level of knowledge about the information they obtain?

As Bolton, Lemon, and Verhoef (2004) noticed, customer satisfaction has received considerable attention in marketing studies. Service quality programs can influence customer satisfaction (Bolton et al., 2004). Good e-service could help the organization remain competitive and improve customer satisfaction (van Mulken & van der Meer, 2005). Even though customers'

non-purchase behavior may not be a good indicator of customer lifetime value for organizations (Malthouse & Blattberg, 2002), the reliability of the organizations' service may be an important factor for increasing the length of organization-customer relationship (Lemon & Bolton, 2002). Customer satisfaction with a non-purchase behavior experience, such as an information inquiry, can also be an indicator of the success of organizations' service endeavor.

According to Doll and Torkzadeh (1988), user satisfaction is defined as the opinion of the user about a specific computer application that they use. Customer satisfaction is often considered as the customer's evaluation of the experience of a purchase behavior (Anderson, Fornell, & Lehmann, 1994). Ives, Olson, and Baroudi (1983) defined user information satisfaction as the extent to which users believe the information system available to them meets their information requirements. Berry and Parasuraman (1991) measured customer satisfaction with a service by using the gap between the customer's expectation of performance and their perceived experience of performance. In this research, the customer's satisfaction with the e-service provided by the organization representative can be considered as the customer's overall perception about how well the organization representative can solve the customer's inquiries and meet the customer's requests through the online one-to-one communication application.

Danaher and Haddrell (1996) in a customer satisfaction study measured both the overall satisfaction with the service and the satisfaction with the key components of the service process.

In this dissertation research, both the customer satisfaction with the overall e-service and the customer satisfaction with two key components of the e-service process were examined. Because it is the research interest to examine whether the responses of the representative can achieve schema resonance in the e-service communication, it is important to know how the customers will evaluate and rate the two key components of the e-service: (1) the communication

approach the representative has used to respond to the customers' questions, and (2) the response information provided by the representative.

The occurrence of schema resonance in the e-service communication for responding to customers' information inquiries can increase the customer's satisfaction level and improve the customer's overall experience with the e-service provided by the organization representative. As Mandler (1982) argued in a discussion about the structure of value, "one can know the value of an event (its congruity with some existing schema) before one is aware of the details of the event that is being judged" (p. 19). The customer can feel the value of the e-service provided by the representative when schema resonance takes place, because the representative not only is able to successfully provide the information that the customer wants to acquire but also can foresee and provide what the customer plans to request next. Such kind of "proactively-thinking-for-the-customer-in-advance" behavior of the representative can arouse the customer's emotion and enhance the customer's assimilation process. Assimilation allows integration of external elements into existing cognitive structures (Mandler, 1982; Piaget, 1970), and both the requested information and the additional information would be congruent with the customer's sense-making schemas. Because schematic congruity could make the individual present more positive affect (Mandler, 1982), and because assimilative cognitive activity can become positively valued emotional experience (Mandler, 1982), e-service communication with the occurrence of schema resonance could be more satisfactory to the customer than e-service communication without schema resonance or e-service communication with failed schema resonance. The customers in the e-service communication with the occurrence of schema resonance could also be more satisfied with the communication approach and the information than customers in the e-service

communication without schema resonance or the e-service communication with failed schema resonance. The following hypotheses are proposed:

H1a: Compared to the e-service users in the non-schema-resonance e-service condition, e-service users in the schema-resonance e-service condition will be more satisfied with the overall e-service.

H1b: Compared to the e-service users in the failed-schema-resonance e-service condition, e-service users in the schema-resonance e-service condition will be more satisfied with the overall e-service.

H2a: Compared to the e-service users in the non-schema-resonance e-service condition, e-service users in the schema-resonance e-service condition will be more satisfied with the communication approach used by the online representative.

H2b: Compared to the e-service users in the failed-schema-resonance e-service condition, e-service users in the schema-resonance e-service condition will be more satisfied with the communication approach used by the online representative.

H3a: Compared to the e-service users in the non-schema-resonance e-service condition, e-service users in the schema-resonance e-service condition will be more satisfied with the information provided by the online representative.

H3b: Compared to the e-service users in the failed-schema-resonance e-service condition, e-service users in the schema-resonance e-service condition will be more satisfied with the information provided by the online representative.

As Bolton and colleagues (2004) suggested, customers' service usage may influence the organization-customer relationship and even customers' purchase behavior. The discrepancies between customer expectations and organizations' service performance can influence the

length/duration of the organization-customer relationship (Bolton et al., 2004; Bolton, Lemon, & Bramlett, 2002; Kumar, 2002). The behavior of customers can be influenced by the level of satisfaction (Garbarino & Johnson, 1999). Research suggests that customers who are more satisfied with organizations' service use the service more often (e.g., Bolton & Lemon, 1999). The occurrence of schema resonance in the e-service communication could minimize the discrepancies between the customer's expectations and the organization's service performance and make the customers more satisfied with the e-service. As a result, the customer would use the e-service more often. As Fishbein and Ajzen (2010) suggested, if measured appropriately, behavioral intentions can "account for an appreciable proportion of variance in actual behavior."(p. 48). Therefore, the customer, who would use the e-service more often, would show greater intent to continue using the e-service for future information inquiries. Fishbein and Ajzen (2010) introduced behavioral intention as "readiness to perform the behavior" (p. 21). Ajzen (2002a) defined behavioral intention as an indication of an individual's readiness to perform a given behavior. In this study, the customer's intent to continue using the e-service is considered as how ready the customer feels to use the e-service again for future information inquiries. The following hypotheses are proposed:

H4a: Compared to the e-service users in the non-schema-resonance e-service condition, e-service users in the schema-resonance e-service condition will show greater intent to continue using the e-service.

H4b: Compared to the e-service users in the failed-schema-resonance e-service condition, e-service users in the schema-resonance e-service condition will show greater intent to continue using the e-service.

Gender has been used as a common factor to segment products and services (Putrevu, 2001). As Rodgers and Harris (2003) suggested, "in the context of the Internet, gender is believed to influence, or perhaps moderate, the extent and pattern of participation in web activities" (p. 322). This dissertation research also aims to find out whether, in the e-service communication where schema resonance takes place, gender would show some differences.

Previous research found that males and females did not show difference in their ability to use the Internet to find information online (Hargittai & Shafer, 2006). In the e-service communication with the occurrence of schema resonance, it is unknown whether this type of proactive information-providing strategy is more effective for males or females to obtain information and gain knowledge about it. Therefore, the following research question is asked:

RQ3: In the schema-resonance e-service condition, will females and males show similar levels of knowledge about the information they obtain?

Previous research showed that gender made a difference in satisfaction with online information seeking experience. Females showed more positive attitudes toward both on/off-line sources of information search (Kim, Lehto, & Morrison, 2007), and females were more involved in the emotional experience during online shopping (Dittmar, Long, & Meek, 2004). In addition, females viewed computer mediated communication more favorably than males (Hiltz & Johnson, 1990). The e-service communication is an online information search process for the customer. It is assumed that females would feel the information inquiry process via e-service is more satisfactory. Therefore, the following hypotheses are proposed:

H5a: In the schema-resonance e-service condition, females will be more satisfied with the overall e-service than will males.

H5b: In the schema-resonance e-service condition, females will be more satisfied with the communication approach used by the online representative than will males.

H5c: In the schema-resonance e-service condition, females will be more satisfied with the information provided by the online representative than will males.

Research showed that females spent more time on the Internet than males per week (Kim et al., 2007). Females showed stronger needs for online information than males (Hiltz & Johnson, 1990) and did more online information searches than males (Seock & Bailey, 2008). Research also showed that female required assistance from an assistant agent (online customer representative) more often than males during online shopping process and females showed higher intention to require assistance from an assistant agent than males (Seock & Bailey, 2008). E-service can be used by customers to request assistance from an online representative to obtain information. It is assumed that females, after experiencing a schema-resonance e-service communication, would have higher intent to continue use the e-service than would males. Therefore, the following hypothesis is proposed:

H5d: In the schema-resonance e-service condition, females will show greater intent to continue using the e-service than will males.

Because e-service is offered by an organization or company via the instant messaging (IM) application, this dissertation research also aims to find out whether the experience with instant messaging would show differences in the schema-resonance e-service.

Srinivasan (1985) found that users' ability to use a system would strongly motivate them and influence the content accuracy and the ease of comprehension. Research also showed that users who were more computer-literate were more likely to favorably evaluate the e-services (Zhang, Prybutok, & Huang, 2006). Garoufallou, Trohopoulos, Siatri, and Balatsoukas (2007)

found that users who had more web-use experience were more satisfied with the results of using web-based application. Hargittai and Shafer (2006) found that in general people who had more web-use experience were better at finding content online.

To examine the effects of the experience with instant messaging in the schema-resonance e-service, the following research questions and hypotheses are proposed:

RQ4: In the schema-resonance e-service condition, will individuals who have high instant messaging experience show a similar level of knowledge about the information they obtain as will individuals who have low experience?

H6a: In the schema-resonance e-service condition, individuals who have high instant messaging experience will be more satisfied with the overall e-service than will individuals who have low instant messaging experience.

H6b: In the schema-resonance e-service condition, individuals who have high instant messaging experience will be more satisfied with the communication approach used by the online representative than will individuals who have low instant messaging experience.

H6c: In schema-resonance e-service condition, individuals who have high instant messaging experience are more satisfied with the information provided by the online representative than individuals who have low instant messaging experience.

H6d: In the schema-resonance e-service condition, individuals who have high instant messaging experience will show greater intent to continue using the e-service than will individuals who have low instant messaging experience.

Because "the main effect may be misleading when there is a statistically significant interaction" (Gliner, Morgan, & Leech, 2009, p.323), the research aims to find out whether there are interactions among e-service condition (schema-resonance condition vs. non-schema-

resonance condition), gender (female vs. male), and experience with instant messaging (high instant messaging experience vs. low instant messaging experience). If there is an interaction as well as main effects, the researcher plans to re-examine the main effects to see if the interaction overrides the main effects. This dissertation research has special interest in the comparison between the schema-resonance e-service condition and the non-schema-resonance condition, because the researcher wants to find out whether the schema resonance e-service has practical worthiness when compared to the regular, non-schema-resonance e-service. It is unknown whether there are any two-way or three-way interactions among e-service condition, gender, and experience with instant messaging for both the schema-resonance and non-schema resonance conditions. Therefore, the following research questions are proposed:

RQ5: Is there any two-way or three-way interaction effect on knowledge?

RQ6: Is there any two-way or three-way interaction effect on satisfaction with the overall e-service?

RQ7: Is there any two-way or three-way interaction effect on satisfaction with the communication approach used by the online representative?

RQ8: Is there any two-way or three-way interaction effect on satisfaction with the information provided by the online representative?

RQ9: Is there any two-way or three-way interaction effect on intent to continue using the e-service?

METHOD

Design

A post-test only 3 x 2 x 2 factorial between-subjects experimental/quasi-experimental design was used to answer the proposed research questions and test the proposed hypotheses. Because the comparison between two of the three manipulated conditions (the non-schema-resonance e-service condition and the failed-schema-resonance e-service condition) is not the research interest of this dissertation, the factorial experiment design is not fully counterbalanced. The experiment was conducted using simulated organization-customer e-service communication scenarios. In the simulated e-service communication scenarios, the participants played the role of the customers who had inquiries (questions) to ask and wanted to get the answers to the inquiries. The researcher played the role of the organization representative and provided information in response to the participants' inquiries.

Variables

Independent Variables

E-service condition

E-service condition is a manipulated experimental independent variable. There are three different conditions for the e-service: schema-resonance e-service condition (e-service communication with the successful attempt to achieve schema resonance in every communication round), non-schema-resonance e-service condition (e-service communication with the non-schema-resonance one-question-and-one-answer dialogue in every communication round), and failed-schema-resonance e-service condition (e-service communication with unsuccessful attempt to achieve schema resonance in every communication round).

Schema-resonance e-service condition is "e-service communication with the successful attempt to achieve schema resonance in every communication round." In this condition, the researcher would attempt to achieve schema resonance in every communication round, and the schema resonance was successfully achieved in every communication round. In this condition, the representative would achieve successful schema resonance by providing both the requested information and the additional information which was also wanted by the participant in every reply to the inquiry.

Non-schema-resonance e-service condition is "e-service communication with the non-schema-resonance one-question-and-one-answer dialogue in every communication round." In this condition, no attempts would be made by the researcher to achieve schema resonance, and the conversation would be conducted in a one-question-and-one-answer dialogic manner. The researcher would only provide the requested information to the participant in the reply and would not provide any additional information.

Failed-schema-resonance e-service condition is "e-service communication with unsuccessful attempt to achieve schema resonance in every communication round." In this condition, the researcher's attempt to achieve schema resonance in every reply was not successful. The researcher would provide both the requested information and the additional information in every reply to the inquiry. However, only the requested information was what the participant wanted to know; the additional information was irrelevant and not what the participant also wanted to know.

The relations among these three e-service conditions are shown in Figure 2.

No Attempt to Achieve Schema Resonance	or	Attempt to Achieve Schema Resonance
Non-schema-resonance E-service Condition where only the requested information is provided in every reply		Condition where both the requested information and the additional information are provided in every reply

Successful Attempt to Achieve Schema Resonance	or	Unsuccessful Attempt to Achieve Schema Resonance
Schema-resonance E-service Condition where both the requested information and the additional information are wanted by the customer		**Failed-schema-resonance E-service Condition** where the requested information is wanted but the additional information is not wanted by the customer

Figure 2. Relations among Three E-service Conditions.

Gender

Gender is a quasi-experimental independent variable in this research. The two gender groups are males and females.

Experience with instant messaging

Experience with instant messaging is also a quasi-experimental independent variable in this research. "Experience with instant messaging" is defined as the frequency of one's use of the instant messaging (live chat) technologies. The two levels are "low" experience and "high" experience.

Dependent Variables

Effectiveness of e-service communication

The effectiveness of e-service communication is defined as the degree to which the replies of the organization representative can successfully answer the inquiries of the customer.

The operational definition of this variable is how effectively the customer obtains the knowledge about the information provided through the e-service communication.

Satisfaction with the overall e-service

Satisfaction with the overall e-service is defined as how well the customer feels the e-service provided by the organization representative meets his/her needs. The operational definition is the degree to which the customer perceives the overall service as satisfactory.

Satisfaction with the communication approach

Satisfaction with the communication approach is defined as how well the customer feels the responding style the representative uses to answer the questions during the communication meets his/her needs. The operational definition is the degree to which the customer perceives the communication approach used by the representative as satisfactory.

Satisfaction with the information

Satisfaction with the information is defined as how well the customer feels the information provided by the representative during the communication meets his/her needs. The operational definition is the degree to which the customer perceives the information provided by the representative as satisfactory.

Intent to continue using the e-service

Intent to continue using the e-service is defined as the readiness of the customer to continue using the e-service. The operational definition is the degree to which the customer is likely to use the-e-service again.

Participants

A convenience sample was used in this dissertation research. College students at Colorado State University were recruited to participate in the experiment. The researcher used

the G*Power 3.1.9.2 computer software to calculate the total required sample size in this research. G*Power 3 is a flexible statistical power analysis computer program for the social and behavioral sciences and can be used to compute effect sizes and required sample size (Faul, Erdfelder, Lang, & Buchner, 2007). As for the required sample size, the researcher wanted to obtain at least a medium effect size (f=.25) (Cohen, 1988) and a sufficient statistical power (95%). As shown in Table 1, a total of 251 participants were required. There were 12 groups in the 3x2x2 factorial design, and at least 21 participants were required for each group according to the G*Power computation of required sample size. However, the researcher felt that 21 participants per group might not be sufficient for this research, so the researcher strived to recruit at least 30 participants per group.

Table 1: *G*Power Required Sample Size Computation*

F tests - ANOVA: Fixed effects, special, main effects and interactions			
Analysis:	A priori: Compute required sample size		
Input:	Effect size f	=	0.25
	α err prob	=	0.05
	Power (1-β err prob)	=	0.95
	Numerator df	=	2
	Number of groups	=	12
Output:	Noncentrality parameter λ	=	15.6875000
	Critical F	=	3.0335979
	Denominator df	=	239
	Total sample size	=	251
	Actual power	=	0.9506138

The researcher went to two sections of JTC100 course and three sections of JTC300 course to recruit undergraduate students as participants. The researcher gave students two copies of the informed consent form (see Appendix A) and asked students to read the form. After the

students finished reading the informed consent form, they would decide whether to participate in the study or not.

Students who chose to not participate in the study would not sign the consent form and would have the opportunity to receive extra credit by writing a two-page (double-spaced) essay on the topic "the advantages of using e-service as a customer." None chose to write the essay to receive the extra credit.

Students who decided to participate in the study were asked to sign and date two copies of the form. The participant kept one copy, and the researcher collected and kept the other copy. Students who chose to participate in the research received extra credit for the course. The amount of the extra credit was determined by the course instructor.

The researcher passed out an experiment session sign-up sheet (Appendix B) and asked those students who were willing to participate to select one available experimental session and write down their first name, last name, and gender in the row of the selected session.

The researcher had access to the five classes on RamCT Blackboard and used the Blackboard email system to send an e-mail alert to students on the day before their signed-up participation dates to remind them of the experiment session dates, times, and locations. Later on, the researcher would use the Gradebook of the RamCT Blackboard to give extra credit to students for their participation in the experiment. Students' names and gender information on the sign-up sheet were kept confidential and only used for communication purpose.

A total of 423 college students at Colorado State University from five sections of two large communication courses were recruited as the experimental subjects and participated in the experiment. A total of 409 participants completed the experiment session and filled out the online survey. Twenty survey entries were excluded due to providing either contradictory

responses (4 cases) or failing the manipulation check question (16 cases). A total of 389 participants' survey entries were usable and included in the data set.

Students who were willing to participate in the research were randomly assigned to one of the three manipulated e-service conditions. For each participant, the researcher assigned the participant to one of the three manipulated e-service condition by throwing a dice. If the number of the dice was 1 or 2, the participant was assigned to the schema-resonance e-service condition; if the number of the dice was 3 or 4, the participant was assigned to the non-schema-resonance e-service condition; if the number of the dice was 5 or 6, the participant was assigned to the failed-schema-resonance e-service condition.

There were a total of 12 groups. 389 participants were randomly assigned to one of these 12 groups (see Table 2). The sample size of 389 could allow the statistical test (ANOVA) to have a power $(1-\beta)$ of .995 to detect the main effects and the combined effects of the independent variables when a significant level (α) of .05 and a medium effect size $(f=.25)$ are desired.

Table 2: *Distribution of Participants in 12 Groups*

	Female		Male	
	High Instant Messaging Experience	Low Instant Messaging Experience	High Instant Messaging Experience	Low Instant Messaging Experience
Schema-resonance E-service Condition	35	34	31	30
Non-schema-resonance E-service Condition	35	34	30	32
Failed-schema-resonance E-service Condition	33	35	30	30

As shown in Table 3, 382 out of 389 participants are between 18 and 24 years old.

Table 3: *Distribution of Ages of Participants*

Age	18	19	20	21	22	23	24	25	26	27	30	31	35	Total
Frequency	33	74	119	96	41	12	7	1	2	1	1	1	1	389

Sixty-two participants were freshmen; 94 participants were sophomores; 158 participants were juniors; 75 participants were seniors.

Sixteen out of the 389 participants were international students. A total of 127 American students and three international students were randomly assigned to the schema-resonance e-service condition; 124 American students and seven international students were randomly assigned to the non-schema-resonance e-service condition; 122 American students and six international students were randomly assigned to the failed-schema-resonance e-service condition.

Among the 130 participants in the schema-resonance e-service condition, three were only-one-race Hispanic/Latino; 111 were only-one-race white; two were only-one-race African American; six were only-one-race Asian; and eight had more than one race. Among the 131 participants in the non-schema-resonance e-service condition, four were only-one-race Hispanic/Latino; 105 were only-one-race white; one was only-one-race African American; six were only-one-race Asian; 14 had more than one race; and one was other race (unspecified). Among the 128 participants in the failed-schema-resonance e-service condition, six were only-one-race Hispanic/Latino; 93 were only-one-race white; six were only-one-race African

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American; six were only-one-race Asian; 16 had more than one race; and one was other race (specified as Eritrean).

Among the 130 participants in the schema-resonance e-service condition, seven were only affiliated with the College of Agricultural Sciences; two were only affiliated with the College of Business; 10 were only affiliated with the College of Engineering; 30 were only affiliated with the College of Health and Human Sciences; 19 were only affiliated with the College of Liberal Arts; 13 were only affiliated with the Warner College of Natural Resources; 14 were only affiliated with the College of Natural Sciences; six were only affiliated with the College of Veterinary Medicine & Biomedical Sciences; 24 were affiliated with more than one college; three were undeclared; and two did not know which college they were affiliated with.

Among the 131 participants in the non-schema-resonance e-service condition, six were only affiliated with the College of Agricultural Sciences; three were only affiliated with the College of Business; 16 were only affiliated with the College of Engineering; 20 were only affiliated with the College of Health and Human Sciences; 37 were only affiliated with the College of Liberal Arts; eight were only affiliated with the Warner College of Natural Resources; 11 were only affiliated with the College of Natural Sciences; five were only affiliated with the College of Veterinary Medicine & Biomedical Sciences; 20 were affiliated with more than one college; four were undeclared; and one did not know which college he/she was affiliated with.

Among the 128 participants in the failed-schema-resonance e-service condition, five were only affiliated with the College of Agricultural Sciences; 12 were only affiliated with the College of Business; 13 were only affiliated with the College of Engineering; 20 were only affiliated with the College of Health and Human Sciences; 33 were only affiliated with the College of Liberal Arts; eight were only affiliated with the Warner College of Natural Resources; 10 were only

affiliated with the College of Natural Sciences; five were only affiliated with the College of Veterinary Medicine & Biomedical Sciences; 12 were affiliated with more than one college; five were undeclared; and six did not know which college they were in.

In the schema-resonance e-service condition, participants had a mean score of 3.12 (SD=2.065, 1-7 scale where 1 is no experience at all and 7 is a lot of experience) for experience with non-live online class and a mean score of 1.58 (SD=1.380, 1-7 scale where 1 is no experience at all and 7 is a lot of experience) for experience with live, interactive online class. In the non-schema-resonance e-service condition, participants had a mean score of 3.20 (SD=2.121, 1-7 scale where 1 is no experience at all and 7 is a lot of experience) for experience with non-live online class and a mean score of 1.80 (SD=1.511, 1-7 scale where 1 is no experience at all and 7 is a lot of experience) for experience with live, interactive online class. In the failed-schema-resonance e-service condition, participants had a mean score of 3.30 (SD=2.113, 1-7 scale where 1 is no experience at all and 7 is a lot of experience) for experience with non-live online class and a mean score of 1.50 (SD=1.129, 1-7 scale where 1 is no experience at all and 7 is a lot of experience) for experience with live, interactive online class.

These statistics indicated that the attributes of the participants were well balanced across the three conditions due to the random assignment.

Procedure

Experimental Procedure

Only one participant participated in the experiment in a university computer laboratory at a time. The experiment was conducted in the computer laboratory. When a participant came to the computer laboratory, the researcher welcomed the participant and asked the participant to have a seat. The researcher verified the gender information which the participant reported on the

sign-up sheet and asked the participant to fill out a pre-experiment survey questionnaire (see Appendix C). This pre-experiment questionnaire was used to measure the participant's experience with instant messaging.

While the participant was completing the pre-experiment survey, the researcher walked into the inner room of the computer laboratory and threw the dice to assign the participant to one of the three e-service conditions. If 1 or 2 appeared on the top face of the dice, the researcher assigned the participant to the schema-resonance e-service condition; if 3 or 4 appeared, the participant was assigned to the non-schema-resonance condition; if 5 or 6 appeared, the participant was assigned to the failed-schema-resonance condition.

When the participant completed the pre-experiment questionnaire, the researcher brought the experiment introduction and instructions sheet (see Appendix D) to the participant and asked the participant to read the experiment introduction. To avoid priming the participant by revealing the real purpose of the research, the researcher deliberately replaced the real purpose of the experiment with a relevant research purpose (to invite students to learn about Virtual Class and obtain students' opinions about Virtual Class) in the experiment introduction. The real purpose of the study was explained to all participants in the debriefing at the end of the experiment session.

While the participant was reading the experiment introduction and instructions sheet, the researcher took the pre-experiment questionnaire to the inner room of the laboratory and determined whether the participant had "high instant messaging experience" or "low instant messaging experience" based on the participant's responses to the five questions on the pre-experiment questionnaire. If the mean score of the participant's responses was less than 3 or equal to 3, the researcher considered the participant had low experience; if the mean score of the

participant's responses was more than 3, the researcher considered the participant had high experience.

After determining whether the participant had low or high instant messaging experience, the researcher would give the participant a participation identification number which indicated the participant's assigned condition, gender, instant messaging experience, and the order in which the participant within that group appeared to participate. The participation identification number was used to protect the participants' identity and privacy. The participation identification number was a five-digit number in the format of #####: the first number could be 1, 2, or 3, and indicated the condition the participant was randomly assigned to (1 stood for schema-resonance condition, 2 for non-schema-resonance condition, and 3 for failed-schema-resonance condition); the second number could be 0 or 1 and indicated the gender of the participant (0 stood for female and 1 for male); the third number could be 0 or 1 and indicated the experience with instant messaging (0 stood for low experience and 1 stood for high experience); the fourth and fifth numbers were a two-digit number starting from 01 and indicated the order in which the participant within that group participated (01 meant the participate was the first in that group to participate, 02 meant the participant was the second in that group to participate, etc.). For example, if a participant was assigned to the schema-resonance condition, was a male, had low instant messaging experience, and was the 14th in that group (schema-resonance condition, male, and low experience group) to participate in the experiment, this participant's participation identification number would be 11014. If a participant was assigned to the failed-schema-resonance condition, was a female, had high instant messaging experience, and was the 27th in that group (failed-schema-resonance condition, female, and high experience group) to participate in the experiment, this participant's participation identification number would be 30127.

After the researcher determined the participant's participation identification number, the researcher wrote that number on the number-tracking page that was reserved for that specific group in a notebook. By doing so, the researcher could track the number of the participants of a specific group who had already participated, know the order in which a new participant in that group would participate, and give the correct experiment identification number to the new participant in that group.

There were 12 groups in the experiment (see Table 2). There were 12 number-tracking pages in the notebook that were used to record the number of participants for the 12 groups. An example of one of the 12 number-tracking pages can be seen in Appendix E.

If a participant didn't complete the experiment due to computer technical issues, decided to quit in the middle of the experiment session, or didn't took the experiment seriously and only obtained answers to eight or fewer questions, the participant would be excluded from the research. The participant's experiment identification number was crossed off on the number-tracking page. The next participant in that group would be given the same identification number. Eight participants didn't complete the experimental session due to computer technical issue. Six participants didn't take the experiment seriously and ended the communication after obtaining answers to eight or fewer questions.

The researcher also wrote the participation identification number on the pre-experiment questionnaire and on the task sheet (Appendix F). Twelve questions were on the task sheet. The task that the participant needed to complete in the experiment was to get and understand all of the answers to the twelve questions which were related to a fictional "Virtual Class" program. The questions and answers about the "Virtual Class" program were all made up by the researcher

(see details in the stimulus section). "Virtual Class" was selected as the topic used in the experiment, because it was closely related the student participants' college life.

The researcher also wrote down a section code and a group code on the task sheet. The researcher used the section code and group code to re-confirm that the correct numbers were used to indicate the participant's condition and the experience with instant messaging. The section code could be 1, 2, or 3 and indicated the condition the participant was randomly assigned to (1 stood for schema-resonance condition, 2 for non-schema-resonance condition, and 3 for failed-schema-resonance condition). The group code could be 0 or 1 and indicated the experience with instant messaging (0 stood for low experience and 1 stood for high experience). The researcher used the terms "section code" and "group code" instead of "e-service condition" and "instant messaging experience" to avoid priming the participant. The use of section code and group code could also help the researcher examine the participant's survey entry to see whether the participant entered an incorrect participation identification number.

It took about 20 seconds for the researcher to determine the participant's participation identification number; write the number on the number-tracking page, pre-experiment questionnaire, and task sheet; and write the section code and group code on the task sheet. After doing all of these, the researcher would wait for the participant to finish reading the experiment introduction and instructions sheet. When the participant finished reading the introduction and instructions sheet, the researcher brought the task sheet to the participant and showed the computer and the instant messaging application—QQ International—to the participant. QQ International is a full-featured instant messenger offered by the world's third largest Internet company—Tencent ("QQ International," n.d.).

The researcher asked the participant whether he/she knew how to use the QQ International instant messaging (live chat) application shown on the computer screen to ask questions. If the participant said he/she didn't know how to use the application to ask questions, the researcher would explain how to type questions on the application. All the participants said they knew how to use this application to ask questions.

QQ International instant messaging computer application was used in the experiment to simulate the e-service (live chat) communication between an organization representative and a customer. The participant's QQ International account name was "CSU Student" while the researcher's QQ International account name was "CSU Student Services." The researcher used "CSU Student" and "CSU Student Services" as the account names to simulate the e-service communication regarding "Virtual Class" between a student and an online representative from student services. In addition, QQ International instant messaging recorded the communication transcripts in a text file and also recorded the time every conversation message was posted. An example of the online communication transcripts recorded by the QQ International application can be seen in Appendix G.

After showing the computer and the QQ International instant messaging application to the participant, the researcher asked the participant to read the task sheet very carefully and instructed the participant to start the online communication after finishing reading the task sheet. The researcher told the participant that he (the researcher) would wait in the inner room of the laboratory. The participant could conduct the online communication at her/his own pace and was instructed to let the researcher know immediately by speaking out when the communication ended. The participant was also instructed to let the researcher know immediately if the participant encountered any technical issues with the computer and the instant messaging

software. When the participant encountered technical issues such as the loss of Internet connection or the breakdown of QQ International application, the researcher stopped the experiment session, thanked the participant, assured the participant that the extra credit would be given, and debriefed the participant. Eight participants didn't complete the experimental session due to computer technical issues. The participant was also instructed to refer to the experiment introduction and instructions (Appendix D) and the task sheet (Appendix F) if he/she had any question regarding how to complete the task during the experiment.

While the participant was reading the task sheet and getting ready for the online communication, the researcher went back to the inner room of the laboratory, sat down in front of a computer, and got ready to use QQ International to play the role of online representative. Because there were walls between the inner room and the main room of the laboratory, the participant would not know that the researcher played the role of the "online representative" until the participant was debriefed at the end of the experiment session.

When the participant was ready to ask questions, he/she used the QQ International instant messaging (live chat) application to start the online conversation to get the answers to the questions on the task sheet. At the same time, the researcher was on the other end of the QQ International instant messaging playing the role of the "online representative" in the inner room and provided answers to the participant. The researcher used the same font (Times New Rome), the same font size (18-point), and the same font color (automatic black) for all the online communications.

When the participant thought he/she got all the answers to the questions on the task sheet, the participant ended the online communication and spoke out to let the researcher know

immediately. The researcher closed the chatting window on the participant's computer and showed the participant the post-experiment online survey (see Appendix H).

If a participant didn't take the online communication seriously, just wanted to get over with the experiment, and only obtained answers to eight or fewer questions, the researcher would treat this participant as he/she didn't complete the experiment and would not ask the participant to do the online survey after the participant ended the online communication. For example, if a participant ended the online communication just after asking two questions, the researcher would stop the experiment and thank the participant, and would not ask the participant to take the online survey. The researcher would also cross off this participant's participation identification number from the number-tracking page and exclude this participant's pre-experiment survey and task sheet from the research. Six participants didn't take the experiment seriously and ended the communication after only obtaining answers to eight or fewer questions.

After the participant ended the online communication, the researcher instructed the participant to read the survey questions and items carefully and to complete the online survey at his/her own pace. The online survey included 12 multiple-choice questions regarding the information provided to the participant during the online communication. The survey also included the dependent variable questions, one manipulation-check question which examined whether the participant recognized the manipulation used in the manipulated e-service condition, and several demographic questions.

While the participant was doing the online survey, the researcher went back to the inner room and saved the communication transcript as an e-version text document in the hard drive. The online survey was powered by Qualtrics, which is a leading online survey service used for academic research (Qualtrics, n.d., n.p.).

After the participant completed the online survey, the researcher orally debriefed the participant and explained the real purpose of the research. The debriefing statement can be seen in Appendix I. After the debriefing, the researcher gave the data withdrawal form (see Appendix J) to the participant, and the participant could choose to withdraw his/her data from the experiment. None of the participants chose to withdraw their data.

At the end of an experiment session, the researcher thanked the participant, walked the participant out of the laboratory, collected the introduction and instructions sheet and the task sheet, cleared the chatting history on both QQ International instant messaging accounts on the researcher's and the participant's computers, entered the extra credit for the participant on RamCT Blackboard, and got ready for the next experiment session.

Each experiment session took about 25-30 minutes. From November 12, 2014, to April 17, 2015, the researcher proctored 423 sessions for the actual experiment.

Procedure for Question-order-ranking Survey

In the experiment, a participant was instructed to get answers to the twelve questions on the task sheet. The researcher did not assume which questions were the most wanted questions by the participants. The researcher used a question-order-ranking survey (Appendix K) to determine which questions were the most wanted questions among the potential participants.

Prior to the pretests and the actual experiment, the question-order-ranking survey was conducted on November 10, 2014. A small communication class was used as the convenience sample to do this question-order-ranking survey. A total of 22 students were invited to participate in this question-order-ranking survey. Students who chose to participate received 5 points of extra credit for that class. Those who chose not to participate in the survey could also

receive the extra credit by writing a one-page essay on the topic "the advantage of online interactive course." All 22 students chose to participate in the survey.

The researcher gave the Consent Letter (Appendix L) to students. Students filled out the question-order-ranking survey questionnaire. The survey questionnaire was anonymous, and students did not write their names on the questionnaire. It took about 10 minutes for all 22 students to complete the survey. After all students completed the survey, the researcher collected the survey questionnaires.

The purpose of this question-order-ranking survey was to investigate the potential participants' sense-making schemas related to the Virtual Class program. The survey questionnaire results helped the researcher determine which six questions were the more-wanted questions and which six questions were the less-wanted questions. The six questions that the participants most wanted to ask indicated the "want-to-know" questions. Therefore, the answers to these six questions were provided as the requested information in the experiment. These six most-wanted questions were marked as Q1, Q3, Q5, Q7, Q9, and Q11 on the task sheet (see Appendix F). The other six questions were the questions that the potential participants least wanted to ask. These six less-wanted questions indicated the "may-also-want-to-know" questions. The answers to these six questions were provided as the additional information in the experiment. The least-wanted question was marked as Q2. The second least wanted question was marked as Q4. The third least wanted question was marked as Q8. The fourth least wanted question was marked as Q6. The fifth least wanted question was marked as Q10. The sixth least wanted question was marked as Q12. By arranging the question order this way, a "want-to-know" question was paired with a "may-also-want-to-know" question on the task sheet.

Originally, the third least wanted question was marked as Q6. The fourth least wanted question was marked as Q8. However, this made Q5 and Q6 seem irrelevant to each other. Therefore, the researcher decided to switch Q 6 and Q8 to ensure that the connection between a "want-to-know" question and a 'may-also-want-to-know" question was strong and logical.

Stimulus

When designing the stimulus, the researcher intentionally attempted to control for some potential extraneous variables which might influence the results of the experiment. For example, because the order the participant used to ask questions might affect the participant's sense-making schemas, the participants were instructed to ask questions following the assigned order (see Appendix F). In reality, sometimes a customer may ask only one question at a time, while at other time the customer may ask more than one question at a time. If a participant asked more than one question at a time, the participant would use multiple sense-making schemas to process the information and this could affect the information-processing process of the participant and might also affect the quality of the communication. To control the effect of the quantity of questions asked at a time, the participants were instructed to ask only one question at a time in the experiment.

There were three manipulated conditions for the e-service. In the data-entry stage, schema-resonance e-service condition was given the value of 1. Non-schema-resonance e-service condition was given the value of 2. Failed-schema-resonance was given the value of 3.

Schema-resonance E-service Condition

In the schema-resonance e-service condition, the researcher manipulated the condition of "e-service communication with successful attempt to achieve schema resonance in every communication round."

The task for a participant in this condition was to obtain and understand the answers to the 12 questions on the task sheet (Appendix F). In the reply, the researcher provided both the answer (requested information) to the question which was asked by the participant and the answer (additional information) to the question the participant planned to ask next.

For example, the participants had two questions to ask:

Q1: Does Virtual Class cost the same tuition as the parallel in-person class?
Q2: When can students start registering for Virtual Class?

The participant asked Q1:

"Does Virtual Class cost the same tuition as the parallel in-person class?"

The researcher provided the answers to both Q1 and Q2:

"Yes, the tuition of Virtual Class is the same as that of the parallel in-person class. You might also like to know that students can start registering for Virtual Class at the same time when they start registering for the traditional in-person classes."

In this reply, "Yes, the tuition of Virtual Class is the same as that of the parallel in-person class" was the requested information and the answer to Q1. "Students can start registering for Virtual Class at the same time when they start registering for the traditional in-person classes" was the additional information, because it was not requested by the participant. However, it was the answer to Q2 and was the information the participant planned to request next.

In this communication round, only Q1 was asked by the participant, and the Q2 was not asked. In the reply, the researcher provided the answers to both Q1 and Q2. If the schema resonance functioned as expected, the participant would skip asking Q2 and would ask Q3 next. When the participant asked Q3, the researcher would provide answers to both Q3 and Q4. The researcher would provide response messages like this in every communication round until the participant had no more questions to ask.

Ideally, for 12 questions, six communication rounds would be sufficient if schema resonance functioned as expected. The communication for this schema-resonance e-service condition could look like the following transcript. The text and questions inside the parentheses were included to track the number of questions and were not part of the transcript.

"My participation ID is xxxxx. I have some questions to ask.

Thank you. You may start asking questions.

(Q1) **Does Virtual Class cost the same tuition as the parallel in-person class?**
(Q2: When can students start registering for Virtual Class?)

Yes, the tuition of Virtual Class is the same as that of the parallel in-person class.
You might also like to know that students can start registering for Virtual Class at the same time when they start registering for the traditional in-person classes.

(Q3) **Who is eligible to take Virtual Class?**
(Q4: If the traditional in-person class still has openings, can students register for the parallel Virtual Class?)

Only undergraduate students in this university are eligible to take Virtual Class.
You might also like to know that regardless of whether the traditional in-person class has openings or not, student can register for the Virtual Class if the Virtual Class has openings.

(Q5) **Is Virtual Class worth the same credit hours as the parallel in-person class?**
(Q6: If a student didn't attend a Virtual Class session at the scheduled time, can this student make up for that missed Virtual Class session at a later time?)

Virtual Class is worth the same credit hours as the parallel in-person class.
You might also like to know that students must attend a Virtual Class session at the scheduled time and cannot make up for a missed Virtual Class session at a later time, because Virtual Class only offers live online classes.

(Q7) **Is Virtual Class the same as the online class (Online Plus) offered by the university?**
(Q8: Can students download the teaching materials in Virtual Class?)

Virtual Class is not the same as the Online Plus. Virtual Class can offer live and interactive teaching-learning experience, but the Online Plus doesn't offer live or interactive teaching-learning experience.

You might also like to know that in Virtual Class students can download the teaching materials unlimited times.

(Q9) **How can students interact with the instructor in Virtual Class?**
(Q10: How do students turn in assignments in Virtual Class?)

To interact with the instructor in Virtual Class, students can either type comments and questions on the live-chatting discussion board or use a microphone to speak and ask questions.
You might also like to know that in Virtual Class students will turn in all assignments as Word documents electronically to the Assignment Database of the Virtual Class system.

(Q11) **How many Virtual Classes can one student take per semester?**
(Q12: How can students log in to the Virtual Class system to take a Virtual Class?)

One student can take no more than two Virtual Classes per semester.
You might also like to know that students need to use their eID and password to log in to the Virtual Class system to take a Virtual Class.

Thank you! I have no more questions."

For any reason, if the participant continued asking Q2 after asking Q1 and receiving the response to Q1, the researcher would provide only the answer to Q2 in the reply even though that information had already been given in response to Q1. In this case, the schema resonance did not take place, and it took two communication rounds, instead of one communication round, to answer both Q1 and Q2. A total of 12 participants asked Q2 after asking Q1 and receiving the response to Q1, the researcher provided only the answer to Q2 in the reply. After receiving the answer to Q2, all of these 12 participants only asked Q3, Q5, Q7, Q9, and Q11, and skipped Q4, Q6, Q8, Q10, and Q12.

If the participant asked the same question twice, the researcher would provide only the answer to that question once again in the reply. None of the participants in this e-service condition asked the same question twice.

Non-schema-resonance E-service Condition

In the non-schema-resonance e-service condition, the researcher manipulated the condition of "e-service communication with the non-schema-resonance one-question-and-one-answer dialogue in every communication round."

The task for a participant in this condition was to obtain and understand the answers to the same 12 questions on the task sheet. In this condition, schema resonance would not take place in any communication round, because the researcher only provided the answer (requested information) to the question asked by the participant and did not provide the answer (additional information) to the next question that the participant planned to ask.

For example, the participants had two questions to ask:

Q1: Does Virtual Class cost the same tuition as the parallel in-person class?
Q2: When can students start registering for Virtual Class?

The participant asked Q1:

"Does Virtual Class cost the same tuition as the parallel in-person class?"

The researcher provided the answer to Q1:

"Yes, the tuition of Virtual Class is the same as that of the parallel in-person class."

The participant then asked Q2:

"When can students start registering for Virtual Class?"

The researcher provided the answer to Q2:

"Students can start registering for Virtual Class at the same time when they start registering for the traditional in-person classes."

In every communication round, only one question was asked, and only the answer to that question was provided. For 12 questions, 12 communication rounds presumably would be needed to provide answers to the 12 questions. The communication for this non-schema-

resonance e-service condition could look like the following transcript. The text inside the parentheses was included to track the number of questions and was not part of the transcript.

"My participation ID is xxxxx. I have some questions to ask

Thank you. You may start asking questions.

(Q1) **Does Virtual Class cost the same tuition as the parallel in-person class?**

Yes, the tuition of Virtual Class is the same as that of the parallel in-person class.

(Q2) **When can students start registering for Virtual Class?**

Students can start registering for Virtual Class at the same time when they start registering for the traditional in-person classes.

(Q3) **Who is eligible to take Virtual Class?**

Only undergraduate students in this university are eligible to take Virtual Class.

(Q4) **If the traditional in-person class still has openings, can students register for the parallel Virtual Class?**

Regardless of whether the traditional in-person class has openings or not, student can register for the Virtual Class if the Virtual Class has openings.

(Q5) **Is Virtual Class worth the same credit hours as the parallel in-person class?**

Virtual Class is worth the same credit hours as the parallel in-person class.

(Q6) **If a student didn't attend a Virtual Class session at the scheduled time, can this student make up for that missed Virtual Class session at a later time?**

Students must attend a Virtual Class session at the scheduled time and cannot make up for a missed Virtual Class session at a later time, because Virtual Class only offers live online classes.

(Q7) **Is Virtual Class the same as the online class (Online Plus) offered by the university?**

Virtual Class is not the same as the Online Plus. Virtual Class can offer live and interactive teaching-learning experience, but the Online Plus doesn't offer live or interactive teaching-learning experience.

(Q8) **Can students download the teaching materials in Virtual Class?**

In Virtual Class, students can download the teaching materials unlimited times.

(Q9) **How can students interact with the instructor in Virtual Class?**

To interact with the instructor in Virtual Class, students can either type comments and questions on the live-chatting discussion board or use a microphone to speak and ask questions.

(Q10) **How do students turn in assignments in Virtual Class?**

In Virtual Class, students will turn in all assignments as Word documents electronically to the Assignment Database of the Virtual Class system.

(Q11) **How many Virtual Classes can one student take per semester?**

One student can take no more than two Virtual Classes per semester.

(Q12) **How can students log in to the Virtual Class system to take a Virtual Class?**

Students need to use their eID and password to log in to the Virtual Class system to take a Virtual Class.

Thank you! I have no more questions."

If the participant asked the same question twice, the researcher would provide only the answer to that question once again in the reply. None of the participants in this e-service condition asked the same question twice.

Failed-schema-resonance E-service Condition

In the failed-schema-resonance e-service condition, the researcher manipulated the condition of "e-service communication with unsuccessful attempt to achieve schema resonance in every communication round."

The task for the participants in this condition also was to obtain and understand the answers to the same 12 questions on the task sheet. In the reply, the researcher would provide the

answer (requested information) to the question asked by the participant and a piece of additional information that was not what the participant wanted to request. This simulated the situation where what the online representative assumes the customer may also want to know is not what the customer really wants to know.

For example, the participants had two questions to ask:

Q1: Does Virtual Class cost the same tuition as the parallel in-person class?
Q2: When can students start registering for Virtual Class?

The participant asked Q1:

"Does Virtual Class cost the same tuition as the parallel in-person class?"

The researcher provided the answer to Q1 and a piece of additional information:

"Yes, the tuition of Virtual Class is the same as that of the parallel in-person class. You might also like to know that the tuition for a traditional graduate in-person class is 60% more than a traditional undergraduate in-person class."

The participant then asked Q2:

"When can students start registering for Virtual Class?"

The researcher provided the answer to Q2 and another piece of additional information:

"Students can start registering for Virtual Class at the same time when they start registering for the traditional in-person class. You might also like to know that the date for graduate students to register for traditional in-person classes is three weeks earlier than the date for undergraduate students."

In the first reply by the researcher, "Yes, the tuition of Virtual Class is the same as that of the parallel in-person class" was the requested information and the answer to Q1. However, "the tuition for a traditional graduate in-person class is 60% more than a traditional undergraduate in-person class" was not what the participant wanted to know and was a piece of unwanted additional information. In this case, the researcher "assumed" the additional information was what the participant might also want to know, but it was not. The researcher attempted to achieve

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schema resonance by providing both the requested information and the additional information. Unfortunately, the additional information was unwanted and could not be congruent with the participant's sense-making schema. The attempt to achieve schema resonance failed.

In this first communication round, the participant received the answer to only Q1 and a piece of unwanted additional information. The participant would ask Q2 next.

In the second reply, the researcher also attempted to achieve schema resonance by providing the requested information and the additional information. Because the additional information was still not what the participant wanted to know, the researcher's attempt failed again. In this communication round, the participant received the answer to only Q2 and another piece of unwanted additional information. Schema resonance did not occur.

In this e-service condition, although the researcher provided both the requested information and the additional information in each reply, only the requested information was useful to the participant and was the answer to the question asked by the participant. Only one of the participant's questions was answered in each communication round. The participant had 12 questions to ask, and it should take 12 communication rounds for the participant to get the answers to the 12 questions. The communication for this failed-schema-resonance e-service condition could look like the following transcript. The text inside the parentheses was included to track the number of questions and was not part of the transcript.

"My participation ID is xxxxx. I have some questions to ask

Thank you. You may start asking questions.

(Q1) **Does Virtual Class cost the same tuition as the parallel in-person class?**

Yes, the tuition of Virtual Class is the same as that of the parallel in-person class.
You might also like to know that the tuition for a traditional graduate in-person class is 60% more than a traditional undergraduate in-person class.

(Q2) When can students start registering for Virtual Class?

Students can start registering for Virtual Class at the same time when they start registering for the traditional in-person class.
You might also like to know that the date for graduate students to register for traditional in-person classes is three weeks earlier than the date for undergraduate students.

(Q3) Who is eligible to take Virtual Class?

Only undergraduate students in this university are eligible to take Virtual Class.
You might also like to know that graduate students are eligible to take both graduate-level and undergraduate-level in-person classes.

(Q4) If the traditional in-person class still has openings, can students register for the parallel Virtual Class?

Regardless of whether the traditional in-person class has openings or not, student can register for the Virtual Class if the Virtual Class has openings.
You might also like to know that graduate students cannot register for a traditional in-person class if the class has no openings.

(Q5) Is Virtual Class worth the same credit hours as the parallel in-person class?

Virtual Class is worth the same credit hours as the parallel in-person class.
You might also like to know that graduate students can register for varying number of credit hours when taking a traditional in-person class.

(Q6) If a student didn't attend a Virtual Class session at the scheduled time, can this student make up for the missed Virtual Class session at a later time?

Students must attend a Virtual Class session at the scheduled time and cannot make up for a missed Virtual Class session at a later time, because Virtual Class only offers live online classes.
You might also like to know that graduate students can make up for a missed graduate class session because the professor will record the class session for later use.

(Q7) Is Virtual Class the same as the online class (Online Plus) offered by the university?

Virtual Class is not the same as the Online Plus. Virtual Class can offer live and interactive teaching-learning experience, but the Online Plus doesn't offer live or interactive teaching-learning experience.

You might also like to know that the traditional graduate-level classes are all interactive and given by professors in person.

(Q8) **Can students download the teaching materials in Virtual Class?**

In Virtual Class, students can download the teaching materials unlimited times. You might also like to know that graduate students cannot download teaching materials in a traditional in-person class.

(Q9) **How can students interact with the instructor in Virtual Class?**

To interact with the instructor in Virtual Class, students can either type comments and questions on the live-chatting discussion board or use a microphone to speak and ask questions.
You might also like to know that the graduate in-person class allows graduate students to use email for group discussions and interaction with the instructor.

(Q10) **How do students turn in assignments in Virtual Class?**

In Virtual Class, students will turn in all assignments as Word documents electronically to the Assignment Database of the Virtual Class system.
You might also like to know that graduate students need to send all assignments as PDF files to the instructor via email in a traditional in-person class.

(Q11) **How many Virtual Classes can one student take per semester?**

One student can take no more than two Virtual Classes per semester.
You might also like to know that graduate students can take up to three traditional in person classes per semester.

(Q12) **How can students log in to the Virtual Class system to take a Virtual Class?**

Students need to use their eID and password to log in to the Virtual Class system to take a Virtual Class.
You might also like to know that graduate students need to use CSU ID number and student email to register for graduate in-person classes.

Thank you! I have no more questions."

All pieces of the additional information shown in the above transcript were created by the researcher. The researcher made the additional information related to the requested information but not relevant to what the participants needed to request. By doing this, the researcher

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simulated the situation where what the representative assumes the customer may also want to know is actually not what the customer really also wants to know.

If the participant asked the same question twice, the researcher would provide only the answer to that question again in the reply. None of the participants in this e-service condition asked the same question twice.

Measurements

Independent Variable Measurements

Gender

The participant self-identified his/her gender as male or female in the online survey. The assigned value for male was 1, female was 0.

Experience with instant messaging

Previous studies measured user experience with web, Internet, and online applications. Lehto, Kim, and Morrison (2006) measured web use experience by asking how long (years of web use) the participant had used the Internet. In another study, they used six categories (less than 6 months, 6 months to 1 year, 1-2 years, 3-4 years, 5-6 years, and more than 6 years) to measure "experience with online use" (Kim, Lehto, & Morrison, 2007). Novak, Hoffman, and Yung (2000) measured the construct "Web usage" by measuring three variables—StartWeb (when did you start using the web?), TimeUse (How much time would you estimate that you personally use the web?), and ExpectUse (In the coming year, how much do you expect to use the web, compared to your current level of usage?). Skadberg and Kimmel (2004) used the frequency of visiting virtual tour websites to measure "experience with similar websites." Palmquist and Kim (2000) used four questions (1. Have you ever used any online databases available in the university libraries or any other places? 2. How long have you been using online

databases? 3. How often do you use on-line databases? 4. Could you name any of on-line databases that you have used before?) to measure the "on-line database search experience" and dichotomized the participants into "Novice" and "Experienced" categories based on the participants' answers to the questions.

In this dissertation research, the researcher decided to use the frequency of using the instant messaging to measure experience with the instant messaging. The researcher decided to not use "how long have you used the instant messaging?" to measure this specific type of experience, because, as for a specific technology or service, the length of use may not represent the user's experience with the technology or service. For example, a person used the instant messaging (live chat) once five year ago but never uses it again after that. When asked "how long have you used the instant messaging," the person may report "5-6 years" of use on the six-category scale designed by Kim, Lehto, and Morrison (2007). In this case, this person's reported experience is "high" but he/she actually has "low" experience due to the fact that he/she only used the technology once in the past five years.

The researcher believed that a more accurate measure for experience with a specific technology or service was to measure the frequency of using that technology or service. Given that the sample of this research was college students, the prevalence of the Internet, the availability of the instant messaging on the Internet, and the high computer/web use proficiency level would allow a person to have a lot of experience with a specific internet-based technology or service in a short period of time. The frequency of using a specific internet-based technology or service could represent the level of a user's experience with that technology or service.

A five-item 6-point scale was designed based on previous research (e.g. Palmquist & Kim, 2000; Skadberg & Kimmel, 2004) and used to measure *experience with instant messaging*.

The participants self-identified the frequency of using instant messaging. A brief introduction to the instant messaging and a statement of instant messaging application examples were included in the pre-experiment survey to reduce the participants' misunderstanding of the term "instant messaging." The introduction and example statement was "Instant Messaging (IM) is a type of online chat service which offers real-time text transmission over the Internet. Instant Messaging examples are Yahoo! Messenger, MSN Messenger, AIM Messenger, Google Talk, Skype Instant Messaging, etc." The participants self-reported the frequency of using the instant messaging by answering five questions: "In general, how often do you use instant messaging?"; "How often do you use instant messaging to have conversations with others?"; "How often do you use instant messaging to ask questions?"; "How often do you use instant messaging to exchange information with people?"; and "How often do you use instant messaging to keep in touch with others?" For each question, there were six values (1=Never, 2=Rarely, 3=Sometime, 4=Often, 5=Usually, and 6=Always).

The scale reliability for the experience with instant messaging was achieved (Cronbach's α =.910). Schmitt (1996) pointed out that items could measure more than one factor or dimension even if the correlations among the items are high. Therefore, the researcher decided to conduct a factor analysis to check whether or not the items measures one factor. Factor analysis was conducted. Data reduction commend was used in SPSS. The default "Eigenvalues over 1" extraction method and the "Varimax" rotation method were used. The rotated solution was displayed. The factor analysis result indicated that these five questions measured one factor. A "scale of instant messaging experience" was created by combining items and dividing the combined value by the number of items. "Scale of instant messaging experience" was transferred into "instant message experience level" and was dichotomized into 0 and 1, with the mean value

no more than 3 recoded as "0" (low experience) while the mean value more than 3 recoded as "1" (high experience). The researcher compared the values of "instant message experience level" with the assigned values of "group code" on the task sheets to check whether the initial assignment of the participant's instant messaging experience was correct. The values of "instant message experience level" matched the values of "group code" perfectly.

Dependent Variable Measurements

The effectiveness of e-service communication

To measure the effectiveness of e-service communication, 12 multiple-choice questions about the Virtual Class were used (see Appendix H). These knowledge-related questions were created based on the information provided to the participants during the online communication in the experiment. For each question, the correct answer was coded as "1", while the incorrect answer was coded as "0." The values of the 12 questions were added and the "Knowledge Index" was created. There were 13 possible values for 'Knowledge Index": 0 = no correct answers, 1 = only one correct answer, 2 = two correct answers, etc., with 12 = twelve correct answers. The more correct answers the participant had, the higher score he/she received. The Kuder-Richardson-20 reliability analysis (KR20=.79) was conducted.

Satisfaction with the overall e-service

Ives and colleagues (1983) suggested measuring user satisfaction on a multiple-item scale. Danaher and Haddrell (1996) found out that measuring customer satisfaction with a single-item scale had been criticized for having questionable reliability and that recent studies tended to use multiple items to measure customer satisfaction.

The measure of the "satisfaction with the overall e-service" in this research was adapted from the studies that used multiple-item scale to measure the overall customer satisfaction

(Danaher & Haddrell, 1996; Wang, Tang, & Tang, 2001; Hu, Cheng, Chiu, & Hong, 2011; American Customer Satisfaction Index, 2009). A four-item, 7-point scale was used to measure the satisfaction with the overall e-service. The participant answered four questions in the online survey: "Overall, how satisfied are you with the service provided by the representative?" (1= Very Dissatisfied, 7= Very Satisfied), "How well does the service provided by the representative meet your expectations?" (1=Fails to Meet, 7= Greatly Exceeds), "Please imagine an ideal service you may receive. How well do you think the service provided by the representative compares with that ideal service?" (1=Not Very Close to the Ideal, 7=Very Close to the Ideal), and "How would you rate the overall service provided by the representative?" (1=Terrible, 7=Excellent). Factor analysis was conducted and indicated that these four questions measured one component. The scale reliability was achieved (Cronbach's α =.901). Question items were combined, a "scale of overall satisfaction" was created, and mean scores were computed.

Lee (2006) suggested that every study could measure multiple customer satisfaction factors by adopting suitable scales for the feature of the study. Previous studies also measured multiple key components of user/customer satisfaction (e.g., Bailey & Pearson, 1983; Ives et al., 1983; Wang et al., 2001). Therefore, the measures of satisfaction with two key components of the e-service (the communication approach and the information) were also developed in this research.

A four-item, 7-point scale was used to measure the satisfaction with the communication approach used by the representative. A brief statement explaining the term "communication approach" was presented to the participants in the online survey. The statement was "Communication approach is the question-responding technique the representative used to provide the information you requested." After reading the statement, the participants indicated

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the degree to which they agreed with four statements: "Overall, the communication approach used by the representative satisfied me," "The representative's communication approach made it difficult to complete all my tasks" (reversed item), "The representative's communication approach helped obtain the information I needed," and "The representative's communication approach saved time in solving my questions." The values of these measures were from 1 to 7, where 1 meant "Strongly Disagree" and 7 meant "Strongly Agree." The values of the reversed item were reverse-coded. Factor analysis was conducted and indicated that these four items measured one factor. The scale reliability was achieved (Cronbach's α =.799). Items were combined, a "scale of communication approach satisfaction" was created, and mean scores were computed.

A four-item, 7-point scale was used to measure the satisfaction with the information provided by the representative. The participants indicated the degree to which they agreed with four statements: "The information provided by the representative satisfies me," "The information provided by the representative meets my expectations," "The information provided by the representative does not fulfill my needs" (reversed item), and "The information provided by the representative helps solve my questions." The values of these measures were from 1 to 7, where 1 meant "Strongly Disagree" and 7 meant "Strongly Agree." The values of the reversed item were reverse-coded. Factor analysis was conducted and indicated that these four items measured one factor. The scale reliability was achieved (Cronbach's α =.901). Items were combined, a "scale of information satisfaction" was created, and mean scores were computed.

Intent to continue using the e-service

A four-item, 7-point scale was used to measure the "intent to continue using the e-service." The scale items were developed from measures used in previous behavioral intention

research (e.g., Ajzen, 2002b; Norman & Conner, 1996; Rise, Kovac, Kraft, & Moan, 2008). The participant read the following question in the online survey: "In the future, if you have access to this type of online service, what will you do?" After reading this question, the participant indicated the degree to which he/she agreed with the four statements: "I intend to continue using this type of online service," "I will not use this type of online service to seek assistance in the future" (reversed item), "I do not plan to use this type of online service again to get information I want" (reversed item), and "I would use this type of online service to help me solve problems in the future." The values of these measures were from 1 to 7, where 1 meant "Strongly Disagree" and 7 meant "Strongly Agree." The values of the two reversed items were reverse-coded. Factor analysis was conducted and indicated that these four items measured one factor. The scale reliability was achieved (Cronbach's α =.908). Items were combined, a "scale of information satisfaction" was created, and mean scores were computed.

Manipulation Check Measurement

A manipulation check question was included in the online post-experiment survey to check whether or not the participant was aware of the manipulation used in the e-service condition. To avoid priming the participants, the manipulation check question was asked after all of the questions measuring independent variables and dependent variables were asked.

The manipulation check question was a multiple-choice question: "In each message provided by the online service representative, how did the representative respond to the question you were asking? A. The representative provided the answer to the question that I was asking, and he/she also provided information that I was going to request. B. The representative provided the answer to the question I was asking, but he/she also provided information that I did not want

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to know. C. The representative provided the answer to the question I was asking. D. The representative did not provide the answer to the question that I was asking."

If the manipulation worked, participants in the schema-resonance e-service condition would choose "A." Participants in the non-schema-resonance e-service condition would choose "C." Participants in the failed-schema-resonance e-service condition would choose "B."

The value for answer A was 1, which was also the number standing for the schema-resonance e-service condition. The value for answer B was 3, which was also the number standing for the failed-schema-resonance e-service condition. The value for answer C was 2, which was also the number standing for the non-schema-resonance e-service condition. The value for answer D was 0.

A total of 16 participants failed the manipulation check and their survey entries were excluded from the subsequent analysis.

Other Demographic Measurements

Age

The participant reported his/her age at last birthday. The value was the age reported by the participant.

Education

The participant identified the highest education level he/she had. Since the participants were college students, five categories were included: freshman, sophomore, junior, senior, and graduate. The value for freshman was 1. The value for sophomore was 2. The value for junior was 3. The value for senior was 4. The value for graduate was 5.

International Student Status

The participant self-identified in the online survey whether he/she was an international student. The value for "Yes" was 1. The value for "No" was 0.

Race/Ethnicity

The participant self-reported his/her race/ethnicity in the online survey. The race/ethnicity categories included Hispanic/Latino, White (a person having origins in any of the original peoples of Europe, the Middle East, or North Africa), African American/Black, American Indian/Alaska Native, Asian, Native Hawaiian/Other Pacific Islander, and Some Other Race. Participants were instructed to select all that apply. Each race/ethnicity was coded as 0 or 1 in SPSS where 0= not checked and 1=checked. The race/ethnicity was re-coded in one column with values from 0 to 8. If the participant didn't check any of these options, the value for race/ethnicity was 0. The value for Hispanic/Latino was 1, White 2, African American/Black 3, American Indian/Alaska Native 4, Asian 5, Native Hawaiian/Other Pacific Islander 6, and Some Other Race 7. If the participant selected "Some Other Race," the participant was asked to specify the race. If the participant identifies himself/herself as more than one race or ethnicity, the value was 8.

College Affiliation

The participant self-reported which college(s) he/she was currently affiliated with at Colorado State University (Fort Collins). Participants were instructed to select all that apply. There are eight colleges at CSU, Fort Collins campus (http://admissions.colostate.edu/colleges). The eight colleges on the survey were College of Agricultural Sciences, College of Business, College of Engineering, College of Health and Human Sciences, College of Liberal Arts, Warner College of Natural Resources, College of Natural Sciences, and College of Veterinary Medicine

& Biomedical Sciences. The participants also had the option to choose "I don't know" or "None of these." The participant would be asked to specify the college if he/she chose "None of these." If a participant did not recognize the colleges and specified the "major" instead of the "college," the researcher checked which college offered the major the participant specified and reassign the right value for the college with which the participant was affiliated. If the participant was affiliated with more than one college, he/she could select all the colleges he/she was affiliated with. Each college was coded as 0 or 1 in SPSS where 0= not checked and 1=checked. The college affiliation was re-coded in one column with values from 1 to 11.There were 11 values for college affiliation: 1=College of Agricultural Sciences, 2=College of Business, 3=College of Engineering, 4=College of Health and Human Sciences, 5=College of Liberal Arts, 6=Warner College of Natural Resources, 7=College of Natural Sciences, 8=College of Veterinary Medicine & Biomedical Sciences, 9=I don't know, 10= None of these, 11= affiliated with more than one college.

Experience with non-live online class

A 7-point scale was used for this measurement. The participant answered the question: "In general, do you have any experience with non-live online classes?" The value of this measurement was from 1 to 7, where 1 meant "No Experience At All" and 7 meant "A Lot of Experience."

Experience with live, interactive online class

A 7-point scale was used for this measurement. The participant answered the question: "In general, do you have any experience with live, interactive online classes?" The value of this measurement was from 1 to 7, where 1 meant "No Experience At All" while 7 meant "A Lot of Experience."

Measurement for Question-order-ranking Survey

There were 12 questions regarding the Virtual Class on the question-order-ranking survey questionnaire (Appendix K). The participants ranked the twelve questions from 1 to 12, where 1 meant the most-want-to-ask question, while 12 meant the least-want-to-ask question. The participants were instructed to use each number (1-12) only once. The participants were instructed to not use the same number to rank two or more questions. The value for the most-want-to-ask question ranked as "1" was 1, the value for the second most-want-to-ask question ranked as "2" was 2, etc., and the value for the least-want-to-ask question ranked as "12" was 12. The researcher added up all the values for each question. The question which had the smallest value was the most-want-to-know question, the question which had the second smallest value was the second most-want-to-know question, etc., and the question which had the largest value was the least-want-to-know question.

Pretests

Three pretests were conducted by the researcher to check whether the procedure, the manipulation, and survey questions needed improvement.

A convenience sample of eighty-two student participants was used for the first pretest. Students were recruited from a large communication course JTC300. The first pretest was conducted to examine the reliability and validity of measurements and to detect potential problems with the experimental procedure. Participants were randomly assigned to the three e-service conditions. Seventy-nine participants completed the experiment.

The Cronbach's alpha was .946 for the scale of "intent to continue using the e-service." Although .90 has been recommended as the maximum Cronbach's alpha value (Streiner, 2003), the acceptable alpha values in different reports range from .07 to .95 (Tavakol & Dennick, 2011).

A high value of alpha (> .90) may suggest the test length could be shortened and the number of items could be reduced (Tavakol & Dennick, 2011). A high alpha may suggest the redundancies of items that ask the same question in slightly different ways (Streiner & Norman, 1989). The researcher noticed that the value of Cronbach's alpha (.946) for the scale of "intent to continue using the e-service" was high. After examining the items, the researcher found out that the items did indeed ask the same question in slightly different ways. In the first pretest, the researcher used five statements to measure the intent: "I intend to continue using this online service to ask questions," "I will not continue using this online service to ask questions" (reversed item), "I plan to continue using this online service to ask questions," "I don't want to continue using this online service to ask questions" (reversed item), and "I expect to continue using this online service to ask questions". The items asked whether or not to continue using the online service to ask questions in differently ways. The researcher redesigned the measurement and used four items to measure the different aspects of the same factor—intent to continue using the e-service. These four items, as shown in Appendix H, were used in the actual experiment. The Cronbach's alpha value for these four redesigned items was .887 in the second and third pretests.

In the first pretest, participants in the schema-resonance condition were not more satisfied with the overall e-service, the communication approach, or the information than those in the non-schema-resonance e-service condition. The researcher assumed that the old version of the introduction and instructions (Appendix M) used in the pretest was too long and complicated. It could cause the participants' fatigue. The participants might not be sensitive to the treatment due to fatigue. Therefore, the researcher revised the introduction and instructions sheet and made it more reader-friendly. The revised version, as shown in Appendix D, was the version used in the actual experiment.

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In addition to the manipulation check question used in the actual experiment, the researcher also used another manipulation check question in the first pretest: "In the communication, did the online representative successfully predict the question you were going to ask next?" The three options for this question was Yes, No, and Not Sure. However, this manipulation check question did not work. Many participants chose "Not Sure" even though they were in the schema-resonance condition. The researcher decided to delete this manipulation question.

In the first pretest, the researcher also noticed that some participants typed the next question during the time they were waiting for the response to the last question, while others didn't type during the waiting time and only started typing the next question when they received the response to the last question. The researcher considered making "Don't type the next question before you receive and read the reply of the representative" a rule. However, making this rule could decrease the ecological validity and also could introduced a confound (undesired waiting time) to the experiment design. The researcher decided not to make this a rule and instructed the participants to "ask the questions at your own pace."

In the first pretest, the researcher also noticed that it took longer time for the researcher to type the same responses in the afternoon if many experiment sessions were conducted in the morning. The researcher felt tired in the afternoon after typing all morning. This could be a problem, because the inconsistent typing speed could affect the time the participant spent on the e-service communication. The researcher needed to make the typing speed consistent. Therefore, the researcher decided to copy and paste the responses to the chatting box of the instant messaging window instead of typing the responses. Also, the researcher tracked how much time was needed to type the response to every question in the three different conditions. The

researcher pasted the response in the chatting box, waited for the same length of time which the researcher would need to type the same response, and then click the "Enter" key to post the response on the chatting window. By doing so, the typing speed of the researcher was kept consistent.

The researcher would wait 11 seconds after the participant started a conversation and then post "Thank you. You may start asking questions." The times the researcher needed to wait to post a response after a question was asked are listed in Table 4.

Table 4: *Time Researcher Waited before Posting Response*

Schema-Resonance E-service Condition											
Question	Q1 (Q2)		Q3 (Q4)		Q5 (Q6)		Q7 (Q8)		Q9 (Q10)		Q11 (Q12)
Time	25s		26s		28s		28s		30s		24s
Non-Schema-Resonance E-service Condition											
Question	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Time	12s	13s	12s	14s	12s	16s	16s	12s	16s	14s	11s	13s
Failed-Schema-Resonance E-service Condition											
Question	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Time	22s	25s	22s	26s	23s	27s	27s	22s	26s	25s	20s	23s

In the first pretest, the researcher noticed that some participants encountered computer technical issues and could not complete the experimental session. Some participants quit in the middle of the experiment. The researcher also noticed that some participants just wanted to get over with the experiment to receive extra credit, did not take the experiment seriously, and only asked a few of the questions. Because those participants did not complete the task or did not follow the instructions to complete the task, those participants should be excluded from the research. The researcher made the fowling participant exclusion criterion: If a participant didn't complete the experiment due to a computer technical issue, decided to quit in the middle of the

experiment session, or didn't took the experiment seriously and only obtained answers to eight or fewer questions, the participant would be excluded from the research. The researcher excluded participants who only obtained answers to eight or fewer questions, because the first pretest showed that participants who obtained answers to eight questions completed all of the tasks and obtained all of the 12 answers while participants who only obtained eight or fewer answers ended the communication and did not complete the tasks.

Because no significant differences were found between the schema-resonance e-service condition and the non-schema-resonance e-service condition in terms of the overall e-service satisfaction, communication approach satisfaction, and information satisfaction in the first pretest, the researcher decided to conduct another pretest only for the schema-resonance condition and the non-schema-resonance e-service condition. The second pretest was limited and only 18 participants participated. The second pretest was conducted to examine the revised experimental procedure, used the revised materials, and used a convenience sample from the same large communication course. The results showed that there were still no significant differences in the overall satisfaction, the communication approach satisfaction, and the information satisfaction between these two conditions. The researcher reexamined the materials used in the experiment to try to find out the reason and realized that participants might not form necessary sense-making schemas in mind before they asked questions. The old version of the task sheet (Appendix N) listed the questions after the instructions. When the participants finished reading the instructions, they might not read all the 12 questions carefully as instructed before they started the conversation. If the participants didn't read all the questions or know what they needed to ask before they started the conversation, they may not form the sense-making schemas in mind which could recognize and resonate with the additional information. To ensure that the

participants would form the necessary sense-making schemas before they started the online conversation, the researcher decided to put all of the questions before the instructions on the task sheet and warn the participants that they would need to know what they needed to ask before the conversation started. The new version of the task sheet was the task sheet (Appendix F) used in the actual experiment.

The third pretest was also conducted using a convenience sample from the same large communication course. The third pretest was conducted to examine the satisfaction levels. The third pretest followed the same experimental procedure as the second pretest but used the revised task sheet. The third pretest was also limited, and 12 participants were randomly assigned to either the schema-resonance condition or the non-schema-resonance condition. The means of the satisfaction variables were higher in the schema-resonance condition than in the non-schema-resonance condition. The trend was in the direction the research proposed.

After these three pretests were conducted, the researcher started the actual experiment and data collection.

IRB Review

The researcher submitted the IRB application form and applied for IRB approval for this dissertation research protocol on September 28, 2014. The IRB requested clarification and additional information regarding the sample size and the experiment procedure on November 4, 2014. The researcher made changes to the research protocol according to the IRB's suggestions. The researcher submitted the revised protocol with the requested information on November 6, 2014. The IRB approved this dissertation research protocol on November 7, 2014. The IRB approval was obtained before the pretests and the actual experiment were conducted.

Data Analysis

The researcher used IBM SPSS 22 to enter, clean, reduce, and analyze data. All the data collected from the online survey, the pre-experiment survey, and the coding sheets were entered into SPSS 22. The researcher clean the data by examining the typos made by the participants in the online survey and checked if the participation identification numbers and condition numbers were correctly entered. Manipulation check question was used to exclude cases from the data where the manipulation failed. The researcher also excluded four cases which included contradictory responses. After cleaning and reducing the data, the researcher conducted the scale reliability analysis, factor analysis, created new scales for satisfaction variables and the intent variable, constructed the additive index for the knowledge variable, and ran appropriate statistical tests to test the hypotheses and answer the research questions.

RESULTS

The normality of the dependent variables was tested. As shown in Table 5, the Shapiro-Wilk normality test results, skewness values, and kurtosis values indicated that all the dependent variables (knowledge, e-service users' overall satisfaction, satisfaction with communication approach, satisfaction with information, behavior intention of using e-service, time of e-service, and communication rounds of e-service) were not normally distributed.

Table 5: *Statistics for Skewness, Kurtosis, and Normality Test*

	N	Skewness		Kurtosis		Shapiro-Wilk		
	Statistic	Statistic	Std. Error	Statistic	Std. Error	Statistic	df	Sig.
Knowledge	389	-2.658	.124	8.529	.247	.573	389	.000
Overall E-service Satisfaction	389	-1.624	.124	3.651	.247	.838	389	.000
Communication Approach Satisfaction	389	-1.562	.124	2.766	.247	.814	389	.000
Information Satisfaction	389	-1.944	.124	4.869	.247	.754	389	.000
Intent to Continue Using E-service	389	-.887	.124	.290	.247	.919	389	.000
Valid N (listwise)	389							

According to IBM guidelines for transforming variable to normality ("Transforming Variable," n.d.), data transformation was conducted to try to transform all the dependent variables to normality. For example, for the positively skewed variables (time of e-service), logarithmic transformations were conducted. Commends of LG10, LG10 (variable+1), LN, and

LN (variable+1) were used respectively in attempt to transform the variables to normality. Unfortunately, the transformed variables were still highly positively skewed and also failed the normality test. For the negatively skewed variables (knowledge, communication rounds, overall satisfaction, satisfaction with communication approach, satisfaction with information, and behavior intention of using e-service), exponential and power transformations were conducted. Commends of EXP (variable), 2**variable, and variable**3 were used respectively in attempt to transform the variables to normality. Unfortunately, the transformed variables were still negatively skewed and also failed the normality test.

Because both the raw scores and the transformed scores of the dependent variables were not normally distributed, the nonparametric test Wilcoxon-Mann-Whitney test was conducted on the raw scores to test the hypotheses and answer research questions that were proposed to compare means between two groups. Although medians are usually reported for non-parametric tests ("Reporting Statistics," n.d.), the researcher decided to report both medians and means in order to have a better understanding of the raw data. In addition, r, as a measure of effect size (Cohen, 1988) was calculated by dividing Z by the square root of N ($r = Z / \sqrt{N}$) (Fritz, Morris, & Richler, 2011) and reported in the text. According to Cohen (1988), for r, a small effect size is .1; a medium effect is .3; a large effect size is .5.

For the purpose of clarity of expression, the term "SR" was used in the tables to stand for the schema-resonance e-service condition, "Non-SR" for the non-schema-resonance e-service condition, and "Failed SR" for the failed-schema-resonance e-service condition.

The descriptive statistics of dependent variables for the schema-resonance e-service condition and the non-schema-resonance e-service condition can be found in Table 6.

Table 6: *Statistics of Dependent Variables in SR and Non-SR Conditions*

	Condition	N	Mean Rank	Sum of Ranks
Knowledge	SR	130	127.71	16602.00
	Non-SR	131	134.27	17589.00
Overall E-service Satisfaction	SR	130	140.15	18219.00
	Non-SR	131	121.92	15972.00
Communication Approach Satisfaction	SR	130	143.27	18624.50
	Non-SR	131	118.83	15566.50
Information Satisfaction	SR	130	142.36	18507.00
	Non-SR	131	119.73	15684.00
Intent to Continue Using E-service	SR	130	135.30	17589.00
	Non-SR	131	126.73	16602.00

The Mann-Whitney U test results for schema-resonance e-service condition and non-schema-resonance e-service condition are presented in Table 7.

Table 7: *Mann-Whitney U Test Results for SR Condition and Non-SR Condition Comparison*

	Knowledge	Overall E-service Satisfaction	Communication Approach Satisfaction	Information Satisfaction	Intent to Continue Using E-service
Mann-Whitney U	8087.000	7326.000	6920.500	7038.000	7956.000
Wilcoxon W	16602.000	15972.000	15566.500	15684.000	16602.000
Z	-.919	-1.984	-2.700	-2.624	-.922
Asymp. Sig. (1-tailed)	.179	**.024**	**.004**	**.005**	.179

Grouping Variable: Condition

The descriptive statistics of dependent variables for the schema-resonance e-service condition and the failed-schema-resonance e-service condition can be found in Table 8.

Table 8: *Statistics of Dependent Variables in SR and Failed-SR Conditions*

	Condition	N	Mean Rank	Sum of Ranks
Knowledge	SR	130	136.55	17752.00
	Failed SR	128	122.34	15659.00
Overall E-service Satisfaction	SR	130	150.75	19597.50
	Failed SR	128	107.92	13813.50
Communication Approach Satisfaction	SR	130	153.00	19889.50
	Failed SR	128	105.64	13521.50
Information Satisfaction	SR	130	153.42	19944.00
	Failed SR	128	105.21	13467.00
Intent to Continue Using the E-service	SR	130	142.47	18521.00
	Failed SR	128	116.33	14890.00

The Mann-Whitney U test results for schema-resonance e-service condition and failed-schema-resonance e-service condition are presented in Table 9.

Table 9: *Mann-Whitney U Test Results for SR Condition and Failed-SR Condition Comparison*

	Knowledge	Overall E-service Satisfaction	Communication Approach Satisfaction	Information Satisfaction	Intent to Continue Using E-service
Mann-Whitney U	7403.000	5557.500	5265.500	5211.000	6634.000
Wilcoxon W	15659.000	13813.500	13521.500	13467.000	14890.000
Z	-1.849	-4.662	-5.220	-5.437	-2.825
Asymp. Sig. (1-tailed)	**.032**	**.000**	**.000**	**.000**	**.003**

Grouping Variable: Condition

The medians of the dependent variables in the three e-service conditions are presented in Table 10.

Table 10: *Medians of Dependent Variables in SR, Non-SR, and Failed-SR Conditions*

Condition			Knowledge	Overall E-service Satisfaction	Communication Approach Satisfaction	Information Satisfaction	Intent to Continue Using E-service
SR	N	Valid	130	130	130	130	130
		Missing	0	0	0	0	0
		Median	12.00	6.75	6.75	7.00	6.00
Non-SR	N	Valid	131	131	131	131	131
		Missing	0	0	0	0	0
		Median	12.00	6.50	6.50	6.75	5.75
Failed SR	N	Valid	128	128	128	128	128
		Missing	0	0	0	0	0
		Median	12.00	6.00	6.00	6.25	5.25

Results for Research Questions and Hypotheses

Wilcoxon-Mann-Whitney test was conducted on the raw scores to test the hypotheses and answer research questions that were proposed to compare means between two groups.

RQ1 asked if, compared to the e-service users in the non-schema-resonance e-service condition, the e-service users in the schema-resonance e-service condition would show a similar level of knowledge about the information they obtained.

Yes. The e-service users in the schema-resonance e-service condition (*Mdn*=12) showed a similar level of knowledge about the information they obtained as did their counterparts in the non-schema-resonance e-service condition (*Mdn*=12). E-service users in schema-resonance e-service condition answered an average of 11.61 (*SD*=.76) out of 12 knowledge-related questions correctly, while users in non-schema-resonance e-service condition got 11.66 (*SD*=.77) questions

right on average. Mann-Whitney U test results showed that there was no significant difference (U=8087, p=.179, r=.057) in knowledge level of e-service users between the schema-resonance e-service condition and the non-schema-resonance e-service condition.

RQ2 asked if, compared to the e-service users in the failed-schema-resonance e-service condition, the e-service users in the schema-resonance e-service condition would show a similar level of knowledge about the information they obtained.

No. The e-service users in the schema-resonance e-service condition (*Mdn*=12) did not show a similar level of knowledge about the information they obtained as did their counterparts in the failed-schema-resonance e-service condition (*Mdn*=12). E-service users in the schema-resonance e-service condition answered an average of 11.61 (*SD*=.76) out of 12 knowledge-related questions correctly, while users in the failed-schema-resonance e-service condition got 11.30 (*SD*=1.17) questions right on average. Mann-Whitney U test results showed that there was a significant difference (U=7403, p=.032, r=.115) in knowledge level of e-service users between the schema-resonance e-service condition and the failed-schema-resonance e-service condition.

H1a proposed that, compared to the e-service users in the non-schema-resonance e-service condition, the e-service users in the schema-resonance e-service condition would be more satisfied with the overall e-service.

Hypothesis 1a was supported. E-service users in the schema-resonance e-service condition (*Mdn*=6.75) were more satisfied with the overall e-service than were the e-service users in the non-schema-resonance e-service condition (*Mdn*=6.50). E-service users in the schema-resonance e-service condition had a mean score of 6.42 (*SD*=.65) out of 7 on satisfaction with the overall e-service, while e-service users in the non-schema-resonance e-service condition had a mean score of 6.23 (*SD*=.77). Mann-Whitney U test results showed that there was a

statistically significant difference (*U*=7326, *p*=.024, *r*=.123) in satisfaction with the overall e-service between the schema-resonance e-service condition and the non-schema-resonance e-service condition.

H1b proposed that, compared to the e-service users in the failed-schema-resonance e-service condition, e-service users in the schema-resonance e-service condition would be more satisfied with the overall e-service.

Hypothesis 1b was supported. E-service users in the schema-resonance e-service condition (*Mdn*=6.75) were more satisfied with the overall e-service than were the e-service users in the failed-schema-resonance e-service condition (*Mdn*=6.00). E-service users in the schema-resonance e-service condition had a mean score of 6.42 (*SD*=.65) out of 7 on satisfaction with the overall e-service, while e-service users in the failed-schema-resonance e-service condition had a mean score of 5.89 (*SD*=1.06). Mann-Whitney U test results showed that there was a statistically significant difference (*U*=5557.5, *p*<.001, *r*=.290) in satisfaction with the overall e-service between the schema-resonance e-service condition and the failed- schema-resonance e-service condition.

H2a proposed that, compared to the e-service users in the non-schema-resonance e-service condition, e-service users in the schema-resonance e-service condition would be more satisfied with the communication approach used by the online representative.

Hypothesis 2a was supported. E-service users in the schema-resonance e-service condition (*Mdn*=6.75) were more satisfied with the communication approach used by the online representative than were the e-service users in the non-schema-resonance e-service condition (*Mdn*=6.5). E-service users in the schema-resonance e-service condition had a mean score of 6.51 (*SD*=.68) out of 7 on satisfaction with the communication approach, while e-service users in

the non-schema-resonance e-service condition had a mean score of 6.29 (*SD*=.80). Mann-Whitney U test results showed that there was a statistically significant difference (*U*=6920.5, *p*=.004, *r*=.167) in satisfaction with the communication approach between the schema-resonance e-service condition and the non-schema-resonance e-service condition.

H2b proposed that, compared to the e-service users in the failed-schema-resonance e-service condition, e-service users in the schema-resonance e-service condition would be more satisfied with the communication approach used by the online representative.

Hypothesis 2b was supported. E-service users in the schema-resonance e-service condition (*Mdn*=6.75) were more satisfied with the communication approach used by the online representative than were the e-service users in the failed-schema-resonance e-service condition (*Mdn*=6). E-service users in the schema-resonance e-service condition had a mean score of 6.51 (*SD*=.68) out of 7 on satisfaction with the communication approach, while e-service users in the failed-schema-resonance e-service condition had a mean score of 5.89 (*SD*=1.10). Mann-Whitney U test results showed that there was a statistically significant difference (*U*=5265.5, *p*<.001, *r*=.325) in satisfaction with the communication approach between the schema-resonance e-service condition and the failed-schema-resonance e-service condition.

H3a proposed that, compared to the e-service users in the non-schema-resonance e-service condition, e-service users in the schema-resonance e-service condition would be more satisfied with the information provided by the online representative.

Hypothesis 3a was supported. E-service users in the schema-resonance e-service condition (*Mdn*=7.00) were more satisfied with the information provided by the online representative than were the e-service users in the non-schema-resonance e-service condition (*Mdn*=6.75). E-service users in the schema-resonance e-service condition had a mean score of

6.63 (*SD*=.59) out of 7 on satisfaction with the information, while e-service users in the non-schema-resonance e-service condition had a mean score of 6.42 (*SD*=.72). Mann-Whitney U test results showed that there was a statistically significant difference (*U*=7038, *p*=.005, *r*=.162) in satisfaction with the information between the schema-resonance e-service condition and the non-schema-resonance e-service condition.

H3b proposed that, compared to the e-service users in the failed-schema-resonance e-service condition, e-service users in the schema-resonance e-service condition would be more satisfied with the information provided by the online representative

Hypothesis 3b was supported. E-service users in the schema-resonance e-service condition (*Mdn*=7.00) were more satisfied with the information provided by the online representative than were the e-service users in the failed-schema-resonance e-service condition (*Mdn*=6.25). E-service users in the schema-resonance e-service condition had a mean score of 6.63 (*SD*=.59) out of 7 on satisfaction with the information, while e-service users in the failed-schema-resonance e-service condition had a mean score of 6.02 (*SD*=1.11). Mann-Whitney U test results showed that there was a statistically significant difference (*U*=5211, *p*<.001, *r*=.338) in satisfaction with the information between the schema-resonance e-service condition and the failed-schema-resonance e-service condition.

H4a proposed that, compared to the e-service users in the non-schema-resonance e-service condition, e-service users in the schema-resonance e-service condition would show greater intent to continue using the e-service.

Hypothesis 4a was not supported. E-service users in the schema-resonance e-service condition (*Mdn*=6.00) didn't show greater intent to continue using the e-service than did the e-service users in the non-schema-resonance e-service condition (*Mdn*=5.75). E-service users in

the schema-resonance e-service condition had a mean score of 5.61 (SD=1.29) out of 7 on intent to continue using the e-service, while e-service users in the non-schema-resonance e-service condition had a mean score of 5.49 (SD=1.28). Mann-Whitney U test results showed that there was no significant difference (U=7956, p=.179, r=.057) in intent to continue using the e-service between the schema-resonance e-service condition and the non-schema-resonance e-service condition.

H4b proposed that, compared to the e-service users in failed-schema-resonance e-service condition, e-service users in the schema-resonance e-service condition would show greater intent to continue using the e-service.

Hypothesis 4b was supported. E-service users in the schema-resonance e-service condition (Mdn=6.00) showed greater intent to continue using the e-service than did the e-service users in failed-schema-resonance e-service condition (Mdn=5.25). E-service users in the schema-resonance e-service condition had a mean score of 5.61 (SD=1.29) out of 7 on intent to continue using the e-service, while e-service users in the failed-schema-resonance e-service condition had a mean score of 5.15 (SD=1.41). Mann-Whitney U test results showed that there was a statistically significant difference (U=6634, p=.003, r=.176) in intent to continue using the e-service between the schema-resonance e-service condition and the failed- schema-resonance e-service condition.

Research Questions 3 and Hypotheses 5a-d were proposed to test the gender effects on the dependent variables in the schema-resonance e-service condition.

The medians of the dependent variables for females and males in the schema-resonance e-service condition are presented in Table 11.

Table 11: *Medians of Dependent Variables in SR Condition for Females and Males*

Condition			Knowledge	Overall E-service Satisfaction	Communication Approach Satisfaction	Information Satisfaction	Intent to Continue Using E-service
Female	N	Valid	69	69	69	69	69
		Missing	0	0	0	0	0
		Median	12.00	6.75	7.00	7.00	6.25
Male	N	Valid	61	61	61	61	61
		Missing	0	0	0	0	0
		Median	12.00	6.50	6.50	6.75	5.50

The descriptive statistics of gender in the schema-resonance e-service condition are presented in Table 12.

Table 12: *Statistics of Gender in SR Condition*

	Gender	N	Mean Rank	Sum of Ranks
Knowledge	Female	69	68.60	4733.50
	Male	61	61.99	3781.50
Overall E-service Satisfaction	Female	69	72.47	5000.50
	Male	61	57.61	3514.50
Communication Approach Satisfaction	Female	69	73.38	5063.50
	Male	61	56.58	3451.50
Information Satisfaction	Female	69	73.12	5045.50
	Male	61	56.88	3469.50
Intent to Continue Using E-service	Female	69	74.14	5115.50
	Male	61	55.73	3399.50

The Mann-Whitney U test results for gender in the schema-resonance e-service condition are presented in Table 13.

Table 13: *Mann-Whitney U Test Results for Gender Comparison in SR condition*

	Knowledge	Overall E-service Satisfaction	Communication Approach Satisfaction	Information Satisfaction	Intent to Continue Using E-service
Mann-Whitney U	1890.500	1623.500	1560.500	1578.500	1508.500
Wilcoxon W	3781.500	3514.500	3451.500	3469.500	3399.500
Z	-1.264	-2.299	-2.687	-2.761	-2.799
Asymp. Sig. (1-tailed)	.103	**.011**	**.004**	**.003**	**.003**

Grouping Variable: Gender

RQ3 asked if, in the schema-resonance e-service condition, females and males would show similar levels of knowledge about the information they obtained.

Yes. In the schema-resonance e-service condition, females (*Mdn*=12.00) and males (*Mdn*=12.00) showed similar levels of knowledge about the information they obtained. Females answered an average of 11.72 (*SD*=.51) out of 12 knowledge-related questions correctly, while males got 11.48 (*SD*=.96) questions right on average. Mann-Whitney U test results showed that there was no significant difference (*U*=1890.5, *p*=.103, *r*=.111) in knowledge level between females and males in the schema-resonance e-service condition.

H5a proposed that, in the schema-resonance e-service condition, females would be more satisfied with the overall e-service than would males.

Hypothesis 5a was supported. In the schema-resonance e-service condition, females (*Mdn*=6.75) were more satisfied with the overall e-service than were males (*Mdn*=6.50). Females in the schema-resonance e-service condition had a mean score of 6.56 (*SD*=.52) out of 7 on satisfaction with the overall e-service, while males had a mean score of 6.26 (*SD*=.75). Mann-Whitney U test results showed that there was a statistically significant difference (*U*=1623.5,

p=.011, r=.202) in satisfaction with the overall e-service between females and males in the schema-resonance e-service condition.

H5b proposed that, in the schema-resonance e-service condition, females would be more satisfied with the communication approach used by the online representative than would males.

Hypothesis 5b was supported. In the schema-resonance e-service condition, females (*Mdn*=7.00) were more satisfied with the communication approach used by the online representative than were males (*Mdn*=6.50). Females in the schema-resonance e-service condition had a mean score of 6.66 (*SD*=.58) out of 7 on satisfaction with the communication approach, while males had a mean score of 6.34 (*SD*=.74). Mann-Whitney U test results showed that there was a statistically significant difference (*U*=1560.5, p=.004, r=.236) in satisfaction with the communication approach between females and males in the schema-resonance e-service condition.

H5c proposed that, in the schema-resonance e-service condition, females were more satisfied with the information provided by the online representative than males.

Hypothesis 5c was supported. In the schema-resonance e-service condition, females (*Mdn*=7.00) were more satisfied with the information provided by the online representative than were males (*Mdn*=6.75). Females in the schema-resonance e-service condition had a mean score of 6.76 (*SD*=.45) out of 7 on satisfaction with the information, while males had a mean score of 6.48 (*SD*=.69). Mann-Whitney U test resulted show that there was a statistically significant difference (*U*=1578.5, p=.003, r=.242) in satisfaction with the information between females and males in the schema-resonance e-service condition.

H5d proposed that, in the schema-resonance e-service condition, females would show greater intent to continue using the e-service than would males.

Hypothesis 5d was supported. In the schema-resonance e-service condition, females (*Mdn*=6.25) showed greater intent to continue using the e-service than did males (*Mdn*=5.50). Females in the schema-resonance e-service condition had a mean score of 5.89 (*SD*=1.18) out of 7 on intent to continue using the e-service, while males had a mean score of 5.30 (*SD*=1.34). Mann-Whitney U test results showed that there was a statistically significant difference (*U*=1508.5, *p*=.003, *r*=.245) in intent to continue using the e-service between females and males in the schema-resonance e-service condition.

Research Questions 4 and Hypotheses 6a-d were proposed to test the effects of instant messaging experience on the dependent variables in the schema-resonance e-service condition.

The descriptive statistics of instant messaging experience in the schema-resonance e-service condition are presented in Table 14.

Table 14: *Statistics of Instant Messaging Experience in SR Condition*

	Experience with Instant Messaging	N	Mean Rank	Sum of Ranks
Knowledge	Low	64	68.67	4395.00
	High	66	62.42	4120.00
Overall E-service Satisfaction	Low	64	67.31	4308.00
	High	66	63.74	4207.00
Communication Approach Satisfaction	Low	64	67.04	4290.50
	High	66	64.01	4224.50
Information Satisfaction	Low	64	66.02	4225.50
	High	66	64.99	4289.50
Intent to Continue Using E-service	Low	64	58.85	3766.50
	High	66	71.95	4748.50

The Mann-Whitney U test results for instant messaging experience in the schema-resonance e-service condition are presented in Table 15.

Table 15: *Mann-Whitney U Test Results for Instant Messaging Experience Comparison in SR Condition*

	Knowledge	Overall E-service Satisfaction	Communication Approach Satisfaction	Information Satisfaction	Intent to Continue Using E-service
Mann-Whitney U	1909.000	1996.000	2013.500	2078.500	1686.500
Wilcoxon W	4120.000	4207.000	4224.500	4289.500	3766.500
Z	-1.197	-.553	-.486	-.176	-1.995
Asymp. Sig. (1-tailed)	.116	.290	.314	.431	**.023**

Grouping Variable: Experience with Instant Messaging

The medians of the dependent variables for high instant messaging experience individuals and low instant messaging experience individuals in the schema-resonance e-service condition are presented in Table 16.

Table 16: *Medians of the Dependent Variables in SR Condition for High-experience Individuals and Low-experience Individuals*

Condition		Knowledge	Overall E-service Satisfaction	Communication Approach Satisfaction	Information Satisfaction	Intent to Continue Using E-service
Low Experience	N Valid	64	64	64	64	64
	Missing	0	0	0	0	0
	Median	12.00	6.75	6.75	7.00	5.625
High Experience	N Valid	66	66	66	66	66
	Missing	0	0	0	0	0
	Median	12.00	6.75	6.75	7.00	6.25

RQ4 asked if, in the schema-resonance e-service condition, individuals who had high instant messaging experience would show similar levels of knowledge about the information they obtained as would individuals who had low experience.

Yes. In the schema-resonance e-service condition, individuals who had high instant messaging experience (*Mdn*=12.00) and individuals who had low instant messaging experience (*Mdn*=12.00) showed similar levels of knowledge about the information they obtained. Individuals who had high instant messaging experience answered an average of 11.56 (*SD*=.73) out of 12 knowledge-related questions correctly, while individuals who had low instant messaging experience got 11.66 (*SD*=.80) questions right on average. Mann-Whitney U test results showed that there was no significant difference (*U*=1909, *p*=.116, *r*=.010) in knowledge level between individuals who had high instant messaging experience and individuals who had low instant messaging experience in the schema-resonance e-service condition.

H6a proposed that, in the schema-resonance e-service condition, individuals who had high instant messaging experience would be more satisfied with the overall e-service than would individuals who had low instant messaging experience.

Hypothesis 6a was not supported. In the schema-resonance e-service condition, individuals who had high instant messaging experience (*Mdn*=6.75) were as satisfied with the overall e-service as were individuals who had low instant messaging experience (*Mdn*=6.75). Individuals who had high instant messaging experience in the schema-resonance e-service condition had a mean score of 6.39 (*SD*=.69) out of 7 on satisfaction with the overall e-service, while individuals who had low instant messaging experience had a mean score of 6.45 (*SD*=.61). Although the mean of satisfaction with overall e-service for individuals with low experience was higher, Mann-Whitney U test results showed that there was no significant difference (*U*=1996,

p=.290, *r*=.049) in satisfaction with the overall e-service between individuals who had high instant messaging experience and individuals who had low instant messaging experience in the schema-resonance e-service condition.

H6b proposed that, in the schema-resonance e-service condition, individuals who had high instant messaging experience would be more satisfied with the communication approach used by the online representative than would individuals who had low instant messaging experience.

Hypothesis 6b was not supported. In the schema-resonance e-service condition, individuals who had high instant messaging experience (*Mdn*=6.75) were as satisfied with the communication approach used by the online representative as were individuals who had low instant messaging experience (*Mdn*=6.75). Individuals who had high instant messaging experience in the schema-resonance e-service condition had a mean score of 6.45 (*SD*=.75) out of 7 on satisfaction with the communication approach, while individuals who had low instant messaging experience had a mean score of 6.57 (*SD*=.58). Although the mean of communication approach satisfaction for individuals with low experience was higher, Mann-Whitney U test results showed that there was no significant difference (*U*=2013.5, *p*=.314, *r*=.043) in satisfaction with the communication approach between individuals who had high instant messaging experience and individuals who had low instant messaging experience in the schema-resonance e-service condition.

H6c proposed that, in the schema-resonance e-service condition, individuals who had high instant messaging experience would be more satisfied with the information provided by the online representative than would individuals who had low instant messaging experience.

Hypothesis 6c was not supported. In the schema-resonance e-service condition, individuals who had high instant messaging experience (*Mdn*=7.00) were as satisfied with the information provided by the online representative as were individuals who had low instant messaging experience (*Mdn*=7.00). Individuals who had high instant messaging experience in the schema-resonance e-service condition had a mean score of 6.62 (*SD*=.60) out of 7 on satisfaction with the information, while individuals who had low instant messaging experience had a mean score of 6.64 (*SD*=.58). Although the mean of the information satisfaction for individuals with low experience was higher, Mann-Whitney U test results showed that there was no significant difference (*U*=2078.5, *p*=.431, *r*=.015) in satisfaction with the information between individuals who had high instant messaging experience and individuals who had low instant messaging experience in the schema-resonance e-service condition.

H6d proposed that, in the schema-resonance e-service condition, individuals who had high instant messaging experience would show more intent to continue using the e-service than individuals who had low instant messaging experience.

Hypothesis 6d was supported. In the schema-resonance e-service condition, individuals who had high instant messaging experience (*Mdn*=6.25) showed more intent to continue using the e-service than did individuals who had low instant messaging experience (*Mdn*=5.625). Individuals who had high instant messaging experience in the schema-resonance e-service condition had a mean score of 5.74 (*SD*=1.40) out of 7 on intent to continue using the e-service, while individuals who had low instant messaging experience had a mean score of 5.48 (*SD*=1.15). Mann-Whitney U test results showed that there was a statistically significant difference (*U*=1686.5, *p*=.023, *r*=.175) in intent to continue using the e-service between individuals who

had high instant messaging experience and individuals who had low instant messaging experience in the schema-resonance e-service condition.

Because "the main effect may be misleading when there is a statistically significant interaction" (Gliner et al., 2009, p.323), this dissertation research aimed to find out whether there were interactions among e-service condition (schema-resonance condition and non-schema-resonance condition), gender (female and male), and experience with instant messaging (high instant messaging experience and low instant messaging experience). If there was an interaction as well as main effects, the researcher planned to re-examine the main effects to see if the interaction overrode the main effects. This dissertation research, especially, had interest in the comparison between the schema-resonance e-service condition and the non-schema-resonance e-service condition, because the researcher intended to find out whether the schema-resonance e-service would have practical worthiness when compared to the regular, non-schema-resonance e-service. Therefore, this research also examined the potential combined effects of e-service condition, gender, and experience with instant messaging on the dependent variables for the schema-resonance e-service condition and the non-schema-resonance e-service condition. Research questions 5-9 were asked to check whether there were any effects of two-way or three-way interactions on the dependent variables.

Because the dependent variables were not normally distributed, the general linear model univariate test (i.e., factorial ANOVA) was not appropriate to use to examine the interactions (UCLA, n.d.). Only an ANOVA is required to perform factorial non-parametric analyses after data alignment and ranking (Wobbrock, Findlater, Gergle, & Higgins, 2011). Therefore, the rank transformation (Laerd, n.d.) was conducted on the dependent variables, and the univariate tests were conducted on the ranked data of the dependent variables. Cell selection command was

conducted to only include data for the schema-resonance condition and the non-schema-resonance condition.

RQ5 asked if there was any two-way or three-way interaction effect on knowledge.

No. As shown in Table 17, there appeared to be no significant effect of any two-way or three-way interaction on knowledge.

Table 17: *Factorial ANOVA on Knowledge*

Dependent Variable: Rank of Knowledge

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Condition	2523.455	1	2523.455	.767	.382	.003
Gender	13156.655	1	13156.655	4.000	**.047**	.016
IMexperience	3839.549	1	3839.549	1.167	.281	.005
Condition x Gender	113.772	1	113.772	.035	.853	.000
Condition x IMexperience	1587.638	1	1587.638	.483	.488	.002
Gender x IMexperience	6970.671	1	6970.671	2.119	.147	.008
Condition x Gender x IMexperience	3522.654	1	3522.654	1.071	.302	.004
Total	5342758.000	261				

RQ6 asked if there was any two-way or three-way interaction effect on satisfaction with the overall e-service.

No. As shown in Table 18, there appeared to be no significant effect of any two-way or three-way interaction on satisfaction with the overall e-service.

Table 18: *Factorial ANOVA on Satisfaction with Overall E-service*

Dependent Variable: Rank of Overall E-service Satisfaction

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Condition	20514.794	1	20514.794	3.808	**.052**	.015
Gender	39356.564	1	39356.564	7.305	**.007**	.028
IMexperience	1372.020	1	1372.020	.255	.614	.001
Condition x Gender	1776.275	1	1776.275	.330	.566	.001
Condition x IMexperience	237.880	1	237.880	.044	.834	.000
Gender x IMexperience	1847.939	1	1847.939	.343	.559	.001
Condition x Gender x IMexperience	1582.999	1	1582.999	.294	.588	.001
Total	5909983.000	261				

RQ7 asked if there was any two-way or three-way interaction effect on satisfaction with the communication approach used by the online representative.

No. As shown in Table 19, there appeared to be no significant effect of any two-way or three-way interaction on satisfaction with the communication approach.

Table 19: *Factorial ANOVA on Satisfaction with Communication Approach*

Dependent Variable:　Rank of Communication Approach Satisfaction

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Condition	36227.908	1	36227.908	7.183	**.008**	.028
Gender	45137.736	1	45137.736	8.949	**.003**	.034
IMexperience	512.843	1	512.843	.102	.750	.000
Condition x Gender	4766.008	1	4766.008	.945	.332	.004
Condition x IMexperience	6742.675	1	6742.675	1.337	.249	.005
Gender x IMexperience	1839.431	1	1839.431	.365	.546	.001
Condition x Gender x IMexperience	15473.525	1	15473.525	3.068	.081	.012
Total	5868241.000	261				

RQ8 asked if there was any two-way or three-way interaction effect on satisfaction with the information provided by the online representative.

No. As shown in Table 20, there appeared to be no significant effect of any two-way or three-way interaction on satisfaction with the information.

Table 20: *Factorial ANOVA on Satisfaction with Information*

Dependent Variable: Rank of Information Satisfaction

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Condition	30604.352	1	30604.352	6.649	**.010**	.026
Gender	33948.748	1	33948.748	7.376	**.007**	.028
IMexperience	1710.635	1	1710.635	.372	.543	.001
Condition x Gender	5360.725	1	5360.725	1.165	.282	.005
Condition x IMexperience	3265.737	1	3265.737	.710	.400	.003
Gender x IMexperience	11303.998	1	11303.998	2.456	.118	.010
Condition x Gender x IMexperience	9848.071	1	9848.071	2.140	.145	.008
Total	5741827.500	261				

RQ9 asked if there was any two-way or three-way interaction effect on intent to continue using the e-service.

No. As shown in Table 21, there appears to be no significant effect of any two-way or three-way interactions on the intent to continue using the e-service.

Table 21: *Factorial ANOVA on Intent to Continue Using E-service*

Dependent Variable: Rank of Intent to Continue Using the E-service

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Condition	3826.335	1	3826.335	.713	.399	.003
Gender	48900.460	1	48900.460	9.106	**.003**	.035
IMexperience	29919.915	1	29919.915	5.572	**.019**	.022
Condition x Gender	6207.380	1	6207.380	1.156	.283	.005
Condition x IMexperience	726.764	1	726.764	.135	.713	.001
Gender x IMexperience	9057.199	1	9057.199	1.687	.195	.007
Condition x Gender x IMexperience	4693.925	1	4693.925	.874	.351	.003
Total	5945293.500	261				

Post Hoc Analyses

Although no hypotheses or research questions were proposed to examine the effects of gender on dependent variables in the non-schema-resonance e-service condition, the researcher wanted to know if the effect of gender in the schema-resonance e-service condition would be similar for the non-schema-resonance e-service condition. The e-service condition split commend in SPSS was used, and Mann-Whitney U test was conducted for both the schema-resonance e-service condition and the non-schema-resonance e-service condition. Table 22 shows that gender had no significant effect ($p>.05$) on any dependent variables in the non-schema-resonance e-service condition. Gender had no significant effect on knowledge ($p=.107$) in either the schema-resonance e-service condition or the non-schema-resonance e-service condition. Gender had significant effects on overall e-service satisfaction ($p=.011$), communication approach satisfaction ($p=.004$), information satisfaction ($p=.003$), and intent to

continue using the e-service (*p*=.003) in the schema-resonance e-service condition, but gender had no significant effects (*p*>.05) on these variables in the non-schema-resonance e-service condition.

Table 22: *Mann-Whitney U Test Results for Gender Comparison in SR and Non-SR Conditions*

Condition		Knowledge	Overall E-service Satisfaction	Communication Approach Satisfaction	Information Satisfaction	Intent to Continue Using E-service
SR	Mann-Whitney U	1890.500	1623.500	1560.500	1578.500	1508.500
	Wilcoxon W	3781.500	3514.500	3451.500	3469.500	3399.500
	Z	-1.264	-2.299	-2.687	-2.761	-2.799
	Asymp. Sig. (1-tailed)	.103	**.011**	**.004**	**.003**	**.003**
Non-SR	Mann-Whitney U	1890.500	1839.000	1843.000	1902.500	1839.500
	Wilcoxon W	3843.500	3792.000	3796.000	3855.500	3792.500
	Z	-1.562	-1.400	-1.389	-1.149	-1.387
	Asymp. Sig. (1-tailed)	.059	.081	.083	.125	.083

Grouping Variable: Gender

Although no hypotheses or research questions were proposed to examine the effects of instant messaging experience on dependent variables in the non-schema-resonance e-service condition, the researcher wanted to know if the effect of instant messaging experience in the schema-resonance e-service condition would be similar for the non-schema-resonance e-service condition. The e-service condition split commend in SPSS was used, and Mann-Whitney U test was conducted for both the schema-resonance e-service condition and the non-schema-resonance e-service condition. Table 23 shows that instant messaging experience had no significant effects (*p*>.05) on any dependent variables in the schema-resonance e-service condition. Instant messaging experience only had effect on intent to continue using e-service (*p*=.023) in the

schema-resonance e-service condition, but the significant effect did not exist in the non-schema-resonance e-service condition.

Table 23: *Mann-Whitney U Test Results for Instant Messaging Experience Comparison in SR Condition and in Non-SR Condition*

Condition		Knowledge	Overall E-service Satisfaction	Communication Approach Satisfaction	Information Satisfaction	Intent to Continue Using E-service
SR	Mann-Whitney U	1909.000	1996.000	2013.500	2078.500	1686.500
	Wilcoxon W	4120.000	4207.000	4224.500	4289.500	3766.500
	Z	-1.197	-.553	-.486	-.176	-1.995
	Asymp. Sig. (1-tailed)	.116	.290	.314	.431	**.023**
Non-SR	Mann-Whitney U	2123.000	2112.500	1921.000	1949.500	1828.000
	Wilcoxon W	4268.000	4257.500	4132.000	4160.500	4039.000
	Z	-.138	-.151	-1.050	-.949	-1.466
	Asymp. Sig. (1-tailed)	.445	.440	.147	.172	.072

Grouping Variable: Experience with Instant Messaging

To make useful practical implications for applying schema resonance model in a real e-service practice, the researcher also wanted to know if the effect of schema resonance would be similar for females and males. The gender split commend in SPSS was used, and Mann-Whitney U test was conducted to compare the schema-resonance e-service condition and the non-schema-resonance e-service condition for females and males. As Table 24 shows, schema resonance had no significant effect ($p>.05$) on knowledge or intent to continue using e-service for either females or males. Schema resonance had significant effects on overall e-service satisfaction ($p=.040$), communication approach satisfaction ($p=.004$), and information satisfaction ($p=.004$) for females, but the significant effects did not exist for males. Table 25 shows that the mean ranks of the three satisfaction variables in the schema-resonance e-service condition were higher

than the mean ranks of the three satisfaction variables in non-schema-resonance e-service condition for both females and males. The differences in the three satisfaction variables between the schema-resonance e-service condition and the non-schema-resonance e-service condition were statistically significant for females, but not significant for males.

Table 24: *Mann-Whitney U Test Results for SR Condition and Non-SR Condition Comparison among Females and among Males*

Gender		Knowledge	Overall E-service Satisfaction	Communication Approach Satisfaction	Information Satisfaction	Intent to Continue Using E-service
Female	Mann-Whitney U	2231.000	1980.000	1791.000	1818.000	2045.500
	Wilcoxon W	4646.000	4395.000	4206.000	4233.000	4460.500
	Z	-.898	-1.754	-2.648	-2.699	-1.438
	Asymp. Sig. (1-tailed)	.185	**.040**	**.004**	**.004**	.076
Male	Mann-Whitney U	1812.500	1710.000	1684.000	1691.000	1866.000
	Wilcoxon W	3703.500	3663.000	3637.000	3644.000	3757.000
	Z	-.488	-.925	-1.065	-1.063	-.127
	Asymp. Sig. (1-tailed)	.313	.178	.144	.144	.450

Grouping Variable: Condition

Table 25: *Statistics of Satisfaction Variables in SR Condition and Non-SR Condition among Females and among Males*

Gender		Condition	N	Mean Rank	Sum of Ranks
Female	Overall e-service Satisfaction	SR	69	75.30	5196.00
		Non-SR	69	63.70	4395.00
	Communication Approach Satisfaction	SR	69	78.04	5385.00
		Non-SR	69	60.96	4206.00
	Information Satisfaction	SR	69	77.65	5358.00
		Non-SR	69	61.35	4233.00
Male	Overall e-service Satisfaction	SR	61	64.97	3963.00
		Non-SR	62	59.08	3663.00
	Communication Approach Satisfaction	SR	61	65.39	3989.00
		Non-SR	62	58.66	3637.00
	Information Satisfaction	SR	61	65.28	3982.00
		Non-SR	62	58.77	3644.00

The researcher also wanted to know if the effects of schema resonance remained the same for individuals with low instant messaging experience and for individuals with high instant messaging experience. The instant-message experience split commend in SPSS was used, and Mann-Whitney U test was conducted. As Table 26 shows, schema resonance had no significant effects (p>.05) on knowledge, overall e-service satisfaction, or intent to continue using the e-service for low-experience individuals or for high-experience individuals. Schema resonance had significant effect on communication approach satisfaction (p=.005) and information satisfaction (p=.010) for low-experience individuals, but the significant effect did not exist for high-experience individuals.

Table 26: *Mann-Whitney U Test Results for SR Condition and Non-SR Condition Comparison among Low-experience Individuals and among High-experience Individuals*

Experience with Instant Messaging		Knowledge	Overall E-service Satisfaction	Communication Approach Satisfaction	Information Satisfaction	Intent to Continue Using E-service
Low	Mann-Whitney U	2096.500	1791.500	1568.500	1649.500	2023.000
	Wilcoxon W	4176.500	4002.500	3779.500	3860.500	4234.000
	Z	-.098	-1.524	-2.610	-2.322	-.416
	Asymp. Sig. (1-tailed)	.461	.064	**.005**	**.010**	.339
High	Mann-Whitney U	1951.000	1858.500	1896.000	1880.000	1929.500
	Wilcoxon W	4162.000	4003.500	4041.000	4025.000	4074.500
	Z	-1.132	-1.339	-1.185	-1.328	-1.001
	Asymp. Sig. (1-tailed)	.129	.091	.118	.092	.159

Grouping Variable: Condition

Table 27 shows that the mean ranks of the communication approach satisfaction and the information satisfaction in the schema-resonance e-service condition were higher than the mean ranks in the non-schema-resonance e-service condition both for low-experience individuals and

for high-experience individuals. The differences in communication approach satisfaction and information satisfaction between the schema-resonance e-service condition and the non-schema-resonance e-service condition were statistically significant for low-experience individuals, but not significant for high-experience individuals.

Table 27: *Statistics of Satisfaction Variables in SR Condition and in Non-SR Condition among Low-experience Individuals and among High-experience Individuals*

Experience with Instant Messaging		Condition	N	Mean Rank	Sum of Ranks
Low	Communication Approach Satisfaction	SR	64	73.99	4735.50
		Non-SR	66	57.27	3779.50
	Information Satisfaction	SR	64	72.73	4654.50
		Non-SR	66	58.49	3860.50
High	Communication Approach Satisfaction	SR	66	69.77	4605.00
		Non-SR	65	62.17	4041.00
	Information Satisfaction	SR	66	70.02	4621.00
		Non-SR	65	61.92	4025.00

Although the comparison between the non-schema-resonance e-service condition and the failed-schema-resonance e-service condition was not of research interest in this dissertation, the comparison results could still help the researcher to make useful practical implications on how to apply Schema Resonance Model based on the gender of the customer in real-world practices when the occurrence of schema resonance is not certain. Therefore, post hoc analyses were also conducted to compare the non-schema-resonance e-service condition and the failed-schema-resonance e-service condition. The gender split commend in SPSS was used, and Mann-Whitney U test was conducted. As Tables 28 and Table 29 show, females had higher mean ranks of all three satisfaction variables in the Non-SR condition than in the Failed-SR condition. Males had higher mean ranks of satisfaction and intention variables in the Non-SR condition than in the Failed-SR condition. The differences were statistically significant.

Table 28: *Mann-Whitney U Test Results for Non-SR Condition and Failed-SR Condition Comparison among Females and among Males*

Gender		Knowledge	Overall E-service Satisfaction	Communication Approach Satisfaction	Information Satisfaction	Intent to Continue Using E-service
Female	Mann-Whitney U	2080.000	1822.000	1827.500	1931.000	2098.500
	Wilcoxon W	4426.000	4168.000	4173.500	4277.000	4444.500
	Z	-1.567	-2.280	-2.270	-1.859	-1.071
	Asymp. Sig. (1-tailed)	.058	**.012**	**.012**	**.032**	.142
Male	Mann-Whitney U	1478.000	1481.000	1454.500	1393.000	1487.000
	Wilcoxon W	3308.000	3311.000	3284.500	3223.000	3317.000
	Z	-2.262	-1.955	-2.094	-2.442	-1.915
	Asymp. Sig. (1-tailed)	**.012**	**.026**	**.018**	**.008**	**.028**

Grouping Variable: Condition

Table 29: *Statistics of Dependent Variables in Non-SR Condition and in Failed-SR Condition for Females and Males*

Gender		Condition	N	Mean Rank	Sum of Ranks
Female	Knowledge	Non-SR	69	72.86	5027.00
		Failed SR	68	65.09	4426.00
	Overall e-service Satisfaction	Non-SR	69	76.59	5285.00
		Failed SR	68	61.29	4168.00
	Communication Approach Satisfaction	Non-SR	69	76.51	5279.50
		Failed SR	68	61.38	4173.50
	Information Satisfaction	Non-SR	69	75.01	5176.00
		Failed SR	68	62.90	4277.00
	Intent to Continue Using E-service	Non-SR	69	72.59	5008.50
		Failed SR	68	65.36	4444.50
Male	Knowledge	Non-SR	62	67.66	4195.00
		Failed SR	60	55.13	3308.00
	Overall e-service Satisfaction	Non-SR	62	67.61	4192.00
		Failed SR	60	55.18	3311.00
	Communication Approach Satisfaction	Non-SR	62	68.04	4218.50
		Failed SR	60	54.74	3284.50
	Information Satisfaction	Non-SR	62	69.03	4280.00
		Failed SR	60	53.72	3223.00
	Intent to Continue Using E-service	Non-SR	62	67.52	4186.00
		Failed SR	60	55.28	3317.00

All three types of satisfaction were significantly lower (p<.05) in the failed-schema-resonance e-service condition than in the non-schema-resonance e-service condition for both

females and males. Both knowledge about the requested information and intent to continue using the e-service were significantly lower (p<.05) in the failed-schema-resonance e-service condition than in the non-schema-resonance e-service condition for males. However, the differences in knowledge and intent between the failed-schema-resonance e-service condition and the non-schema-resonance e-service condition were not significant (p>.05) for females. These findings had special importance for guiding real-world e-service practices, especially when the occurrence of schema resonance is not certain and the online representative is not sure if the additional information can indeed resonate with the customer's sense-making schema.

The detailed theoretical and practical implications based on these findings are discussed in the discussion chapter.

DISCUSSION

This dissertation research proposed a new organization-customer communication model—Schema Resonance Model. The dissertation research explicated the Schema Resonance Model and discussed how to achieve schema resonance in one-to-one e-service communication between an organization representative and its customer.

One purpose of the dissertation research was to test whether schema resonance could be achieved during the one-to-one e-service communication between an organization representative and an individual customer. This dissertation research also aimed to examine whether the occurrence of schema resonance could benefit the e-service communication in terms of customer's knowledge gain, satisfaction, and behavioral intent to continue using the e-service.

A post-test only 3 x 2 x 2 factorial between-subjects experimental/quasi-experimental design was used to examine whether schema resonance could be achieved and to explore the effects of schema resonance on the outcomes of e-service communication.

The results of factorial ANOVA indicated that e-service condition (schema resonance, non-schema resonance, and failed schema resonance) and gender (female or male) were the two significant predictors that had main effects on knowledge gain, overall satisfaction, communication approach satisfaction, and information satisfaction. Gender and instant messaging experience were the two significant predictors that had main effects on customers' intent to continue using the e-service.

Individuals in the schema-resonance e-service condition gained a similar amount of knowledge about the information provided in the communications as those in the non-schema-resonance e-service condition. Individuals in the schema-resonance e-service condition also

showed a similar intent to continue using the e-service as those in the non-schema-resonance e-service condition.

Compared to individuals in the non-schema-resonance e-service condition, individuals in the schema-resonance e-service condition were more satisfied with the overall e-service, the communication approach used in the e-service by the researcher, and the information provided in the e-service by the researcher. More specifically, as the post hoc analysis indicated, only females in the schema-resonance e-service condition were more satisfied with the overall e-service, the communication approach, and the information than females in the non-schema-resonance e-service condition. Males in the schema-resonance e-service condition and those in the non-schema-resonance e-service condition had similar levels of satisfaction with the overall e-service, the communication approach, and the information.

In the schema-resonance e-service condition, males and females had similar knowledge gain, but females were more satisfied with the overall e-service, the communication approach, and the information, and had greater intent to continue using the e-service than males. In the non-schema-resonance e-service condition, females and males showed no differences.

In the non-schema-resonance e-service condition, individuals with low instant messaging experience and individuals with high instant messaging experience showed no significant differences in all dependent variables. In the schema-resonance e-service condition, individuals with low instant messaging experience and individuals with high instant messaging experience showed no significant differences in knowledge gain, overall e-service satisfaction, communication approach satisfaction, or information satisfaction.

In schema-resonance e-service condition, individuals who had high instant messaging experience showed more intent to continue using the e-service than individuals who had low instant messaging experience.

For individuals who had low instant messaging experience or individuals who had high instant messaging experience, there were no significant differences between the schema-resonance e-service condition and the non-schema-resonance e-service condition in terms of knowledge gain, overall e-service satisfaction, and intent to continue using the e-service. For individuals who had low instant messaging experience, those in the schema-resonance e-service condition showed more satisfaction with the communication approach and the information than those in the non-schema-resonance e-service condition. For individuals who had high instant messaging experience, there was no significant difference in communication approach or information satisfaction between the schema-resonance e-service and non-schema-resonance e-service conditions.

Compared to individuals in the failed-schema-resonance e-service condition, individuals in the schema-resonance e-service condition showed more knowledge gain; were more satisfied with the overall e-service, the communication approach used in the e-service, and the information provided in the e-service; and showed greater intent to continue using the e-service.

Theoretical Implications

Schema resonance was not studied directly in this dissertation research. Schema resonance was manipulated in the schema-resonance e-service condition, and the effects of manipulated schema resonance on the dependent variables were observed.

The behavior of the participants (skipping the next question and asking the following question) indicated that schema resonance (as manipulated by the research) resonated with the customer's sense-making schemas.

In the schema-resonance e-service condition, the schema resonance was manipulated because the researcher knew the questions the participant would ask and had all the answers ahead of time. Although the schema resonance was manipulated in the experiment, evidence of resonance with the customer's sense-making schemas in the simulated e-service communication in the experiment setting supported the Schema Resonance Model proposed in this dissertation research. It is possible that a representative who uses one single reply to solve two information inquiries from a customer in a real e-service communication could positively influence customer satisfaction with the overall process, interaction, and information obtained. Thus, it is possible that achieving schema resonance in a real organization-customer e-service communication will have beneficial effects on the organization-customer relationship.

In a real e-service communication, the online representative could apply the sense-producing schemas to produce a reply to the customer's question. The representative would read the customer's question, understand what the customer wants to know, and use the principle sense-producing schema to create a piece of requested information to answer the customer's question. After creating the requested information, the representative would estimate what the customer might also want to know and use the adaptation sense-producing schema to provide an additional piece of information. By doing that, the representative could provide two pieces of information (requested information and additional information) in one reply. If the requested information answers the customer's question, the representative's principle sense-producing schema would resonate with the customer's sense-making schema; if the additional information

answers the question which the customer plans to ask next but hasn't asked yet, the representative's adaptation sense-producing schema would also resonate with another of the customer's sense-making schemas. Once both the representative's sense-producing schemas (principle schema and adaptation schema) resonate with the customer's sense-making schemas, the schema resonance would take place and be achieved successfully.

The Schema Resonance Model proposed in this dissertation research contributes to the organization-customer communication literature in that the model suggests a theoretical framework which maps the representative's sense-making and sense-producing processes and the customer's sense-making process involved in the organization-customer communication. In addition, the model classifies two types of schemas (principle schema and adaptation schema) the representative may use in the sense-producing process to produce information for the customer. The model also contributes to the literature in that it suggests a new communication strategy—proactively providing additional information—that the organization representative could consider using in the organization-customer communication to solve the customer's information inquiries.

It should be pointed out that the Schema Resonance Model might not be limited to online e-service communication. The model could also work in other types of organization-customer communication, such as face-to-face and telephone communications. The Schema Resonance Model requires resonances between the representative's sense-producing schemas and the customer's sense-making schemas. It is also possible to achieve such resonances in a face-to-face or telephone communication regarding information seeking and information sharing.

This dissertation research proposed hypotheses and research questions to examine the outcomes of achieving schema resonance in the e-service communication. The research findings had the following important implications.

The findings of factorial ANOVA indicated that e-service condition and gender had main effects on customer satisfaction but instant messaging experience did not. This may be because the sample used in the dissertation research was college students. No matter whether the instant messaging experience was high or low, the participants all had a generally high level of computer proficiency and all knew how to use the instant messaging e-service. Because they all received the information they were instructed to request, they should have similar satisfaction with the e-service. Another possible reason is that the measurement was for the general instant messaging experience, not for the e-service instant messaging experience. It is possible that an individual may use instant messaging frequently in general but never use instant messaging for e-service. It is also possible that an individual may not use instant messaging frequently in general but may use instant messaging for e-service. Therefore, measurement for general instant messaging experience may not have been sufficient to capture the actual experience with e-service instant messaging for the sample used in this dissertation research.

Both female and male participants in schema-resonance e-service condition gained, respectively, a similar amount of knowledge about the information provided in the e-service communication as those in the non-schema-resonance e-service condition. This indicates that schema resonance does not compromise the effectiveness of the communication. If the information matches the expectations of the schemas, schema congruity is achieved, and little cognitive processing is required for interpreting the information (Hastie, 1980). The same pieces of information were provided in both the schema-resonance e-service condition and the non-

schema-resonance e-service condition, and the information met the expectations of the participants. Both females and males received and successfully obtained the information they planned to request in both the schema-resonance and non-schema-resonance e-service conditions. The same pieces of information in both the schema-resonance and non-schema-resonance e-service conditions were congruent with the participants' sense-making schemas and required the same cognitive load to process. Both females and males in both e-service conditions had the same amount of information to process and were able to process all of the information. As a result, the knowledge gained was similar.

Both female and male participants in the schema-resonance e-service condition showed, respectively, a similar intent to continue using the e-service as those participants in the non-schema-resonance e-service condition. This indicates that schema resonance should not influence individuals' behavioral intention in terms of whether they would continue using the e-service in the future. For both females and males, the instant messaging e-service offered by organizations and companies is just a tool to obtain information and to solve problems. It doesn't matter whether the representative's reply includes one piece of information that answers one question or two pieces that solve two questions at a time. What matters to the customers is whether using the tool (instant messaging e-service) can help meet their needs for information and solving problems.

As suggested by the Technology Acceptance Model (Davis, 1989), perceived usefulness and perceived ease of use of a technology can influence an individual's behavioral intention of using the technology. If an individual considers a technology to be useful and easy to use in a specific situation, the individual could consider using the technology in that situation or in a similar situation (Davis, 1989). Female and male participants in both the schema-resonance and

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non-schema-resonance e-service conditions knew how to use the instant messaging e-service and successfully used the instant messaging e-service to request all of the information, so individuals in both e-service conditions should have similar perceptions about the instant messaging e-service being useful and easy to use. Therefore, their intent to continue using the e-service in the future should be similar.

Female participants in the schema-resonance e-service condition were more satisfied with the overall e-service, the communication approach, and the information than females in the non-schema-resonance e-service condition. This indicates that schema resonance could enhance female customers' satisfaction with the overall e-service, the communication approach used by the online representative in the e-service, and the information provided by the representative.

Although the researcher provided the same pieces of information in both schema-resonance and non-schema-resonance e-service conditions, the communication approaches used by the researcher in the different experimental conditions were different. In the schema-resonance e-service condition, each reply made by the researcher to the customer's question included two pieces of information, while the reply the researcher made in the non-schema-resonance e-service condition only contained one single piece of information. Because all pieces of information were what the participants originally wanted to know, it is important to note that in both the schema-resonance e-service condition and the non-schema-resonance e-service condition all pieces of information were congruent with the participant's sense-making schemas.

The communication approach used in the schema-resonance e-service condition answered two of the participant's questions in one reply, while the communication approach used in the non-schema-resonance e-service condition only answered one question at a time for the participant. The communication approach used in the schema-resonance e-service condition

may have made female participants feel the e-service was a better quality service. Previous research suggests that service quality programs could influence customer satisfaction (Bolton et al., 2004), and a better quality service could make the customer feel more satisfied. Females in the schema-resonance e-service condition may have perceived receiving answers to two questions in one communication round as a better quality service than receiving only one answer to one question in one communication round, and they thus were more satisfied with the communication approach used in the schema-resonance e-service condition than in the non-schema-resonance e-service condition.

Satisfaction with the communication approach may also have made female participants feel more satisfied with the information provided by the researcher in the schema-resonance e-service condition than in the non-schema-resonance e-service condition. The one-on-one interactive communication between customer and organization allows the delivery of highly personalized service (van Mulken & van der Meer, 2005). Providing two pieces of information in one reply, which could answer both the female participant's current question and the next question, could be perceived by the female participant as highly personalized service. The female participant might feel that the representative really understood what she wanted to know and made personalized information especially for her to meet her needs. Although the same pieces of information were presented in both the schema-resonance and non-schema-resonance e-service conditions, female participants felt more gratified with the information when they received two relevant pieces of information at a time, both of which were what they wanted to know, than when they received only one piece of information at a time. This research finding indicates that proactively providing additional information to female customers in e-service could increase

their satisfaction with the information as long as the additional information is also what they want to know.

Both the communication approach satisfaction and information satisfaction could contribute to the females' satisfaction with the overall e-service. In the post-experiment survey, overall e-service satisfaction was measured before communication approach satisfaction and information satisfaction were measured, to make sure that these latter two measurements did not bias measurement of the overall e-service satisfaction. The finding showed female participants in schema-resonance e-service condition were more satisfied with the overall e-service than in non-schema-resonance e-service condition. It indicated that schema resonance could increase female customers' satisfaction with the overall e-service. Customers' opinions of an organization can be influenced by how the organization responds to customers' on-line inquiries (Zemke & Connellan, 2001). How the organization responds to customers' inquiries in the e-service communication might influence the customers' satisfaction with the overall e-service. Schema resonance could allow the representative to use one reply to provide two pieces of information that can answer both the question the customer has asked and the question the customer hasn't asked but plans to ask next. In this case, how the representative responded to the females' online inquiries could make these females feel that their needs for information inquiry were met in a very efficient and gratifying way. Their positive feelings could influence their opinion about the overall e-service. This may be the reason why female participants in the schema-resonance e-service condition were more satisfied with the overall e-service than those in the non-schema-resonance e-service condition.

Unlike female participants, male participants in the schema-resonance e-service condition and males in the non-schema-resonance e-service condition showed similar levels of satisfaction

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with the overall e-service, the communication approach, and the information. Although the mean ranks for the overall satisfaction, communication approach satisfaction, and information satisfaction for males in the schema-resonance e-service condition were slightly higher than in the non-schema-resonance e-service condition, the differences were not statistically significant.

One possible reason is that the power of the statistical test was not large enough to detect significant differences between the schema-resonance and non-schema-resonance e-service conditions. If this was the case, increasing the sample size should help detect any significant differences. Schema resonance might be found to make males (as well as females) more satisfied with the overall e-service, the communication approach used in the e-service, and the information provided in the e-service.

Another possible reason is that males in the schema-resonance e-service condition simply didn't feel more satisfied with the overall e-service, communication approach, or information than males in the non-schema-resonance e-service condition. Compared to females, males showed less positive attitudes toward online sources of information search (Kim, Lehto, & Morrison, 2007). Males might just consider the e-service as a means of obtaining information they wanted to know. They would feel satisfied as long as they could get the information they wanted through the e-service regardless of whether schema resonance did or did not take place.

No matter what the reason is, schema resonance should not decrease, even if it would not increase, male customers' satisfaction with the overall e-service, communication approach, and information.

In the non-schema-resonance e-service condition, no significant differences were found in the dependent variables between female participants and male participants. However, in the schema-resonance e-service condition, compared to male participants, female participants felt

more satisfied with the overall e-service, communication approach, and information, and had greater intent to continue using the e-service. These findings indicate that the effect of schema resonance on customers' satisfaction and intent to continue using the e-service is larger for females than males. This can be explained by the different ways females and males process information. Females were more likely than males to process all the information provided to them (Meyers-Levy, 1988). Meyer-Levy and Sternthal (1991) found that females were more likely to elaborate the message content in a more comprehensive manner, while males were more likely to be involved in getting the theme of the message. These could explain why females were more satisfied with the information, the communication approach, and the overall e-service than males. When females received the reply containing two pieces of information (requested information and additional information), they may have been more likely to process both pieces of information and would process the information more comprehensively than males. In turn, they would be more likely to realize that both pieces of information were useful, because the two pieces of information answered both the current question they just asked and the next question they planned to ask. As a result, females would feel more satisfied with the information, because it eliminated the need for them to ask the second question. In addition, females would also be more likely to realize that it was the communication approach used by the representative that made it easier to get all the information they wanted. Therefore, they would be more satisfied with the communication approach than would their male counterparts. Through processing all the information in a more comprehensive manner, females would have a stronger feeling than males that the e-service had successfully met their needs, and they would also feel more satisfied with the overall e-service than males.

The behavior of customers can be influenced by their level of satisfaction (Garbarino & Johnson, 1999). Research suggests that customers who are more satisfied with organizations' service use the service more often (e.g., Bolton & Lemon, 1999). Because schema resonance made females more satisfied with the e-service than males, females showed more intent to continue using the e-service.

In the non-schema-resonance e-service condition, individuals with low instant messaging experience and individuals with high instant messaging experience showed no significant differences in all dependent variables. In the schema-resonance e-service condition, individuals with low instant messaging experience and individuals with high instant messaging experience showed no significant differences in knowledge gain, overall e-service satisfaction, communication approach satisfaction, or information satisfaction. These non-significant differences indicated that, regardless of the e-service condition (schema resonance versus non-schema resonance), the instant messaging experience had no effect on e-service users' knowledge gain, overall satisfaction, communication satisfaction, or information satisfaction. This was not expected. It was assumed that individuals who had high instant messaging experience would feel more comfortable in using the e-service and thus would be more satisfied with the e-service. However, experience with instant messaging proved to have no effect.

A possible reason for this result is that instant messaging, for any e-service users in any type of e-service condition, is just a tool for the users to use to request information and solve problems. Although some users could have more experience in using instant messaging while others could have less experience, they all would know how to type questions using the instant messaging application on a computer and interact with the online representative. Because they would receive the same information, they would gain a similar amount of knowledge about the

information they receive. They would feel satisfied with the e-service as long as the use of the e-service tool could meet their needs for information inquiries. This might be the case for this dissertation research. The convenience sample of college students was used in the research. The college students were shown to have generally high computer proficiency. It did not matter whether they had high or low experience with instant messaging. They all were shown to know how to type questions on the instant messaging application on a computer, and the instant messaging e-service was just a tool for them to obtain the information they wanted to know.

In the schema-resonance e-service condition, individuals who had high instant messaging experience showed more intent to continue using the e-service than individuals who had low instant messaging experience. This indicates that the instant messaging experience level had an effect on the individual's intent to continue using the e-service when schema resonance took place. Compared to individuals with low instant messaging experience, individuals with high instant messaging experience were more inclined to use the e-service after experiencing the schema-resonance e-service communication. This is possibly because high instant messaging users were more likely than low instant messaging users to perceive the occurrence of schema resonance as an advantage of the e-service. High instant messaging users may have felt that e-service with the occurrence of schema resonance was adventurous and could help them obtain information faster and save their time and effort because two of their questions were resolved in one reply each time in the schema-resonance e-service condition. The more an individual perceives the advantages of a technology, the more likely the individual is to use the technology (Rogers, 2003).

Individuals with low instant messaging experience might not appreciate schema resonance as much as those high instant messaging users. This is possibly because they did not

use instant messaging a lot and were not familiar with conducting communications via instant messaging. They may not have felt that receiving two pieces of information in one reply via instant messaging was anything special or was a reason for them to increase their use of the instant messaging e-service. This can be explained by the Individual Decision-making Process Model of the Diffusion of Innovation (Rogers, 2003). As a prior condition, one's familiarity with a specific technology or with a cluster of similar technologies could influence the individual's decision to use that specific technology (Rogers, 2003). This finding indicates that the more familiar an individual is with a technology, the more likely the individual would be to use the technology.

In the non-schema-resonance e-service condition, individuals who had high instant messaging experience and individuals who had low instant messaging experience did not show difference in terms of the intent to continue using the e-service. This suggests that the instant messaging experience level did not have effect on e-service users' behavioral intention in the regular one-question-one-answer-dialogue e-service condition (non-schema-resonance e-service condition). This is possibly because both low and high instant messaging users did not feel the regular non-schema-resonance e-service offered anything special and just considered the e-service as a means of obtaining information. Both low and high instant messaging users probably expected to receive only one answer in each reply and simply considered the e-service as a tool to obtain the information they wanted. As the Technology Acceptance Model (Davis, 1989) suggests, if the perceived usefulness of the technology is similar, individual might have similar behavioral intent to use the technology. Because both high and low instant messaging users successfully obtained the information they wanted in the one-question-one-answer-dialogue communication, they both considered the e-service to be useful. Therefore, the non-schema-

resonance e-service condition made both high and low instant messaging users feel similarly in regard to their likelihood of continuing to use the e-service in the future.

For individuals who had low instant messaging experience or individuals who had high instant messaging experience, there were no significant differences between the schema-resonance e-service condition and the non-schema-resonance e-service condition in terms of the knowledge gain, the overall e-service satisfaction, and the intent to continue using the e-service. This indicates that schema resonance had no effect on knowledge gain, overall e-service satisfaction, or intent to continue using the e-service among high instant messaging users or among low instant messaging users. This is possibly because, regardless of the individuals' instant messaging experience level, both individuals in schema-resonance e-service condition and individuals in non-schema-resonance e-service condition successfully obtained the information they wanted to know. As they gained a similar amount of knowledge about the information, they should feel similarly satisfied with the overall e-service, and they both should consider the e-service as a useful tool and would have a similar degree of intent to continue using the e-service.

For individuals who had low instant messaging experience, those in the schema-resonance e-service condition had higher satisfaction with the communication approach and the information than those in the non-schema-resonance e-service condition. However, for individual who had high instant messaging experience, there was no significant difference in the communication approach satisfaction or the information satisfaction between the schema-resonance e-service condition and the non-schema-resonance e-service condition. This indicates that schema resonance had larger effects on the communication approach satisfaction and the information satisfaction for low instant messaging users than for high instant messaging users.

Low instant messaging users did not use instant messaging often, so their expectation of the e-service communication approach would be the regular one-question-one-answer-dialogue communication. When they received two pieces of information in one reply and realized that both pieces of information were what they planned to know, they generated greater satisfaction with this novel type of communication approach than with the expected one-question-one-answer-dialogue communication approach, because this unexpected communication approach could help answer their questions faster than the expected one-question-one-answer-dialogue communication. This unexpected communication approach also could make them feel more satisfied with the information, because the information they received in each reply in the schema-resonance e-service condition did help resolve two questions each time. They might feel receiving two pieces of information at a time made the information more useful than receiving a single piece of information at a time.

As for individuals who had high instant messaging experience, they used instant messaging often and possibly had already got used to receiving more than one piece of information in one reply at a time. When they received two pieces of information in one reply in the present research, they possibly didn't perceive as much novelty with this communication approach as did the low instant messaging users. Thus, they felt similarly satisfied with the schema resonance communication approach and the regular one-question-one-answer-dialogue approach. As a result, high instant messaging users in the schema-resonance e-service condition and those high instant messaging users in the non-schema-resonance e-service condition had a similar level of satisfaction with the communications approach. In addition, assuming high instant messaging users were used to receiving more than one piece of information in one reply, the schema resonance communication approach did not influence their satisfaction with the

information itself. It possibly didn't matter to them if one or two pieces of information were provided at a time. They would feel the information was useful as long as they eventually received all of the information they wanted to know. Because participants in the non-schema-resonance e-service condition eventually received the same information as those in the schema-resonance e-service condition, high instant messaging users from both e-service conditions felt similarly satisfied with the information.

Compared to individuals in the failed-schema-resonance e-service condition, individuals in the schema-resonance e-service condition showed more knowledge gain; were more satisfied with the overall e-service communication, the communication approach, and the information; and showed greater behavioral intent to continue using the e-service. These findings indicate that when provided with additional information in the e-service communication, individuals would prefer the e-service which achieved schema resonance successfully to the e-service communication which failed to achieve schema resonance. The findings also indicate that providing the customer with additional information which is not relevant to the customer's sense-making schemas could decrease the effectiveness of the communication, negatively affect the customer's satisfaction, and lower the customers' intent to use the e-service in future.

In the e-service communication where both requested information and additional information were provided, if the schema resonance attempt failed, the additional information would not be what the participants wanted to know and would not meet the participants' sense-making expectations. If information doesn't match the schema expectations, schema incongruity occurs, and greater cognitive processing is needed to reconcile the information (Hastie, 1980). Participants in the failed-schema-resonance e-service condition experienced schema incongruity, while participants in the schema-resonance e-service condition experienced schema congruity.

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The participants in the failed-schema-resonance e-service condition would need to use more cognition to process the irrelevant additional information than participants in the schema-resonance e-service condition. Because the participants' cognitive load was larger due to the irrelevant additional information in the failed-schema-resonance e-service condition than in the schema-resonance e-service condition, the participants' knowledge gain about the information would be compromised in the failed-schema-resonance e-service condition as compared to the schema-resonance e-service condition. As a result, the schema-resonance e-service condition was more effective than the failed-schema-resonance e-service condition for participants to obtain the information they wanted to know.

Schematic congruity could make individual present more positive affect (Mandler, 1982). Participants in the schema-resonance e-service condition would show more positive affect and felt more satisfied with the information, the communication approach, and the overall e-service, because the schema-resonance e-service condition provided wanted information which was congruent with the participants' sense-making schemas but the failed-schema-resonance e-service condition provided the participants with unwanted information which caused schema incongruity.

The reliability of the organizations' service should be an important factor for increasing the length of the organization-customer relationship (Lemon & Bolton, 2002). This suggests that if the customer feels the e-service is not reliable or cannot meet his/her needs in a satisfactory way, the customer will not be willing to use the e-service again in the future. Because the failed-schema-resonance e-service condition was less effective than the schema-resonance e-service communication, and also because participants in the failed-schema-resonance e-service condition were less satisfied with the e-service than those in the schema-resonance e-service

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communication, participants who experienced the failed schema resonance attempts should consider the e-service to be less reliable than those who experienced the successful schema resonance attempts. As a result, participants in the failed-schema-resonance e-service condition were less inclined to continue using the e-service than those in the schema-resonance e-service communication.

Practical Implications

Because schema resonance was not examined directly, and because most of the effect sizes (.01< r <.34) obtained in this research were small to medium (Gliner et al., 2009), additional research is needed before organizations should consider implementing the following suggestions regarding online e-service communication strategies.

However, the success of achieving manipulated schema resonance with the customer's sense-making schemas in the simulated organization-customer e-service communication suggests that it may be possible to achieve schema resonance in real-world e-service situations. As the research findings show, when compared with the regular one-question-one-answer-dialogue e-service, e-service with schema resonance could increase the customers' satisfaction without compromising the effectiveness of the communication or decreasing customers' intent to continue using the e-service. The findings demonstrate the practical importance of applying the Schema Resonance Model in the real-world organization-customer e-service. This also answers the overarching research question of this dissertation research, "Is it beneficial to achieve schema resonance in the e-service communication?" The answer appears to be yes.

Given that it appears to be possible to achieve schema resonance in real-world e-service and it appears to be beneficial for an organization to achieve schema resonance in e-service communication, an organization should consider applying the proposed Schema Resonance

Model in its e-service practices and strive to achieve schema resonance in e-service communications with the customers. Based on the theoretical structure of the proposed Schema Resonance Model and the findings of this dissertation research, practical advice is offered on what and how an organization can do to apply the Schema Resonance Model and achieve schema resonance in its e-service practices.

To guarantee schema resonance will be successfully achieved, the organization representative should make sure that the requested information she/he provides to the customer is what the customer wants to know and the additional information is also what the customer plans to obtain. To be able to provide the requested and additional information accurately, the representative's sense-producing schemas (both principle schema and adaptation schema) need to resonate with the customer's sense-making schemas.

It is relatively easy for the representative to use the proper principle schema to create the accurate information to answer the customer's question, because the representative can see the question the customer asks and figure out what kind of information the customer wants to know. However, because often the representative cannot know for sure what the next question the customer wants to ask is about, it is less easy for the representative to select the right adaptation schema to create the additional information which is also what the customer wants to know. For example, the representative may think the customer also wants to know a piece of information, but in reality the customer doesn't want to know it at all. There could be a discrepancy between what the representative thinks the customer also wants to know and what the customer really wants to know. This implies that the representative's adaptation schema may not always resonate with the customer's sense-making schema.

The information created by the representative using an adaptation schema can appear to be what the customer also want to know and can seem to be related to what the customer just inquired about, but the same piece of information may not be what the customer really also wants to know or may not even be relevant at all to what the customer also wants to request. Therefore, it is possible that not every attempt by the representative to proactively provide the additional information can achieve schema resonance.

As the research findings show, e-service with failed schema resonance would affect the effectiveness of the e-service, the customers' satisfaction, and the customers' intent to continue using the e-service while e-service with successful schema resonance could benefit both the organization and the customer. The representative should try to avoid making schema resonance attempts which may not be successful in the practices and should always strive to select the proper sense-producing schemas (both principle and adaptation schemas) to make the wanted information for the customer.

To be able to select the right principle schema, the representative needs to receive proper customer service training to be able to tell what the customer wants to know based on the customer's inquiry. As Morsing and Schultz (2006) suggested, the organization and the external stakeholders should both be involved in the sensemaking and sensegiving processes to gain awareness of mutual expectations. Similarly, to gain mutual understanding and enhance the mutual expectations between the representative and the customer, the organization should invite customers to provide feedback throughout the customer service training process. The organization should create comprehensive customer profiles to allow the representative to learn as much as possible about every customer sub-group. The organization should use the customers' background analyses, customers' needs investigation survey, customers' satisfaction survey,

customers' questions and complaints, and so forth to create the customer profiles. The organization should train the representatives on how to provide accurate information to the customers in e-service practices to meet their needs. As the organization's products and services change, develop, and improve, the representative should keep updating his/her knowledge about the products and services to meet the new needs of the customers.

The training will enable the representative to create customer-related schemas in his/her mind. Schema is "a cognitive structure that represents knowledge about a concept or type of stimulus" (Fiske & Taylor, 1991, p.98). The representative will gain knowledge about the products and services, the customers, and customers' needs in the training to make sure that he/she will be able to recognize and understand what a customer wants to know when a question is asked. Once the representative completes the training, the representative should have stored sufficient customer-related schemas in mind which can be selected as principle schemas to produce the requested information for the customer during the e-service. The process of the representative storing principle schemas in mind can be considered as "thinking *like* the customer." The reason for the representative doing all of the training is to be able to "think *like* a customer," so that he/she will know what exactly the customer wants and then provide quality service to the customer.

Schemas can also be "representations of experience that guide action, perception, and thought" (Mandler, 1982, p. 3). Given that schemas are interdependent and can only be meaningful in relation to other schemas (Arbib, 2003), the representative should select an adaptation schema, which is closely related to the principle schema, based on the experience of knowing what the customer may also want to know. The representative could use the selected adaptation schema to provide additional information to the customer. The process of the

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representative preparing for the adaptation schemas can be described as "thinking *for* the customer." To be able to provide correct, useful and, most importantly, relevant additional information, the representative should "think *for* the customer" beyond what the customer has already inquired about. If the representative wants the additional information (what the representative thinks the customer also wants to know) to be what the customer really also wants to know, the representative should accurately predict what the customer may also want to know based on the prior training and the experience of knowing what else previous customers always wanted to know when they asked for a specific piece of information.

If what the representative thinks the customer also wants to know is indeed what the customer also wants to know, the adaptation schema of the representative resonates with the sense-making schema of the customer. To accurately predict what the customer also wants to know, the representative should pay attention to the connections among the various needs of the customers and learn the patterns of the customers' inquiries and questions. The organization can make good use of the archived e-service history, analyze the customers' inquiries, discover the relevance and relations among various questions, and summarize the patterns of the customers' needs and questioning behaviors, so that the organization can design an effective training program to train the representatives. Learning the patterns of customers' inquiries and relations among the inquiries will help the representative store necessary schemas in his/her mind which can be used as the adaptation schemas in deciding what additional information to provide when the situation fits.

The organization may also create computer software for the instant messaging e-service to help the representative decide what the additional information should be. The software can help increase the accuracy of the additional information the representative proactively produces.

The ideal software should display what other questions are often asked if a specific question is asked by the customer in the order of high-to-low probability. The software can also organize the questions for different sub-groups of the audience, such as females and males. It is the customer who initiates the e-service communication in the real world. To initiate the e-service, a customer often needs to provide his/her name, email address, and the question he/she wants to ask, so it is possible to collect the customer's gender information in this e-service initiation process by adding a gender question.

Knowing the gender of the customer could help the representative predict what the customer may also want to know. The representative can use different strategies for different e-service situations. The findings (see Table 28 and Table 29) show that both females and males in the failed-schema-resonance e-service condition were less satisfied with the overall e-service, the communication approach, and the information than those in the non-schema-resonance e-service condition. Also, males in the failed-schema-resonance e-service condition gained less knowledge and had less intent to continue using the e-service than males in the non-schema-resonance e-service condition. However, the findings also show that there was no significant difference in knowledge gain or intent to continue using the e-service between females in the failed-schema-resonance e-service condition and females in the non-schema-resonance e-service condition. These findings indicate that although the failed schema resonance attempts compromised the satisfaction, the failed attempts did not affect the effectiveness of the e-service communication or the intent to continue using the e-service for females.

Organizations need to understand their customers and fulfill customers' needs (Hogan et al., 2002). It is beneficial for organizations to retain current customers (Reichheld & Sasser, 1990). In real life situation, the representative should make sure the e-service is effective to meet

the customers' needs and should strive to retain the customers by making the customers want to use the e-service again.

Based on the findings of this research, the following application strategies are suggested: If the representative, based on the experience and knowledge about the customer and the communication topic, is very sure that the additional information is also what the customer wants to know, the representative should provide both the requested information and the additional information, regardless of the gender of the customer. If the representative is moderately sure the additional information is what the customer also wants to know, the representative should provide both the requested information and the additional information when the customer is a female, but not provide the additional information when the customer is a male. If the representative is just a little bit sure or not sure at all, the representative should not provide the additional information and should only provide the requested information regardless of the gender of the customer.

In the schema-resonance e-service condition in the experiment, the researcher used the phrase "You might also like to know that…" as the transition between the requested information and the additional information. In the real e-service communication, the representative should also use the same or similar transition phrase to make the additional information less abrupt and more acceptable.

The Schema Resonance Model could be applied to other types of organization-customer communications such as face-to-face and telephone communications. Representatives who provide customer service using other types of communications should also receive sufficient training to be able to provide the requested information and, when the situation fits, the additional information to the customers. They should also use some kind of transition phrase to

make the connection between the requested information and the additional information more natural and make the additional information more acceptable.

Limitations

This dissertation research has several limitations which may have influenced the research findings. Possible remedies are proposed for future research to correct the limitations. Estimations of how the remedies might change the research findings are also discussed.

A convenience sample was used in the research. All participants in the research were college students. Although participants had different majors and were associated with different colleges, 98.2 percent of the participants (382 out of 389) were between 18 to 24 years old. The use of this convenience sample means that the research findings can only be generalized to the young adult in the sample. They cannot be generalized to other 18 to 24 year olds or other age groups.

As mentioned previously, the use of convenience sample may also be the reason the instant messaging experience variable didn't have significant effects on the dependent variables, such as knowledge gain and e-service satisfaction. The participants were college students and were shown to have generally high computer proficiency. Regardless of their experience with instant messaging, this group of people would know how to use an instant messaging application on a computer to ask questions and request information.

To address the limitations caused by the use of convenience sample, future research should randomly select potential participants from all age groups of a more representative population. A random sample from a representative population would allow the researcher to generalize the research findings to other age groups of the general public. A random sample

should increase variance in instant messaging experience and make it more likely to detect significant effects of instant messaging experience on the outcomes of the e-service.

The sample size of male participants in the research was insufficient. A total of 61 male participants were randomly assigned to the schema-resonance e-service condition, while a total of 62 male participants were randomly assigned to the non-schema-resonance e-service condition. When comparing males in these two conditions, analysis revealed that the mean ranks for the three satisfaction variables (overall e-service satisfaction, communication approach satisfaction, and information satisfaction) were slightly higher in the schema-resonance e-service condition than in the non-schema-resonance e-service condition. However, the differences were not statistically significant. The sample size of the male participants (61 in the schema-resonance e-service condition and 62 in the non-schema-resonance e-service condition) in this research was not large enough and made the power of the statistical test insufficient (1-β= .867, calculated using G*Power 3) to detect the significant differences (if there were any) in the e-service satisfaction, the communication approach satisfaction, and the information satisfaction between males in the schema-resonance e-service condition and males in the non-schema-resonance e-service condition. To address this limitation, future research should increase the sample size of male participants and should have at least 88 (calculated using G*Power 3) male participants in each of the two e-service conditions. The increased sample size can ensure the statistical test (comparing means of two independent samples) has a sufficient and desired power of .95 to detect the differences in the satisfaction variables between males in these two e-service conditions, when the significance level (α) of .05 and the medium effect size (d=.50) are desired.

Only measuring the general instant messaging experience may not be sufficient. For example, an individual may use instant messaging frequently in general but never use the instant

messaging for e-service. Or an individual may not use instant messaging frequently in general but use the instant messaging for e-service frequently. Therefore, the measurement of e-service instant messaging experience should also be considered. At this point, it is unclear which measurement of experience would be a better predictor for e-service outcomes, especially if the research sample is randomly selected from a representative population with different age groups of people. In future research, the researcher should measure both general instant messaging experience and e-service instant messaging experience. The researcher can then decide which experience measurement (or both) would be appropriate for the research based on the results of statistic tests.

The instant messaging experience was measured with the frequency of using the instant messaging. This may possibly be the reason the effects of instant messaging were not significant. For example, an individual uses the instant messaging very frequently but only has used the instant messaging for two months. Another individual also uses the instant messaging very frequently but has used the instant messaging for five years. Both individuals may report "always" as the frequency of using the instant messaging, but the length of use is very different. Future research should use both the frequency and length of using instant messaging to measure the experience with the instant messaging. Some participants may self-report their experience with the instant messaging inaccurately. Therefore, future research should instruct the participants to report their experience with instant messaging honestly.

The simulation of organization-customer e-service communication in the research was conducted in a computer laboratory. Although the researcher asked all participants to carry out the communication at their own pace, the ecological validity was limited. The research findings might differ in a natural e-service communication setting. For example, the participants had no

distractions in the laboratory, couldn't do multitasking, and might have paid more attention to the information provided to them. This might be the reason the knowledge gained by the participants in schema-resonance and non-schema-resonance conditions were at similar levels. In the laboratory, the instant messaging application was QQ International, and participants might not have liked the chatting interface of this application. It might have caused the participants' overall low intent to continue using the e-service and the non-significant difference in behavioral intention between the schema-resonance and non-schema-resonance e-service conditions. In future research, the researcher could conduct the research in a natural setting, and use a real e-service interface offered by a real organization to increase the ecological validity. The natural setting and the use of a real e-service interface may increase the size of the differences found in the laboratory experiment and detect any significant differences that were non-significant in the laboratory setting.

The communication topic of the simulated e-service in the research was a hypothetical topic that was created by the researcher. The researcher intentionally chose "Virtual Class" as the topic to increase the involvement of the participants in the communication, because the participants were college students and the Virtual Class topic was closely related to their college life. The participants were instructed to ask 12 specific questions related to the Virtual Class topic. Because the questions were not the participants' own questions, the participants did not originally have the sense-making schemas in mind. Instead, they were instructed to create the sense-making schemas. When they received the answers to the questions, their feelings about the information might not be as strong as they would have been if the questions were generated by the participants themselves. That might be the reason why participants did not show more satisfaction than they did in the schema-resonance e-service condition. Not asking their own

questions might also have made the participants less inclined to continue using the e-service. Future research could use the real organization-customer e-service and allow the customers to ask questions they originally want to ask on the topic of their choosing. In this way, when the schema resonance takes place, the customers would really feel the representative knows what they want to know and the schema-resonance communication approach really helps solve their problems. They would probably show more satisfaction with the e-service and more intent to continue using the e-service than they showed in this research.

The researcher excluded participants who obtained answers to only eight or fewer questions from the research based on the participant exclusion criterion determined by the researcher. However, in the actual experiment, nine participants obtained more than eight answers but did not obtain all the 12 answers. Two of them were in the schema-resonance e-service condition, four in the non-schema-resonance condition, and three in the failed-schema-resonance condition. Those participants were not excluded from the research. Including the data for those participants may have affected the values of the dependent variables, such as knowledge gain, time of e-service, and overall e-service satisfaction. Future research should exclude all the participants who do not complete all of the tasks.

The order of the 12 questions on the task sheet was determined based on the results of the question-order-ranking survey. The questions were paired up and listed from the most-wanted-to-ask to the least-wanted-to-ask. This order meant that the questions became less interesting as fewer questions were left to ask, which could have contributed to the number of incomplete experimental sessions. In addition, the most-wanted-to-ask questions selected by the sample used in the question-order-ranking survey may not have been the most-wanted-to-ask questions for the sample of the experiment. Future research should conduct the question-order-ranking survey

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using the same sample of the experiment, with an appropriate interval between the question-order-ranking survey and the experiment to avoid sensitization.

The data for all the dependent variables in this dissertation research were not normally distributed. It may be because the participants could complete the same tasks in the experiment in a similar fashion and there was not much variance in the outcomes of the simulated e-service. Nonparametric test Wilcoxon-Mann-Whitney was conducted to test hypotheses and answer research questions. Future research may have normally distributed data for the outcomes of the e-service, and parametric tests such as Independent Samples T-test should be used.

Schema resonance was not studied directly; it was manipulated in this research. The effects of schema resonance on the outcomes of e-service communication observed in this research were based on the manipulated schema resonance. The effects may differ if schema resonance is achieved in a real organization-customer communication.

As noted previously, most of the effect sizes obtained in the research were relatively small to medium ($.01 < r < .34$). Although small effect sizes were important theoretically, an organization should view the practical implications critically. Before implementing any suggestions made in this research, an organization should conduct further research to determine if it is worth implementing the suggestions from a practical perspective.

This research only examined three types of customers' satisfaction: overall e-service satisfaction, communication approach satisfaction, and information satisfaction. Customer satisfaction could have many dimensions. For example, Homburg and Rudolph (2001) studies seven dimensions (product features, product-related information, services, order handling, complaint handling, interaction with salespeople and interaction with internal staff) for the industrial customer satisfaction. Mishra (2007) identified five dimensions (service orientation,

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diligence, adherence, value for money, and amiability) to study the customer satisfaction for nationalized banks. Danaher and Haddrell (1996) measured both the overall satisfaction with the service and the satisfaction with the key components of the service process in a customer satisfaction study. As for e-service, customers may evaluate various aspects of the e-service process differently, and many components should contribute to the overall satisfaction. Other types of customers' satisfaction related to organization-customer e-service should also be examined in the real-world e-service situation. For example, satisfaction with the tone of the representative, satisfaction with the language use, and satisfaction with the service speed should be studied in future research.

Future Research

The occurrence of schema resonance was manipulated in this dissertation research. To validate the current Schema Resonance Model, it is important to know if and how schema resonance takes place in a real organization-customer e-service communication in a natural setting. Future research could focus on examining how schema resonance is achieved or can be achieved in real organization-customer e-service practices. The researcher could use questions in the post survey to determine if both the requested information and the additional information are what the customer originally wanted to know. If the customer answers yes to these questions, the researcher should also ask if the customer prefers this kind of e-service to the e-service where the customer only receives one piece of information at a time.

Future research could examine the effect of schema resonance on the efficiency of the e-service. Because the e-service time and communication turns were bonded with the manipulated e-service conditions in this research, it was not appropriate to use time and communication turns to measure the efficiency of the communication. In the real-world e-service situations, the

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efficiency of the communication could be measured by the total service time and the number of communication turns needed to resolve the customer's questions. Future research could compare the amount of e-service time and the number of communication turns used in the e-service communication with attempts to achieve schema resonance with those in the regular one-question-and-one-answer communication. Future research could also use questions in the post-service survey to ask the customers to report the degree to which they feel the e-service communication is efficient to solve their questions.

The current model suggests that the customer has two sense-making schemas in mind when schema resonance occurs: one sense-making schema is for processing the requested information, and the other is for processing the additional information. To expand the application of the model, future research could examine whether schema resonance can be achieved when the customer only has one sense-making schema, which initiates the information inquiry process by starting the e-service communication to request one specific piece of information. A customer may not always have two questions to ask when he/she starts a communication with the representative. When the customer only has one question to ask at the beginning, the representative would still provide the requested information and the additional information in the reply. The customer may read the requested information and generate another sense-making schema which makes him/her want to ask another question. After finishing reading the requested information, the customer continues reading the additional information and realizes that the additional information answers the question that just came to mind as he/she was reading the requested information. In this case, schema resonance may also take place. The researcher could use questions in the post survey to ask if the information provided by the representative answered the questions that occurred to the customer during the communication. The researcher

should also ask if the customer prefers this e-service to the e-service where the representative only provides the answer to the question the customer asks.

This research only examined one part of the Schema Resonance Model—the resonance between the representative's sense-producing schemas and the customer's sense-making schemas. Two other parts of the model should also be examined in future research to make the organization's customer service training programs effective. The first part is where the customer's inquiry is processed by the representative. It should not be assumed that the representative will understand all of the questions asked by the customer. Future research could examine whether the representative can understand the customer's inquiry in a way that allows him/her to really comprehend the customer's needs. The researcher could invite the potential customers of an organization to ask questions they may have regarding the products and services the organization offers, and then ask the customers to write down what they expect good answers to the questions should be like. The researcher will also ask the representatives to read all of the questions and give the answers to the questions. The researcher will analyze whether the representatives' answers meet the expectations of the customers. Through this process, the researcher could detect any discrepancies between what the representatives think the customers want to know and what the customers really want to know. Identifying discrepancies will allow the representatives to provide the information that is really wanted by the customers and can be congruent with the sense-making schemas of the customers in the real service practices.

The second part of the model that should be examined in future research is the part where the representative selects the principle and adaptation sense-producing schemas. What the representative thinks the customer may also want to know may not be what the customer really also wants to know. The researcher could ask customers to write down all the questions they may

want to ask about a specific product or service and then ask the customers to match two questions they want to ask together. The researcher will also ask the representatives to match pairs of questions that the customers wants to ask. The researcher will compare how close the matching of the representatives is to the matching of the customers. If the matchings are not close enough, the representatives should have more systematic training to learn more about the customers' needs and the relations among the customers' needs so that they will be able to select the right adaptation schema to provide the additional information that is also wanted by the customer.

Future research could also examine the application of the model in other types of customer-representative communications, such as face-to-face communication and telephone communication. In face-to-face or telephone communication, the representative should be able to provide both the requested information and the additional information in one reply so that schema resonance could be achieved. Future research should examine whether schema resonance has similar effects on the outcomes of customer service in these different types of communication.

Future research could also include two more variables and explore the relationships among all the variables. For example, future research could add "response waiting time" as an independent variable, because different representatives may spend different amounts of time to provide the answer to the same question. The waiting time may affect the customer's satisfaction with the overall service. Because how an organization responds to customers' online inquiries can influence customers' opinions of the organization (Zemke & Connellan, 2001), future research could also include "attitude toward the organization" as a dependent variable.

Future research could also explore the effects of partial schema resonance. In a real organization-customer communication, the sense-producing schemas of a representative may partially resonate with the sense-making schemas of a customer. Schema resonance can be treated as a continuum, and non-schema resonance and full schema resonance are at the two ends of the continuum. Future research could compare partial schema resonance to full schema resonance and non-schema resonance and examine how partial schema resonance may influence the outcomes of the e-service.

Future research could expand the model (see Figure 3) and add the customer's sense-producing and sense-giving processes to the model. It is important to include the customer's sense-producing and sense-giving processes in the model, because the customer's sense-producing and sense-giving processes could influence both the formulation of the initial information inquiry and follow-up questions formulated in response to the information initially provided by the organization representative. Future research could also study how the sense-producing process of a customer may influence the sense-making process of a representative.
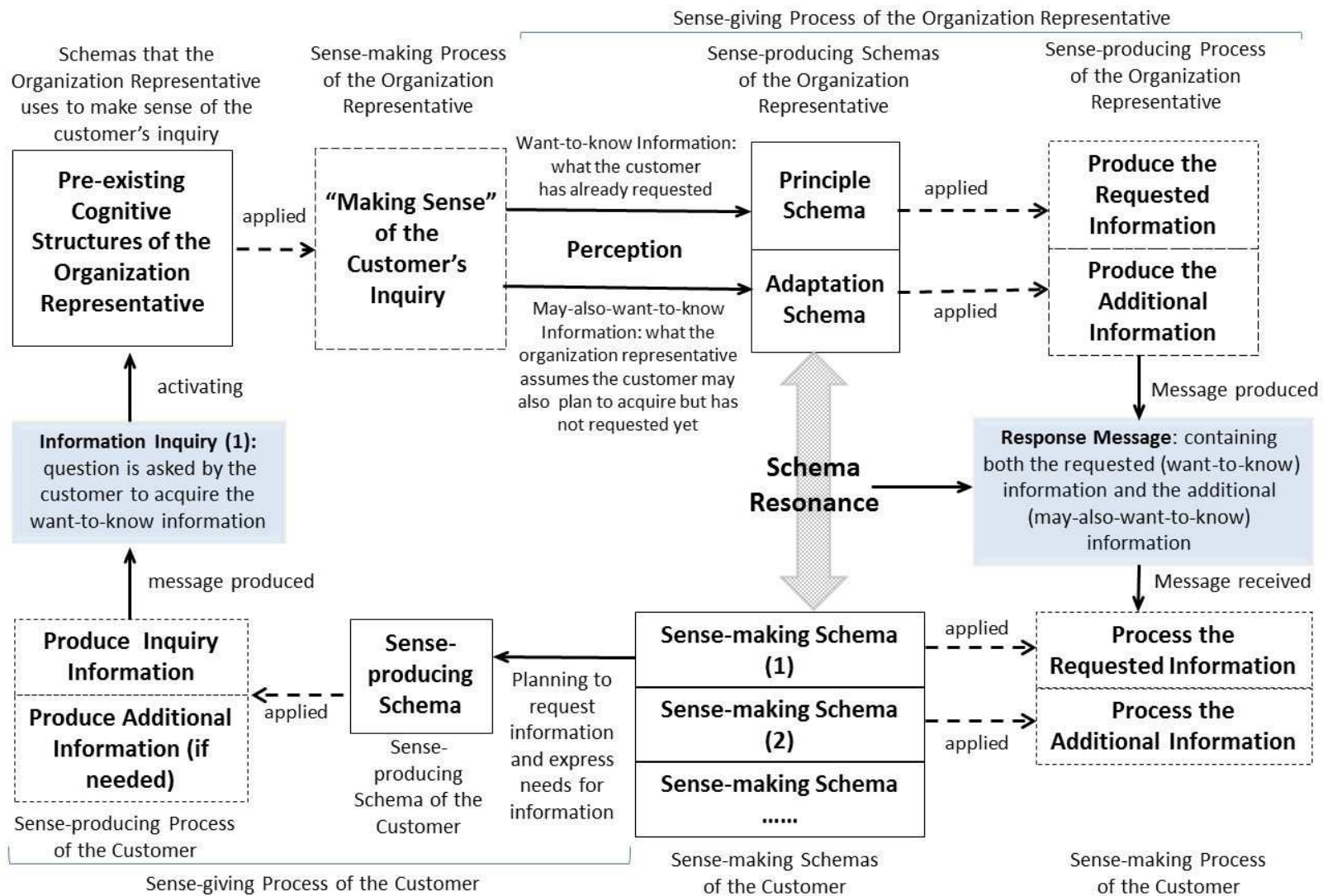
Figure 3. Expanded Schema Resonance Model.

CONCLUSION

This dissertation research answers the overarching research question proposed in the introduction chapter and suggests that it would be beneficial for both the organization and the customer if schema resonance is achieved in e-service communication.

This dissertation research proposed a new organization-customer communication model—the Schema Resonance Mode—to better understand how the one-to-one online communication between an organization representative and an individual customer is conducted and to improve the organization's e-service for customer's information inquiries. The Schema Resonance Model describes the customer's and the representative's schemas and cognitive processes involved in the organization-customer communication. Four types of schemas are included in the Schema Resonance Model: the pre-existing cognitive structure of the organization representative, the principle sense-producing schema of the representative, the adaptation sense-producing schema of the representative, and the sense-making schema of the customer. Three cognitive processes are involved in the Schema Resonance Model: the organization representative's sense-making process, the representative's sense-producing process, and the customer's sense-making process. Schema resonance is defined as the resonance between the schemas used by the organization representative in the sense-producing process and the schemas used by the customer in the sense-making process. Schema resonance occurs when the sense-producing schemas (principle and adaptation schemas) used in the organization representative's sense-producing process can successfully reflect and accurately estimate the sense-making schemas used by the customer in the sense-making process.

In an e-service communication between a customer and a representative, the customer wants to ask questions and has sense-making schemas in mind. The customer would use these

sense-making schemas to start the information inquiries by asking the questions. When a question is received by the representative, the representative would use the pre-existing cognitive structure to make sense of the inquiry. After the representative understands what information the customer wants to know, the representative uses the principle sense-producing schema to produce the requested information in the reply. The representative also could use the adaptation sense-producing schema to provide the additional information in the same reply. When the customer receives the response message, the customer reads the message and uses the sense-making schemas to process the information. After processing the information, the customer would decide what question to ask next or decide to end the e-service communication.

If the requested information is what the customer wants to know and the additional information is also what the customer wants to know, the customer would realize that he/she obtains both the answer to the question he/she has asked and the answer to the question he/she also wants to ask next. When the requested information produced by the representative using the principle sense-producing schema is the answer to the question the customer has asked, the requested information meets the expectation of one of the customer's sense-making schemas. Schema congruity takes place, and the representative's principle sense-producing schema resonates with the customer's sense-making schema. In similar fashion, when the additional information produced by the representative using the adaptation sense-producing schema is the answer to the next question the customer also wants to ask, the additional information also meets the expectation of another of the customer's sense-making schemas. Schema congruity takes place as well, and the representative's adaptation sense-producing schema also resonates with the customer's sense-making schema.

This research discussed the possibility of achieving schema resonance in one-to-one communication between an organization and its customer. Three independent variables were examined: e-service condition (schema resonance, non-schema resonance, and failed schema resonance), gender (male and female), and instant messaging experience (low and high). Four dependent variables were examined in the research: communication effectiveness (knowledge gain), communication efficiency (e-service time and number of communication rounds), customer satisfaction (overall e-service satisfaction, communication approach satisfaction, and information satisfaction), and customer's intent to continue using the e-service. Hypotheses and research questions were proposed to test whether or not schema resonance could benefit the organization-customer e-service in terms of communication effectiveness, communication efficiency, customer satisfaction, and customer's intent to continue using the e-service. Hypotheses and research questions were also proposed to examine whether or not there was differences based on gender or instant messaging experience when schema resonance took place.

A post-test only 3 x 2 x 2 factorial between-subjects experimental/quasi-experimental design was used to test the proposed hypotheses and research questions. A convenience sample was used in this research. A total of 423 college students participated in the experiment and were randomly assigned to one of the three simulated e-service conditions: schema-resonance, non-schema-resonance, and failed-schema-resonance e-service conditions. A total of 409 participants completed the experiment session. After completing the experiment session, participants took an online survey. Incomplete and unusable survey entries were deleted, a total of 389 survey entries were usable. IBM SPSS Statistics 22 was used to run statistic tests to test hypotheses and answer research questions. Research findings were presented and interpreted.

For both the schema-resonance e-service condition and the non-schema-resonance e-service condition, no significant effects of any two-way or three-way interactions among e-service condition, gender, and instant messaging experience were found on knowledge gain, overall e-service satisfaction, communication approach satisfaction, information satisfaction, or intent to continue using the e-service.

Individuals in the schema-resonance e-service condition gained a similar amount of knowledge about the information provided in the communication as those in the non-schema-resonance e-service condition. Individuals in the schema-resonance e-service condition also showed a similar intent to continue using the e-service as those in the non-schema-resonance e-service condition.

Compared to individuals in the non-schema-resonance e-service condition, individuals in the schema-resonance e-service condition were more satisfied with the overall e-service, the communication approach used in e-service, and the information provided in e-service. More specifically, as the post hoc analysis indicated, those females in the schema-resonance e-service condition were more satisfied with the overall e-service, the communication approach, and the information than were females in the non-schema-resonance e-service condition. Males in the schema-resonance e-service condition and males in the non-schema-resonance e-service condition had similar levels of satisfaction with the overall e-service, the communication approach, and the information.

In the schema-resonance e-service condition, males and females had similar knowledge gain, but females were more satisfied with the overall e-service, the communication approach, and the information, and had more intent to continue using the e-service than males. In the non-schema-resonance e-service condition, females and males showed no differences.

In the non-schema-resonance e-service condition, individuals with low instant messaging experience and individuals with high instant messaging experience showed no significant differences in all dependent variables. In the schema-resonance e-service condition, individuals with low instant messaging experience and individuals with high instant messaging experience showed no significant differences in knowledge gain, overall e-service satisfaction, communication approach satisfaction, or information satisfaction.

In the schema-resonance e-service condition, individuals who had high instant messaging experience showed more intent to continue using the e-service than individuals who had low instant messaging experience.

For individuals who had low instant messaging experience and individuals who had high instant messaging experience, there were no significant differences between the schema-resonance and non-schema-resonance e-service conditions in terms of knowledge gain, overall e-service satisfaction, and intent to continue using the e-service. For individuals who had low instant messaging experience, those in the schema-resonance e-service condition showed more satisfaction with the communication approach and the information than those in the non-schema-resonance e-service condition. For individuals who had high instant messaging experience, there was no significant difference in the communication approach satisfaction or the information satisfaction between the schema-resonance and non-schema-resonance e-service conditions.

Compared to individuals in the failed-schema-resonance e-service condition, individuals in the schema-resonance e-service condition showed more knowledge gain; were more satisfied with the overall e-service communication, the communication approach, and the information; and showed greater intent to continue using the e-service.

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This dissertation also offers theoretical and practical implications based on the findings. The success of achieving schema resonance in the simulated organization-customer e-service communication suggests that it is possible to achieve schema resonance in real-world e-service situations. It would be beneficial for an organization to achieve schema resonance in e-service communication to improve the efficiency of the communication and increase customer's satisfaction with the e-service. An organization could create customer profiles to analyze customers' needs, give sufficient trainings to its customer service representatives to help them understand customers' needs, and apply the Schema Resonance Model to its e-service practices. To achieve schema resonance in e-service communication, the organization representative should use one reply to provide both the requested information that the customer has requested and the additional information that the customer also plans to request. The representative could try to achieve schema resonance in the e-service communication when the situation permits. It is possible to apply Schema Resonance Model to other types of organization-customer communication, such as face-to-face communication and telephone communication.

The Schema Resonance Model proposed in this dissertation research contributes to the organization-customer communication literature. The model suggests a theoretical framework that maps the representative's sense-making and sense-producing processes and the customer's sense-making process involved in the organization-customer communication. The model also classifies two types of schemas (principle schema and adaptation schema) the representative may use in the sense-producing process to produce information for the customer. In addition, the model suggests a new communication strategy—proactively providing additional information— that the organization representative could consider using in the organization-customer communication to respond to customer's information inquiries.

Future research should examine the application of Schema Resonance Model in a real organization-customer communication situation and explore how schema resonance could be achieved. Future research should also examine other parts of the Schema Resonance Model, including the part where the customer's inquiry is processed by the representative and the part where the representative selects the principle and adaptation sense-producing schemas. The application of Schema Resonance Model in face-to-face or telephone communication between the organization representative and the customer could also be the topic of future research.

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APPENDIXES

Appendix A

INFORMED CONSENT FORM

Consent to Participate in a Research Study
Colorado State University

TITLE OF STUDY: *Study of Students' Opinion about the Virtual Class Program*

PRINCIPAL INVESTIGATOR: Cindy Christen, Ph.D., Department of Journalism and Technical Communication, cindy.christen@colostate.edu

CO-PRINCIPAL INVESTIGATOR: Xu Song, Ph.D. Candidate, Department of Journalism and Technical Communication, bevin.song@colostate.edu

- You are invited to participate in this study.
- The Principal Investigator, Dr. Cindy Christen, and the Co-Principal Investigator, Xu Song, are doing this study.
- The purpose of the study is to investigate students' opinions.
- The study will be an experimental study. The study session will take place in a computer laboratory in the Clark Building. The study session will take about 22-27 minutes.
- During the experiment, you will be asked to get answers to 12 questions via online chatting with an online representative. After you get the answers, you will be asked to complete an online survey.
- You can participate in this study if you want to participate.
- There are no known risks associated with your participation in the study. It is not possible to identify all potential risks in research procedures, but the researcher(s) have taken reasonable safeguards to minimize any known and potential, but unknown, risks.
- There is no known benefit to you. However, your opinions might help improve the research in the future.
- Your participation in this research is voluntary. If you decide to participate in the study, you may withdraw your consent and stop participating at any time without penalty or loss of benefits to which you are otherwise entitled.
- There is no cost to participate in the study.
- We will keep private all research records that identify you, to the extent allowed by law.
- This study is anonymous. For this study, your name or other identifiable data will not be linked to your data, so nobody (not even the research team) will be able to identify you or your data. We may be asked to share the research files for audit purposes with the CSU Institutional Review Board ethics committee, if necessary.
- For this study, we will assign a code to your data (e.g. 10231) so that the only place your name will appear in our records is on the consent and in our data spreadsheet which links you to your code. Only the research team will have access to the link between you, your code, and your data. The only exception to this is if we are asked to share the research files for audit purposes with the CSU Institutional Review Board ethics committee, if necessary. In addition, for funded studies, the CSU financial management team may also request an audit of research expenditures. For financial audits, only the fact that you participated would be shared, not any research data. When we write about the study to share with other researchers, we will write about the combined information we have gathered. You will not be identified in these written materials. We may publish the results of this study; however, we will keep your name and other identifying information private.

- You will receive extra credit for this course if you choose to participate in this study.
- If you choose to not participate, you can still earn extra credit by completing an alternative assignment if a) you sign up today and b) complete the assignment by next Monday. Ask the researcher for details and the alternative assignment instructions.
- The Colorado Governmental Immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of the injury.
- Before you decide whether to accept this invitation to take part in the study, please ask any questions that might come to mind now. Later, if you have questions about the study, you can contact the investigator, Xu Song, at bevin.song@colostate.edu. If you have any questions about your rights as a volunteer in this research, contact the CSU IRB at: RICRO_IRB@mail.colostate.edu; 970-491-1553. We will give you a copy of this consent form to take with you.

Instructions to participate in the study and earn the extra credit points:

- Carefully read and understand these instructions.
- If you decide to participate in the study, please sign and print your name in the spaces below. Include today's date.
- Please keep one copy of this consent form for your own record. Please return the other copy of the consent form to the researcher.
- Please sign up and provide your name and gender. Your printed name on the sign-up sheet must be legible in order to receive extra credit points.
- Permission to re-contact:

> Do you give permission for the researchers to contact you via email to provide the detailed information (time and location of the experiment) about your participation in the study? Please initial next to your choice below.
>
>   Yes _____ (initials)
>
>   No _____ (initials)

- You will be contacted by the researcher via email regarding the time and location of the study.
- You will be invited to a computer laboratory in Clark Building to participate in the study.

Your signature acknowledges that you have read the information stated and willingly sign this consent form. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing 2 pages.

_____   _____
Signature of person agreeing to take part in the study   Date

_____
Printed name of person agreeing to take part in the study

_____   _____
Name of person providing information to participant   Date

_____
Signature of research staff

Appendix B

SAMPLE OF EXPERIMENT SESSION SIGN-UP SHEET

Sign-up Sheet for Participation in the Study (xx Points Extra Credit)

Study Session Location: Clark Building C235A

Date: Tuesday, Jan. 27

Starting Time	Your First Name	Your Last Name	Your Gender (Male or Female)
8 am			
8:30 am			
9 am			
9:30 am			
10 am			
10:30 am			
11 am			
11:30 am			
12 noon			
12:30 pm			
1 pm			
1:30 pm			
2 pm			
2:30 pm			
3 pm			
3:30 pm			
4 pm			
4:30 pm			
5 pm			
5:30 pm			
6 pm			
6:30 pm			

Appendix C

PRE-EXPERIMENT SURVEY QUESTIONNAIRE

Please Read:

Instant Messaging (IM) is a type of online chat service which offers_real-time text transmission over the Internet.

Instant Messaging examples are Yahoo! Messenger, MSN Messenger, AIM Messenger, Google Talk, Skype Instant Messaging, etc.

1. **In general, how often do you use instant messaging?**

    Never   Seldom   Sometimes   Often   Usually   Always

    1   2   3   4   5   6

2. **How often do you use instant messaging to have conversations with others?**

    Never   Seldom   Sometimes   Often   Usually   Always

    1   2   3   4   5   6

3. **How often do you use instant messaging to ask questions?**

    Never   Seldom   Sometimes   Often   Usually   Always

    1   2   3   4   5   6

4. **How often do you use instant messaging to exchange information with people?**

    Never   Seldom   Sometimes   Often   Usually   Always

    1   2   3   4   5   6

5. **How often do you use instant messaging to keep in touch with others?**

    Never   Seldom   Sometimes   Often   Usually   Always

    1   2   3   4   5   6

The End

Appendix D

INTRODUCTION AND INSTRUCTIONS

Colorado State University plans to launch a new online educational program—"Virtual Class"—to supplement the traditional in-person class and to improve students' online learning experience.

You are invited to participate in this study to get to know about "Virtual Class."

You will use the laboratory computer and the instant messaging (live chat) application to communicate with an online representative of the CSU student services.

You will ask 12 questions regarding "Virtual Class." The representative will serve you online to answer your questions.

After the conversation, you will take an online survey. In the survey, you will share the things you just learned about "Virtual Class." Also, you will evaluate the online representative's service performance.

Please follow the instructions below:

- Read the task sheet carefully.
- Complete the task listed on the task sheet.
- When you complete the task, please inform the laboratory assistant immediately.
- Complete an online survey.

This will conclude the study. Thank you!

EXAMPLE OF NUMBER-TRACKING PAGE

Condition 3 Failed - Schema - Resonance

310 _ _	Male ... Low Exp

① 31001   ㉘ 31028
② 31002   ~~scribbled out~~
③ 31003   ㉙ 31029
④ 31004   ㉚ 31030
⑤ 31005
⑥ 31006
⑦ 31007
⑧ 31008
⑨ 31009
⑩ 31010
⑪ 31011
~~scribbled out~~
⑫ 31012
⑬ 31013
⑭ 31014
⑮ 31015
⑯ 31016
⑰ 31017
⑱ 31018
⑲ 31019
⑳ 31020
㉑ 31021
㉒ 31022
㉓ 31023
㉔ 31024
㉕ 31025
㉖ 31026
㉗ 31027

173

Appendix F

TASK SHEET

Your Participation ID _____   Section Code_____   Group Code_____

Please take a moment now to read all twelve questions below carefully. You need to be very familiar with all these questions and know clearly what you need to ask in order to participate in the study.

Q1:   Does Virtual Class cost the same tuition as the parallel in-person class?
Q2:   When can students start registering for Virtual Class?
Q3:   Who is eligible to take Virtual Class?
Q4:   If the traditional in-person class still has openings, can students register for the parallel Virtual Class?
Q5:   Is Virtual Class worth the same credit hours as the parallel in-person class?
Q6:   If a student didn't attend a Virtual Class session at the scheduled time, can this student make up for that missed Virtual Class session at a later time?
Q7:   Is Virtual Class the same as the online class (Online Plus) offered by the university?
Q8:   Can students download the teaching materials in Virtual Class?
Q9:   How can students interact with the instructor in Virtual Class?
Q10:   How do students turn in assignments in Virtual Class?
Q11:   How many Virtual Classes can one student take per semester?
Q12:   How can students log in to the Virtual Class system to take a Virtual Class?

- Your task is to get and understand all the answers to these twelve questions via typing.
- Ask questions and get the answers at your own pace. Please ask only one question at a time.
- Please ask questions in the order shown. If you feel that the online representative has already given the answer to your question, you can skip that question and ask the next question.
- You should start the conversation by typing "*My Participation ID is #####. I have some questions to ask.*" You can find your Participation ID at the top of this task sheet.
- When you receive a reply from the online representative, it means the representative is ready to serve you and you can start asking questions.
- Take the task sheet with you during the study. You only need to get and understand the answers you receive. Please do not write the answers down on this task sheet.
- If you have other additional questions to ask, please write your questions down on the back of this task sheet after you finish the online conversation.
- Once you obtain and understand all the answers you need, you may end the conversation by typing "*Thank you. I have no more questions.*" Please let the laboratory assistant know immediately that you have completed the task.
- The lab assistant will show you an online survey.

End of Task Sheet

Appendix G

EXAMPLE OF ONLINE COMMUNICATION TRANSCRIPT

Date: 2015-02-09

CEU Student 0:05:42 PM
My participation ID is 21029. i have some questions to ask.

CEU Student Services 0:06:20 PM
Thank you. You may start asking questions.

CEU Student 0:06:20 PM
My first question, is does virtual class cost the same tuition as the parallel in-person class?

CEU Student Services 0:06:42 PM
Yes, the tuition of Virtual Class is the same as that of the parallel in-person class.

CEU Student 0:07:11 PM
my next question is when can students start registering for virtual class?

CEU Student Services 0:07:26 PM
Students can start registering for Virtual Class at the same time when they start registering for the traditional in-person classes.

CEU Student 0:07:51 PM
Next, who is eligible to take virtual class?

CEU Student Services 0:08:05 PM
Only undergraduate students in this university are eligible to take Virtual Class.

CEU Student 0:08:40 PM
if the traditional in-person class still has openings, can students register for the parallel Virtual Class?

CEU Student Services 0:08:53 PM
Regardless of whether the traditional in-person class has openings or not, student can register for the Virtual Class if the Virtual Class has openings.

CEU Student 0:09:22 PM
is virtual class worth the same number of credits as the parallel in-person class?

CEU Student Services 0:09:35 PM
Virtual Class is worth the same number of credits as the parallel in-person class.

CEU Student 0:10:16 PM
if a student didn't attend a virtual class session at the scheduled time, can this student make up for that missed Virtual class session at a later time?

CEU Student Services 0:10:30 PM
Students must attend a Virtual Class session at the scheduled time and cannot make up for a missed Virtual Class session at a later time, because Virtual Class only offers live online classes.

CEU Student 0:11:06 PM
is virtual class the same as the online class (online plus) that is offered by the university?

CEU Student Services 0:11:22 PM
Virtual Class is not the same as the Online Plus. Virtual Class can offer live and interactive teaching-learning experience, but the Online Plus doesn't offer live or interactive teaching-learning experience.

CEU Student 0:11:58 PM
can students download the teaching materials in the virtual class?

CEU Student Services 0:12:05 PM
In Virtual Class, students can download the teaching materials unlimited times.

CEU Student 0:12:41 PM
how can students interact with the instructor in virtual class?

CEU Student Services 0:12:57 PM
To interact with the instructor in Virtual Class, students can either type comments and questions on the live-chatting discussion board or use a microphone to speak and ask questions.

CEU Student 0:13:21 PM
how do students turn in assignments in virtual class?

CEU Student Services 0:13:37 PM
In Virtual Class, students will turn in all assignments as Word documents electronically to the Assignment Database of the Virtual Class system.

CEU Student 0:13:58 PM
how many virtual classes can one student take per semester?

CEU Student Services 0:14:20 PM
One student can take no more than two Virtual Classes per semester.

CEU Student 0:14:32 PM
how can students log in to the virtual class system to take a virtual class?

CEU Student Services 0:14:47 PM
Students need to use their eID and password to log in to the Virtual Class system to take a Virtual Class.

CEU Student 0:14:58 PM
thank you. i have no more questions.

Appendix H

POST-EXPERIMENT ONLINE SURVEY

Your Participation ID is _____. (e.g., 11111)

Your Section Code is _____. (e.g., 1, 2, or 3)

Your Group Code is _____. (e.g., 1 or 0)

Part One: Information about Virtual Class

Please answer the following questions: (Please select your answer)
1. What number of credit hours is a Virtual Class worth?
    A. Virtual Class is worth more credit hours than the parallel traditional (on-campus, in-person) class.
    B. Virtual Class is worth the same credit hours as the parallel traditional in-person class.
    C. Virtual Class is worth fewer credit hours than the parallel traditional in-person class.
    D. Some Virtual Classes are worth more credit hours than the parallel traditional in-person class, and some Virtual Classes are worth fewer credit hours than the parallel traditional in-person class.

2. Who is eligible to take Virtual Class?
    A. Only graduate students are eligible to take Virtual Class
    B. Only undergraduate students are eligible to take Virtual Class.
    C. Graduate students and some undergraduate students are eligible to take Virtual Class.
    D. Only the undergraduate students with special permission are eligible to take Virtual Class.

3. How many Virtual Classes can one student take per semester?
    A. A student can take no more than two Virtual Classes per semester.
    B. A student can take up to three Virtual Classes per semester.
    C. A student can take only one Virtual Class per semester.
    D. A student can take as many Virtual Classes as he/she wants per semester.

4. What is the relationship between the in-person class capacity and the Virtual Class registration?
    A. If the in-person class has openings, students cannot register for Virtual Class.
    B. The capacity status of the in-person class does not affect the students' registration for the parallel Virtual Class.
    C. Students can only register for Virtual Class if they also register for the in-person class.
    D. Students can only register for Virtual Class after the in-person classes are full.

5. Does Virtual Class cost the same tuition as the parallel in-person class?
    A. The tuition of Virtual Class is more than that of the parallel in-person class.
    B. The tuition of Virtual Class is the same as that of the parallel in-person class.
    C. The tuition of Virtual Class is less than that of the parallel in-person class.
    D. The tuition of some Virtual Classes is more than that of the parallel in-person classes, and the tuition of some other Virtual Classes is less than that of the parallel in-person classes.

6. What is the difference between Virtual Class and the online class (Online Plus) offered by the university?
    A. Both Virtual Class and the online class (Online Plus) offer live, interactive teaching-learning experience.
    B. Both Virtual Class and the online class (Online Plus) offer non-live teaching-learning experience.
    C. Virtual Class offers live and interactive teaching-learning experience, but the online class (Online Plus) doesn't offer live and interactive teaching-learning experience.
    D. Virtual Class doesn't offer live and interactive teaching-learning experience, but the online class (Online Plus) offers live and interactive teaching-learning experience.

7. When can students start registering for Virtual Class?
    A. Students can start registering for Virtual Class earlier than they can start registering for the in-person classes.
    B. Students can start registering for Virtual Class later than they can start registering for the in-person classes.
    C. Students can start registering for Virtual Class the same time when they can start registering for the in-person classes.
    D. For some Virtual Classes, students can start registering earlier than they can start registering for the in-person classes; for other Virtual Classes, students can start registering later than they can start registering for the in-person classes.

8. How can students log in to the Virtual Class system?
    A. Students use their student CSU ID number to log on the Virtual Class system.
    B. Students use their student email to log on the Virtual Class system.
    C. Students use their eID and password to log on the Virtual Class system.
    D. Students use their student CSU ID number and student email to log on the Virtual Class system.

9. Can students download the teaching materials in Virtual Class?
    A. Students cannot download the teaching materials in the Virtual Class.
    B. Students can download the teaching materials in the Virtual Class unlimited times.
    C. Students can only download the teaching materials in the Virtual Class once.
    D. Students cannot download the teaching materials in the Virtual Class without the instructor's permission.

10. How can students interact with the instructor?
    A. Students can type comments and questions on the live-chatting discussion board but cannot use a microphone to speak and ask questions.
    B. Students can either type comments and questions on the live-chatting discussion board or send emails to the instructor.
    C. Students can either type comments and questions on the live-chatting discussion board or use a microphone to speak and ask questions.
    D. Students can use a microphone to speak and ask questions but cannot type comments and questions on the live-chatting discussion board.

11. When can students take Virtual Class?
    A. Students can take the Virtual Class before the parallel in-person class session starts
    B. Students can take the Virtual Class after the parallel in-person class session ends.
    C. Students must take the Virtual Class at the scheduled time.
    D. Students can take the Virtual Class anytime they want.

12. How can students turn in assignments in Virtual Class?
    A. Students will turn in all the assignments as Word documents electronically via email to the instructor.
    B. Students will turn in all the assignments as Word documents electronically to the Assignment Database of the Virtual Class system.
    C. Students will turn in all the assignments as PDF documents electronically via email to the instructor.
    D. Students will turn in all the assignments as PDF documents electronically to the Assignment Database of the Virtual Class system.

Part Two: Your Impression of the Online Communication Experience

Please select a number.
1. Overall, how satisfied are you with the service provided by the representative?
   Very Dissatisfied   Very Satisfied
                  1   2   3   4   5   6 7

2. How well does the service provided by the representative meet your expectations?
   Fails to Meet   Greatly Exceed
                  1   2   3   4   5   6 7

3. Please imagine an ideal service you may receive. How well do you think the service provided by the representative compares with that ideal service?
   Not Very Close to the Ideal   Very Close to the Ideal
                  1   2   3   4   5   6   7

4. How would you rate the overall service provided by the representative?
   Terrible   Excellent
                  1   2   3   4   5   6   7

To what extent do you agree with the following statements? (Please select a number)

Please Read: Communication approach is the question-responding technique the representative used to provide the information you requested.

5. Overall, the communication approach used by the representative satisfied me.
   Strongly Disagree   Strongly Agree
                  1   2   3   4   5   6   7

6. The representative's communication approach made it difficult to complete all my tasks.
   Strongly Disagree   Strongly Agree
                  1   2   3   4   5   6   7

7. The representative's communication approach helped obtain the information I needed.
   Strongly Disagree   Strongly Agree
                  1   2   3   4   5   6 7

8. The representative's communication approach saved time in solving my questions.
   Strongly Disagree   Strongly Agree
                  1   2   3   4   5   6 7

To what extent do you agree with the following statements? (Please select a number)

9. The response information provided by the representative satisfies me.

    Strongly Disagree   Strongly Agree

    1   2   3   4   5   6   7

10. The response information provided by the representative meets my expectations.

    Strongly Disagree   Strongly Agree

    1   2   3   4   5   6   7

11. The response information provided by the representative does not fulfill my needs.

    Strongly Disagree   Strongly Agree

    1   2   3   4   5   6   7

12. The response information provided by the representative helps solve my questions.

    Strongly Disagree   Strongly Agree

    1   2   3   4   5   6   7

Please select the number indicating the extent to which you agree with the following statements.

Please Read: In the future, if you have access to this type of online service, what will you do?

13. I intend to continue using this type of online service.

    Strongly Disagree   Strongly Agree

    1   2   3   4   5   6   7

14. I will not use this type of online service to seek assistance in the future.

    Strongly Disagree   Strongly Agree

    1   2   3   4   5   6   7

15. I do not plan to use this type of online service again to get information I want.

    Strongly Disagree   Strongly Agree

    1   2   3   4   5   6   7

16. I would use this type of online service to help me solve problems in the future.

    Strongly Disagree   Strongly Agree

    1   2   3   4   5   6   7

Please answer the following question: (Please select your answer)

17. In each message provided by the online service representative, how did the representative respond to the question you were asking?
    A. The representative provided the answer to the question that I was asking, and he/she also provided information that I was going to request.
    B. The representative provided the answer to the question I was asking, but he/she also provided information that I did not want to know.
    C. The representative provided the answer to the question I was asking.
    D. The representative did not provide the answer to the question that I was asking.

Part Three: About You

1. You are Male____   or   Female _____

2. You became _____ years old at last birthday (e.g., 21).

3. Your Highest Education Level is: (Please select the one that applies)
    _____Freshman   _____Sophomore   _____Junior

    _____Senior   _____Graduate

4. Are you an international student?

    Yes____ or No____

5. Your race/ethnicity: (select all that apply)

    _____Hispanic/Latino

    _____White (a person having origins in any of the original peoples of Europe, the Middle
          East, or North Africa)

    _____African American/Black   _____ American Indian/Alaska Native

    _____Asian   _____ Native Hawaiian/Other Pacific Islander

    _____Some Other Race (please specify): _____

6. Which college(s) are you currently affiliated with? (select all that apply)
    _____College of Agricultural Sciences   _____College of Business

    _____College of Engineering   _____College of Health and Human Sciences

    _____College of Liberal Arts   _____Warner College of Natural Resources

    _____College of Natural Sciences

    _____College of Veterinary Medicine & Biomedical Sciences

    _____ I don't know.   _____ None of these (please specify):_____

7. In general, do you have any experience with non-live online classes?
    No Experience At All   A Lot of Experience
                1   2   3   4   5   6   7

8. In general, do you have any experience with live, interactive online classes?
    No Experience At All   A Lot of Experience
                1   2   3   4   5   6   7

That completes the survey. Thank you for your participation!

Appendix I

DEBRIEFING STATEMENT

The debriefing statement will be given to participants orally.

Thank you very much for participating in this research. Your online communication messages and questionnaire answers will be confidential and can only be accessed by the researcher.

The real purpose of this study is not to get the answers to the questions on "Virtual Class." Participants were deceived in this study because it is important to not let the participants know the real purpose of the study at the beginning to reduce the possibility that participants may guess the answers and provide the answers that the researchers are looking for. Therefore, the researcher used the "Virtual Class" topic to not prime the participants. Because you participated in the study without knowing the real purpose, you may decide to withdraw your survey responses.

The real purpose is to examine how different online instant communication strategies between a representative and a customer work. In the experiment, all the participants were asked to get the answers to the same 12 questions regarding the Virtual Class. During the online communication, some participants only received the responses to the currently asked question. Some received responses that included both answers to the currently asked question and the next question to be asked. Others received responses that included the answer to the currently asked question and a piece of irrelevant information. The researcher is trying to find out whether the difference in responding to the participants' questions will influence the effectiveness and efficiency of the e-service, the customer's satisfaction with the e-service, and the customer's intent to continue using the e-service for future questions. All the information about Virtual Class in this experiment was made up by the Co-Principal Investigator, Xu Song. The "Virtual Class" online representative was played by the Co-Principal Investigator, Xu Song.

If you have further questions, please contact the Co-Principal Investigator via email listed on the consent form. Please don't discuss your experience with this experiment with anyone, because other students may also participate in this research. Discussion with other potential participants could negatively affect the results.

Thank you again for your participation!

Appendix J

DATA WITHDRAWAL FORM

Investigators: Cindy Christen, Ph.D, Associate Professor, and Xu Song, Ph.D. Candidate

Department of Journalism and Technical Communication

Should you choose to withdraw your data, you have the right to do so and should inform the Co-principal Investigator, Xu Song at bevin.song@colostate.edu , or Principal Investigator, Cindy Christen, Ph.D. at cindy.christen@colostate.edu, and sign this data withdrawal form as soon as possible. If you decide to withdraw your data, you will still receive the full amount of extra credit designated to this study.

If you have additional questions, please contact Co-principal Investigator at: bevin.song@colostate.edu.   Please don't discuss your experience with this experiment with anyone, because other students may also participate in this research. Discussion with other potential participants could negatively affect the results. Thank you again for your participation!

Christen and Song; Protocol #14-5318

Please withdraw my data from the study:

Printed Name: _____

Signature: _____

Appendix K

QUESTION-ORDER-RANKING SURVEY

The university plans to launch a Virtual Class program to supplement the traditional in-class teaching method. Virtual Class is a new online teaching-learning platform. Virtual Class provides live and interactive learning experience in the virtual environment. It allows students to take a course in the Virtual Class with live and interactive teaching-learning activities. There are 12 questions regarding the Virtual Class a student may ask.

- Please use 1-12 Arabic numerals to rank all the following questions.
- 1 means "the question I want to ask the most", while 12 means "the question I want to ask the least."
- Please use the numbers 1 to 12 to indicate your preferences. Each number can only be used once.

___ Is Virtual Class worth the same credit hours as the parallel in-person class?

___Who is eligible to take Virtual Class?

___How many Virtual Classes can one student take per semester?

___If the traditional in-person class still has openings, can students register for the parallel Virtual Class?

___Does Virtual Class cost the same tuition as the parallel in-person class?

___Is Virtual Class the same as the online class (Online Plus) offered by the university?

___When can students start registering for Virtual Class?

___How can students log in to the Virtual Class system to take a Virtual Class?

___Can students download the teaching materials in Virtual Class?

___How can students interact with the instructor in Virtual Class?

___If a student didn't attend a Virtual Class session at the scheduled time, can this student make up for that missed Virtual Class session at a later time?

___How do students turn in assignments in Virtual Class?

That completes the survey. Thank you!

Appendix L

CONSENT LETTER FOR QUESTION-ORDER-RANKING SURVEY

November 10, 2014

Dear Participant,

My name is Xu Song, and I am a researcher from Colorado State University in the Department of Journalism and Technical Communication. We are conducting a research study on the Virtual Class program. The title of our project is "Study of Students' Opinions about the Virtual Class Program." The Principal Investigator is Dr. Cindy Christen, Department of Journalism and Technical Communication, and the Co-Principal Investigator is Xu Song, Department of Journalism and Technical Communication.

We would like you to participate in this research survey. You may participate even if you do not know what Virtual Class is.

The survey will take about 8-10 minutes. Your opinions matter to us! Your participation in this research is voluntary. If you decide to participate in the study, you may withdraw your consent and stop participation at any time without penalty.

Your survey responses and questionnaires will be kept confidential. Only the researchers have the access to them. While there are no direct benefits to you, we hope to gain more knowledge on your opinion of the Virtual Class program. Your participation might help improve the design of Virtual Class in the future.

You will earn 5 points extra credit for your participation. If you choose to not participate, you can still earn extra credit by completing an alternative assignment if a) you sign up and b) complete the assignment by next Monday. Ask the researcher for details. There is no cost to participate in the study.

There are no known risks beyond those you might encounter in participating in the survey.
It is not possible to identify all possible potential risks in research procedures, but the researcher(s) have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

If you would like to participate or have any questions, please contact the Co-Principal Investigator at bevin.song@colostate.edu. If you have any questions about your rights as a volunteer in this research, contact the CSU IRB at: RICRO_IRB@mail.colostate.edu; 970-491-1553.

Sincerely,

Dr. Cindy Christen   Xu Song
Associated Professor   Ph.D Candidate

Appendix M

OLD VERSION OF INTRODUCTION AND INSTRUCTIONS

Introduction and Instructions

Colorado State University plans to launch a new online educational program to supplement the traditional in-person class. To accommodate the large enrollment of the traditional in-person class and to improve students' online learning experience, Colorado State University will launch a new program called "Virtual Class." "Virtual Class" is a new online teaching-learning platform. It allows students to take a course in the virtual class with live and interactive teaching-learning activities.

You are invited to participate in this research to get to know more about the "Virtual Class" program. You will use the laboratory computer and the instant messaging (live chat) application to communicate with a representative of the "Virtual Class" program via typing your questions and comments.

Your task is to get and understand all the answers to the twelve questions on the task sheet by using the instant messaging (live chat) application. After you complete the task, you will take a survey questionnaire regarding the information you received from the conversation.

Please read the following instructions carefully.

- Please read the task sheet carefully.

- When you ask questions via typing, you are required to ask only one question at a time.

- Please ask questions in the order shown. If you feel that the representative has already given the answer to your question, you can skip that question and ask next question.

- You should start the conversation by typing "*My Participation ID is xxxxx. I have some questions about Virtual Class to ask.*" You can find your ID number on the top of the task sheet.

- You will receive a reply *"Thank you for your interest in Virtual Class. You may start asking questions now"* from the representative. You can start asking questions when you receive this reply.

- You may ask questions and get all the answers at your own pace.

- Do not write the answers down on the task sheet. Your task is only to get and understand all the answers.

- If you have other additional questions to ask, please write your questions down on the back of the task sheet after you finish the online conversation with the "Virtual Class" representative.

- When you feel that you have got all the answers you need, you may end the online conversation by typing *"Thank you. I have no more questions."* You will leave the conversation window open.

- After typing *"Thank you. I have no more questions."* Please let the laboratory assistant know that you have finished the conversation.

- You will fill out a survey questionnaire.

This will conclude the study. Thank you!

Appendix N

OLD VERSION OF TASK SHEET

Your Participation ID _____   Section Code_____   Group Code_____

- Your task is to get and understand all the answers to the twelve questions listed below via typing.
- Ask questions and get the answers at your own pace. Please ask only one question at a time.
- Please ask questions in the order shown. If you feel that the online representative has already given the answer to your question, you can skip that question and ask the next question.
- You should start the conversation by typing "*My Participation ID is #####. I have some questions to ask.*" You can find your Participation ID at the top of this task sheet.
- When you receive a reply from the online representative, it means the representative is ready to serve you and you can start asking questions.
- Take the task sheet with you during the study. You only need to get and understand the answers you receive. Please do not write the answers down on this task sheet.
- If you have other additional questions to ask, please write your questions down on the back of this task sheet after you finish the online conversation.
- Once you obtain and understand all the answers you need, you may end the conversation by typing "*Thank you. I have no more questions.*" Please let the lab assistant know immediately that you have completed the task.
- The laboratory assistant will show you an online survey.

Below are the 12 questions you need to get the answers to:
Q1:   Does Virtual Class cost the same tuition as the parallel in-person class?
Q2:   When can students start registering for Virtual Class?
Q3:   Who is eligible to take Virtual Class?
Q4:   If the traditional in-person class still has openings, can students register for the parallel Virtual Class?
Q5:   Is Virtual Class worth the same credit hours as the parallel in-person class?
Q6:   If a student didn't attend a Virtual Class session at the scheduled time, can this student make up for that missed Virtual Class session at a later time?
Q7:   Is Virtual Class the same as the online class (Online Plus) offered by the university?
Q8:   Can students download the teaching materials in Virtual Class?
Q9:   How can students interact with the instructor in Virtual Class?
Q10:   How do students turn in assignments in Virtual Class?
Q11:   How many Virtual Classes can one student take per semester?
Q12:   How can students log in to the Virtual Class system to take a Virtual Class?

End of Task Sheet