

TOWARD A NEW KNOWLEDGE SHARING COMMUNITY:  
COLLECTIVE INTELLIGENCE AND LEARNING THROUGH  
WEB-PORTAL-BASED QUESTION-ANSWER SERVICES

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**Abstract**

How does collective intelligence play a role for learning in the context of the Internet? Internet is more than just a fun when people use it for sharing knowledge. The appearance of web-portal-based question-answer services as new knowledge sharing and learning tools is expected to provide Internet users effective learning community models in online environments. The contents of web-portal-based question-answer services are created by users, and consumed by the users themselves. This open web space allows users to share each other's knowledge and is the basis of where collective intelligence as a tool that can be used to empower people.

The purpose of this paper is to present the role of question-answer services and informal knowledge sharing patterns through these services in terms of learning purposes. This thesis examines the power of collective intelligence on the Internet and people's perceptions of this collective intelligence. In order to identify the collective

intelligence in the context of the Internet, web-portal-based question-answer services in Korea have been chosen to be examined. Using questionnaire surveys and data analysis, this thesis reaches a better understanding of how effective question-answer services play the role of providers of space where collective intelligence works for learning.

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*“And we know that in all things God works for the good of those who love him, who have been called according to his purpose” (Romans 8:28).*

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## **Chapter 1. Introduction**

With the advent of the new knowledge society, every sector of the economy has been experiencing significant transformations which have required the improvement of the management of knowledge resources. Many of these transformations have been accelerated with the advent of the commercial use of the Internet. Many scholars have argued that knowledge is becoming more and more important in an innovation-rich, knowledge-based economy. Clearly, knowledge is seen as “the most strategically-important resource which [organizations] possess,” (Grant, 1996, p. 376) and a principal source of value creation, (Nonaka, 1991).

The idea of the knowledge society is based on continuous technological developments. Ideally, a knowledge society should be able to integrate all its members in order to cultivate new forms of societies that will evolve with the times. It is necessary to work toward connecting society members so that equal creation and sharing of knowledge is achieved. Nobody should be excluded from knowledge societies, where knowledge is a public good, available to each and every individual. Everyone must be able to move easily through the flow of information submerging us, and to develop cognitive and critical thinking skills to distinguish between “useful” and “useless” information. (UNESCO World Report, 2005) The current spread of new technologies and the emergence of the Internet as a public network provide new opportunities to widen public knowledge access and sharing. Therefore, the procedures to make the best use of technology for knowledge creation and transfer should be taken

under serious consideration. Although the existing information applications have been used to share knowledge, the important task to accomplish is that new technologies achieve more efficient and effective knowledge sharing for practical needs.

With appearance of a knowledge-based economy, the concept of a learning society was introduced as a key value of knowledge societies. The term “learning society” was defined Torsten Husen (1974) as a new kind of community in which knowledge and information lay at the heart of its activities, and the old limits on where and when organized knowledge could be acquired are disappearing. Peter Drucker (1969) explained the emergence of a knowledge society, where what matters above all would be “learning how to learn.” Thus, new modes of learning may offer a model for organizing the knowledge for individuals. In the process of learning, the human actor must be placed at the heart of a continuing process of knowledge acquisition and communication (UNESCO World Report, 2005). Technologies for learning should be seen as mere tools, and should not allow us to overlook the role that humans in the learning process.

Nowadays, technological innovation makes possible the emergence of new knowledge management systems that could be used to achieve an effective learning society. In particular, the integration of knowledge management techniques and new search engines has a major influence on knowledge sharing for learning purposes. New search engines are helping structure the vast amounts of information online which are more useful and meaningful for users than data-filtering methods that rely on keywords.

Question-answer services based on these new search engine models are the most recently introduced knowledge sharing tools. Different from general search services that give information by linking websites as the result of keyword filtering, question-answer services are based on internal databases which are created and filed by the users themselves. Users of these services are creators and consumers of content at the same time; these services allow users to ask any type of questions, from the most banal to the most complex, and get answers from fellow users. Everyone can participate to this Internet portal, and there are no limitations. Web portal companies also have incentive systems in place to encourage participation and reward great answers.

The purpose of this paper is to present the role of question-answer services and informal knowledge sharing patterns through these services in terms of learning purposes. Initially, this thesis will examine how people use question-answer services for learning purposes and what their opinions are about the services in themselves as well as the knowledge acquired from them. A key point in this investigation is to understand the users' perceptions of the concept of knowledge sharing for learning purposes via these question-answer services. This idea also establishes collective intelligence and its role for learning of users. The study will investigate the power of collective intelligence on the Internet and people's perception of this collective intelligence. The final objective is to reach a better understanding of how effective question-answer services play in their role of providers of space where collective intelligence works in learning.

Past research on knowledge sharing and technology has been very limited to drawing big pictures about their relationship. Most of the present research and studies of the online knowledge sharing is based on the intranet networks of companies, universities, and organizations. They mostly focus on the knowledge sharing and transformation of knowledge at the employee level and not for general Internet users. In addition, a review of the existing literature did not reveal question-answer services as well-defined constructs because these services are in a way a recently introduced method to share knowledge. Even though there exist some research on the question-answer services and user patterns, the main focus on those studies was limited to the general phenomenon without linking the usage patterns to users' perception. In addition, the relation between question-answer services and learning was not explained by former researchers.

Therefore, this thesis will shed some light on the real impact of question-answer services and the views and perceptions which caused by these services. This research will be beneficial because it will provide a good perspective of collective intelligence along with an understanding of how Internet technology can embody a successful knowledge sharing and learning model at the general Internet users' level.

This thesis will suggest answers about the following questions:

Question 1: What are the people's general usage patterns of question-answer services?

Question 2: How do online question-answer services play a role of learning tools?

Question 3: How people use and recognize the question-answer services as learning tools?

Question 4: What are the main factors that affect to the use of question-answer services in terms of people's perception?

Question 5: How do these factors make an impact in the usage pattern of question-answer services?

Question 6: How effective are question-answer services in providing a learning community model?

Question 7: What should be added to question-answer services in order to be developed as effective learning tools?

An investigation of people's usage pattern of question-answer services and their perception will help to understand the people's idea about collective intelligence.

These research questions will point to propositions expressed in the following hypothesis:

*H1: People generally consider question-answer services to be a useful tool for learning. This perception is related to satisfaction, trust about the knowledge and the idea of usefulness of the knowledge they get.*

*H2: The trust of knowledge is established based on users' actual experiences with searching for knowledge.*

*H3: The more trusting and the more satisfied people are with the knowledge acquired from question-answer services, the more use these services will be used in the future for learning purposes. In addition, people's usage pattern of question-answer services for learning purposes is related to the practical components such as accuracy, usefulness, and quality of knowledge.*

*H4: People who consider question-answer services as a satisfactory tool will regard these services as providers of an effective community for learning. They also will anticipate that question-answer services will provide the effective community for learning in the future.*

In order to answer the research questions and hypotheses, this thesis uses a survey approach to observe and analyze the using patterns and the impact of question-answer services. The theoretical frameworks of collective intelligence, learning

theories including social learning theory and constructivist theory will structure the research. Statistical methodology will be adapted to examine the real relationship between people's usage pattern and perception.

This thesis will provide a local study of South Korean's question-answer services. These have been chosen to be examined because Korea is considered one of the first countries to show a successful knowledge sharing model through web-based question-answer services. Prominent local web portal companies such as Naver, Empas and Yahoo! Korea have already enjoyed success by utilizing user-created content with their question-answer services.

### **Outline of the Study**

In order to understand the impact of question-answer services, it is important to know the background of related knowledge issues first. For this reason, in Chapter 2, historical approaches of the literature related to knowledge sharing and technological applications will be reviewed. Literature written on issues including knowledge sharing, online communities, collaborative learning, question-answer services and factors of knowledge sharing will be included. Chapter 3 consists of a review of the theoretical framework on this survey. Collective intelligence theory and learning theories provide helpful propositions for understanding the whole analysis. Chapter 4 suggests the examples of online collective intelligence work. In this chapter, Korean question-answer services will be introduced in detail in order to give background

information about Korea in which survey was conducted. Chapter 5 is a detailed description of the OLS regression that was used to test the various hypotheses. Four hypotheses will be tested based on four dependent variables and seven independent variables. In addition, conceptual and operational framework, the definitions of factors which were used as variables in hypothesis will be given. Chapter 6 shows a detailed discussion of the survey's results. With the general survey results, the results of OLS regression are explained in order to know whether the survey results support the suggested hypothesis. Finally, chapter 7 is a conclusion and a summary of the findings about usage patterns of question-answer services and users' perception based on the findings which were shown in the previous chapters. In this chapter, the limitations of this survey and recommendations for future researches will be provided.

## **Chapter 2. Literature Review**

The knowledge sharing process through the Internet has fascinated researchers throughout diverse social disciplines. Much research effort has been given to understanding the effectiveness of online community on sharing knowledge, particularly for learning. Because of the openness of the Internet to the public, the vast majority of work on knowledge sharing through Internet is based on the collaborative action among users. However, few of them are focused on users' perception about the collaborative work because it is not easy to measure. Even though the question-answer services in Korea have been an important research topic as many web portal sites are becoming popular; they are more focusing on users' usage patterns instead of investigating perceptions.

### **Knowledge Sharing and Learning**

The first step in understanding knowledge sharing through the question-answer services is to examine the agendas for the knowledge sharing. Scholars have long been interested in the topic of knowledge management and sharing. In particular, many studies stress the process of knowledge sharing and its application to the learning process. The study of knowledge sharing has emerged as a main research area from a broad and deep field of study on learning. Increasingly, knowledge-sharing research has moved to an organizational learning perspective by stressing the fact that successful knowledge sharing involves extended learning processes.

Knowledge sharing generally refers to how organizations create, retain, and share knowledge. (Argote,1999). The literature identifies five primary contexts that can affect such successful knowledge sharing implementations, including: the relationship between the source and the recipient, the form and location of the knowledge, the recipient's learning predisposition, the source's knowledge sharing capability, and the broader environment in which the sharing occurs. (Cummings, 2003).

In addition, some studies suggest that successful knowledge sharing involves extended learning processes. Richard Nelson explains that knowledge sharing is seen as occurring through a dynamic learning process where organizations continually interact with customers and suppliers to innovate or creatively imitate. (Kim & Nelson, 2000). Szulanski also focuses on the learning process by explaining that successful knowledge transfers are increasingly seen as requiring an ongoing process of learning interactions, rather than just a series of communications (Szulanski, 2000).

### **Online Community and Learning**

Much of the current research discussed the role of online community since it is very recent topic in knowledge management regime. Studies have tried to define the online community and their existence, and connect to the issue of learning and technology.

In the knowledge sharing perspective, online communities provide the space to share knowledge in a certain category of interest for Internet users. The Internet encourages and allows individuals who share similar interests to form community

through exchanges based on their sense of shared purpose (Wallace, 1999). Wharf and Clague (1997) emphasized relationships among community members and their common interests (beliefs): "[a] group of people share relationships and common interests.

Geographical elements seem to be less important in this situation." Nowadays, the role of online tools for the support of information sharing and communication appears to be crucial, because geographical heterogeneities can be overcome by online tools (J.H. Erik Andriessen, Maura Soekijad & Helen J. Keasberry, 2002).

Simultaneously, a concept of online communities has been written on the idea of virtual communities. Rheingold (1994) defines virtual communities as: "social aggregations that emerge from the Net when enough people carry those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace."

The online community can be explained in the context of "communities of practice (Wenger, E., 1998)" as well. When people share a concern, a set of problems, or passion about a topic, and deepen their knowledge and expertise by interacting, communities of practice develop within a certain knowledge domain. To online communities, this domain is often created through connecting to the Internet. The community members are not from a centralized organizing body, but communities of practice connect members to each other through the Internet by self-managing: These communities of practice have the potential to be conducive to the mastery of new knowledge (Lieberman, 1996). As proposed that some elements of sociability form

important outcomes in communities of practice, David Langlely suggested four dimensions of sociability: trust between fellow group members, shared understanding, affective commitment to the group, and cohesiveness (Langlely, David, 2002). In this perspective, the communities of practice are defined as “domains of knowledge worthy of the collective attention of a group of peers (Wenger, 1998).” In order to describe the collective intelligence by suggesting the “communities of practice”, the definition of no domain of knowledge should be separable from the community both using and developing it.

For the commercialized and business-oriented community, Williams and Cothrel (2000) define online community as groups of people engaging in many-to-many interactions; the motivation for the engagement is the shared interest in certain products. This online community is doing their business by providing the ability to interact with one another to consumers.

The idea of online community is often connected to the idea of the learning community because of the online community’s usefulness as a learning tool. This argument started from scholars’ effort to connect the Internet to learning. Internet plays an important role in many learning organizations where technology can enhance people’s activities by connecting people, accelerating learning, and capturing knowledge by organizing critical documentation (David W. 2004). Digitalization has opened up new frontiers for packaging and disseminating knowledge to the user. Internet is also regarded as crucial to bringing about more democratic access to educational resources (Guttman, 2003). Robert Hutchins (1970) and Torsten Husen

(1974) explain that in the learning society, a new kind of society in which the old limits regarding where and when organized knowledge could be acquired no longer apply. In this perspective, Shoshana Zuboff (1998) notes that learning is no longer a separate activity that occurs either before one enters the workplace or in remote.

Yang (Yang, 2000) asserts that the features of online community are suited for an ideal life-long learning environment for knowledge workers envisioned before the wide spread of network. These features are: 1) an open learning environment; 2) finding learning theme based on individual requirement; 3) self-initiated learning compared to passive acceptance of traditional classroom learning; 4) focusing on innovation instead of limiting to the current written material; 5) and life-long learning.

About the relationship of members in online community, Tu and McIsaac (2002) suggest several factors for building a community of practice for learning which can be applied to online communities: which connections to make between learners, to understand what kind of knowledge to share; what kind of community it is inclined to be; and how tightly sharing knowledge needs to link with work. To enhance learning, one needs to identify and nurture community with the resources, structure, and systems one need to flourish. Communities of practice often require time to develop, to find the right kind of information, the right level of detail, the right participants and the right forums. Individuals must support the community in making these discoveries quickly.

Some studies, however, have taken a different approach to Internet and community by focusing more on its proposition. In order to new technology (Internet) can stimulate the interaction and communication among members, the technology itself

should remain transparent to the community members (Verwijs, C., 2002). In a digital divide perspective, UNESCO showed concern that even though the rise of a global information society has allowed a considerable mass of information to be disseminated via the leading media, different social groups are far from having equal access and the capacity to assimilate this growing flow of knowledge. Therefore, (online) learning community has to produce artifacts and histories that aid in the transfer of knowledge and the increase of understanding (Wenger, 1998).

### **Collaborative Learning**

Scholars agree with the idea that technological innovations and their diffusions are not one-directional. As the technology provides an open space to the public, the public is in its own right, an element of the innovation process (UNESCO, 2005). Furthermore, public collective action is positioned as a driving force for an innovation of knowledge sharing.

With the growth of participatory community on online, it is hardly surprising that the relationship between collective activity and its impact has attracted considerable attention in recent years. In an attempt to explain the various online communities which have appeared as a result of the collective action of Internet users, studies have focused on applications for knowledge sharing and their outcomes. While some research has focused solely on the possibility of establishing an online community for knowledge sharing, other work has sought to show how Internet users

establish online communities and how they use it for specific purposes, such as learning.

The idea of collaborative learning starts from an environmental setting in which actively encourages collaborative work. According to Peter Senge (1990), learning organizations are “organizations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole together.” Even if all people have the capacity to learn, the structures in which they have to function are often not conducive to reflection and engagement. Therefore, organizations which continually expand people’s capacity to create their future require a fundamental mindset shift among their members.

With the proposition of the open environmental setting, many studies emphasis collaborative learning through online community. Myers (1991) explains that collaborative learning exercises are learner centered and enable a learner to share authority and empower themselves. By sharing and communicating knowledge, they transform individual knowledge into society knowledge (D. Robey., 1999). About the network form of this knowledge transformation, Leavitt (1951) finds that decentralized networks (like the Internet) were more efficient for tasks that required creativity and collaborative problem solving. On the open online community, multiple authors edit and update the content of the document, and gradually the content becomes a representation of the shared knowledge or beliefs of the contributors (Leuf, B. & Cunningham, W., 2001). Collaborative activities lead to emergent knowledge,

which is the result of the interaction of understandings of those who contribute to its formation (Whipple, 1987).

### **Factors for Successful Knowledge Sharing**

Research has identified several perception related factors that can affect knowledge sharing success in collaborative work. Satisfaction is one of the dominant factors for collaborative work. Satisfaction is important in the knowledge sharing process because it can reduce a participant's stress. One researcher explains that user satisfaction in a collaborative work has been identified as the satisfaction with the process of individual participation and collaboration (Noël and Robert, 2004). In an anonymous participation setting, the opportunity to assess the contribution of others in the group is lost. In this environment, individual incentive to participate could affect group collaboration. Doll and Deng (2001) assert that user satisfaction is more closely associated with user participation in collaborative applications than in non-collaborative applications.

Trust (in this thesis, trust is used as a same meaning with reliability) of the knowledge and knowledge source is also one of the essentials to promote dialog (Sveiby, 1997). Trust involves a willingness to make oneself vulnerable to others and involves confidence in various facets of another party, namely trust in: (1) in the other's competence; (2) his or her openness and honesty; (3) his or her intentions and concerns; as well as (4) trust in their reliability (Mishra,1996). Research shows that trust has a central role in knowledge sharing; trust facilitates transactions and

collaboration (Fukuyama, 1995). According to Maher et al. (1995), trust can be conceptualised across three dimensions: integrity, benevolence and competence. Among these, integrity-based trust has an important role to motivate knowledge-sharing; it is the perception that another party is honest and reliable. One is not likely to be motivated to share one's knowledge with another individual or community if one perceives them to be dishonest or unreliable. At the same time, when one views a community as upholding trustworthy values such as mutual reciprocity, honesty, reliability and commitment, there is likely to be a greater degree of motivation to participate and share one's knowledge.

Because knowledge has at least some degree of tacitness (Polanyi, 1966), its transfer is subject to a high level of risk and uncertainty. Therefore, involved parties must rely upon their trust in the other party which create or share its knowledge. If recipients see that the knowledge is not credible, the sharing processes cannot go well. However, when the members in collaborative work are not known in some open environment such as the Internet, the receiver of knowledge cannot make a decision about the trustworthiness of the knowledge. In this case, the social similarity of parties is crucial for the decision to exchange knowledge. Child & Rodrigues' (1996) work suggests that social similarity facilitates knowledge transfer.

In addition, the perception of the usefulness of the knowledge sharing system was one of the research topics of important factors for knowledge sharing. Although in the context of online communities, a critical mass of activity is required to attract others (Preece 2000), without critical mass, the perception of the usefulness of the

knowledge sharing system will encourage its use. Davis, F D(1989) found out that perceived ease of use may be a causal antecedent to perceived usefulness even though both perceived usefulness and perceived ease of use affect the user acceptance,

As shown above, there are many related factors which make a knowledge sharing successful. Focused on satisfaction, trust, and the usefulness, this thesis will prove how these factors affect to knowledge sharing through question-answer services.

### **Question-Answer Services**

Clearly, scholars continue to be interested in studies of the appearance of various types of question-answer services and the effect on Internet users. Pack (2000) shows his idea about the phenomenon of increasing question-answer services such as: human search engines, online advisers, knowledge networks, interactive Q&A and people portals. Pack writes if people want to find knowledge from search engine which shows us just directory result, they will not be satisfied with just that. Therefore, information exchange by peer-to-peer network will supplement this knowledge search effort. In other words, these kinds of question-answer services are trying to fill a niche that falls between using an online message board or public chat room and hiring a consultant.

Janes, Hill, and Rolfe (2001) indicate that expert services are the most useful for factual type questions, because in the situation of no interaction among members, the accuracy rate for other types of questions could be reduced. This finding could come after asking 240 questions to 20 expert service sites and comparing the

performance measures such as response rate, response time, and verifiable answers. They also explain that because expert services are likely to continue to fill a niche for factual questions in the digital reference environment, implications for further research and the development of digital reference services may be appropriately turned to source questions.

Even though a number of scholars have tried to show the phenomenon of appearance of question-answer services, relatively few studies exist which examine the attitude and the idea of users toward this service. The studies from recent Korean question-answers services suggest several recommendations for improving web-portal based question-answer services. One study shows the result of the usage pattern of Korean question-answer services (Park, 2004). This study is based on survey result of 253 users' opinions about their general usage pattern and the attitude of question-answer services. Users regard question-answer services to be more efficient than Internet search engines and they believe usefulness of question-answer services to be higher information medium. They are satisfied about the services' convenience although they are not satisfied about the level of expert knowledge. For this reason, users think the answerer's qualification as the most important factor in choosing these services. On the basis of the findings, this study suggests several factors for supplementing the question-answer services in respect of reinforcing the effectiveness of information itself and the efficiency of question-answer services. First, specificity and accuracy should be improved for more effective information by screening participants or checking answers and setting payment for services rendered. In

addition, interactivity, readiness, and convenience are other factors which should be stressed for a more efficient service. Joo-Bum Park said that these factors could be added by expanding communication channels, verifying the answering process, displaying users' log-on conditions, using an intelligent retrieval method, and providing experts profiles in detail Park. 2004).

Another study tried to find characteristics of answerers of question-answer services. By conducting interviews with people who were considered active members, the study indicates that most of the respondents were men with high levels of education. Although they were experts at least about several specific areas they also used various sources such as Internet homepage and related books for answering the questions which were posted. In addition, their major motivation for participation to add their comments is to share the knowledge, not for getting honor or incentives. This study suggested that by encouraging proper use of service and establishing the right ethics of the Internet, knowledge sharing activities through question-answer services will provide a lot of benefits for participants (Lee, 2005).

## **Chapter 3. Theoretical Framework**

The survey was designed to test the collective work for knowledge sharing and social learning function of Internet users. Survey respondents were asked about their perceptions on collective knowledge for learning purpose as well as their participation in collecting and acquiring knowledge. In order to understand this survey, the theories of collective intelligence and learning theories were adapted as a framework. These theories will support in defining users' attitudes and perceptions about question-answer services.

### **Theory of Collective Intelligence**

The concept of collective intelligence espouses that the whole is greater than the sum of any individual parts. This theory has been applied to explain the power of collective work of cyberspace. Pierre Levy (1997) is essentially the first to focus his research on collective intelligence when it became clear that this would be a determining factor in the competitiveness, creativity and human development of knowledge-based societies. He focuses on the potential of collaborative work as a new source of empowerment of knowledge. The collective intelligence is defined by him as follows:

What is collective intelligence? It is a form of universally distributed intelligence, constantly enhanced, coordinated in real time, and resulting in the effective mobilization of skills. I'll add the following indispensable characteristic to this definition: The basis and goal of collective intelligence is the mutual perception and enrichment of individuals rather than the cult of fetishized or hypostatized communities. My initial premise is based on the notion of a universally distributed intelligence. No one knows everything,

everyone knows something, all knowledge resides in humanity. There is no transcendent store of knowledge and knowledge is simply the sum of what we know ... Intelligence is constantly enhanced. There is little doubt that intelligence is universally distributed. But facts must find some form of concrete realization. An intelligence that is frequently ridiculed, ignored, unused, and humiliated is obviously not enhanced (Pierre Levy, 1997).

In terms of learning, collective intelligence is defined as “the main cognitive powers: perception, action planning and coordination, memory, imagination and hypothesis generation, inquisitiveness and learning abilities (Pierre Levy, 1997).” This collective learning and creative process are realized through exchanges of knowledge and intellectual creativity. Collective intelligence is based on humans who have a willingness to share their knowledge, and who have recognized that group knowledge is indeed greater than individual ones.

With the emergence of the cyberspace, the existing social forms of collective intelligence are now spreading very fast. In cyberspace, the process of establishing new social structures, new forms of governance, new relationships between individuals and groups, new economies, and new political powers are now under way. New communication systems should provide members of a community with the means to coordinate their interactions within the same virtual universe of knowledge. Digital communication tools provide a place for collective learning and creativity by way of knowledge exchange. These processes are encouraged by competitive cooperation and cooperative competition in the production of knowledge and as a result, the living world of ideas is interconnected in cyberspace. Levy argues that in cyberspace,

winner are always the ones that enhance and use the available intelligence, and cooperate more efficiently (Pierre Levy, 1997).

Another collective intelligence pioneer, George Pór (1995), defined the concept of collective intelligence as “the theory of a human community to evolve toward higher order complexity thought, problem-solving and integration through collaboration and innovation.” He also stressed the role of the community for the purposes of collaboration and innovation. Only a community that nurtures its collective intelligence will be able to continuously produce a valuable future for its members and stakeholders. He argued that the learning system is responsible for supporting the learning objectives and processes of the community, including the objectives and processes of improving the infrastructure of its collective intelligence.

Then how does the idea of a collective intelligence play a useful role in real world? Doug Schuler (2001) adapts the concept of civic intelligence as a part of collective intelligence in order to explain this role. He defines civic intelligence as “the ability of humankind to use information and communication in order to engage in collective problem-solving.” He argues that:

Like the “intelligence” of an individual, civic intelligence is a relative form that can be less or more effective or creative. Civic intelligence extends the notion of social capital (Putnam, 2000) to include an agenda, an orientation towards action in addition to one of observation and study. Civic intelligence is a form of collective intelligence. It is probably to a much higher degree than an individual’s intelligence, can be

improved and made more effective. And how people create, share, and act upon information is crucial to that.

The organizational structure of critical intelligence becomes a medium for people and institutions to communicate with one another and to share information. This network is necessarily composed of a wide variety of dissimilar institutions and individuals who cooperate with each other because of similar values and commitments to similar objectives (Schuler, 2001).

Some studies, however, have taken a negative approach by looking not so much on the advantages of the collective intelligence, but focusing more on its limitations. The most common complaint against collective intelligence is that it is unreliable . The argument is also that there is a risk that bad ideas, misunderstandings, and misconceptions will be widely held and misinformed.

Allen Newell (1990) argues that it is impossible for any group to function as a coherent rational agent by pointing out the limitations of online communities. He thinks that all members of the group must share the complete body of knowledge and goals relevant to the task in order to establish collective intelligence. However, bandwidth seems insufficient to permit the various members of a group to share the same knowledge. Thus, he found that no group can achieve total integration of knowledge:

A social system, whether a small group or a large formal organization, ceases to act, even approximately, as a single rational agent. Both the knowledge and the goals are distributed and cannot be fully brought to bear in any substantial way on any particular decision. This failure is guaranteed by the very small communication bandwidth between humans compared with the large amount of

knowledge available in each human's head ... Modeling groups as if they had a group mind is too far from the truth to be a useful scientific approximation very often.(pp.490-491)

There also has been literature on specific example of collective intelligence such as Wikipedia. This critical view suggests that even though power users, who spend several hours a day making small edits to numerous pages, often dominate discussions, people who are qualified and interested in administrative functions can hold quite different interests from these power users. In other words, this Internet space does not effectively guarantee the mass of the whole idea so that critics are often kept as outsiders from discussions.

However, these negative arguments cannot be escaped from critics that individual always has a limitation to use the relevant knowledge they possess for every decision. In other words, it is impossible to achieve this ideal state that individual gets the whole knowledge which are related when they are participating in the discussions because of bandwidth limitations (Smith, 1994).

Therefore, even though there are several critical viewpoints, collective intelligence is a valuable tool for explaining collaborative work and its effect in online communities. Based on collective intelligence theories, the following theoretical propositions will be used to analyze this survey:

- In the usage of question-answer services related to users' participation, the perception of collective intelligence impacts the usage pattern of question-answer services.
- Users are resigned to the risk of inaccurate knowledge because they agree with the idea that collective knowledge is always better than the individual's one.

## **Learning Theories**

Learning theories provide us a conceptual background to understand how people get knowledge from learning and how they establish the knowledge structures by themselves.

Social learning theory was highlighted by Albert Bandura (1977), who is considered as a leading proponent of this notion. This theory considers that people learn from one another within a social context. These learning processes include such concepts as observational learning, imitation, and modeling. Individuals have their own ideas about what is appropriate or inappropriate, and they choose the best idea by self-regulation. When individuals regulate their own behavior, they also reflect on their general abilities; Bandura calls these general judgments “self-efficacy appraisals,” and this self-efficacy exert powerful effects on levels of motivation.(Crain, 2000)

Bruner (1995)’s constructivist theory also helps to understand the processes that allow for individuals to collect knowledge. Learning is an active process in which learners construct new ideas based upon their current knowledge. This process of learning is active and involves transformation of information, deriving meaning from experience, forming hypotheses, and decision making. By accepting well sequenced materials, one can build knowledge upon what they already know and go beyond the information they have to discover the key principles by themselves. Bruner (1995) developed three stages of representation: enactive, iconic, and symbolic. In this

process, learners are considered to be creators and thinkers through the use of inquiry, and experience in learning. The problem-solving strategies they develop are more transferable, as they have personal meaning and value in terms of the learner's own purposes and intentions. (Bruner, 1995)

The following survey on learning through question-answer services will be explained based on these learning theories. Thus we have the following theoretical propositions:

- Users learn something from question-answer services based on the context.
- Users learn from question-answer services and they build new knowledge upon what they already have.

## **Chapter 4. Research Background**

Based on conceptual framework, several forms of collective intelligence have been introduced in web context: the Wikipedia form and the Amazonian and Ebay form of collective intelligence.

### **Collective Intelligence Model in Web Context**

#### ***Wikipedia***

Wikipedia ([www.wikipedia.org](http://www.wikipedia.org)), which just started in 2001, is the first website to receive recognition for generating collective intelligence. Wikipedia is an Internet-based, open encyclopedia that allows any person to contribute to it. This project was first started as 'Nupedia' which was monitored by experts, but if users could not find proper explanation for specific keywords, they could visit Wikipedia – which was linked with Nupedia – and contribute content information.

The primary goal of Wikipedia is to create an encyclopedia that can be shared with every Internet user and encourage people to change and improve the content. This was defined as an online, “free-content encyclopedia written collaboratively from users all around the world (Wikipedia).” The source is not created on the back-end, then posted to the web for the user. A reader who sees a mistake or omission in an article can always correct it or add the missing information as an editor. Editors are anonymous, but the quality of content is evaluated by everyone who participates in contributing knowledge to the website. There is a committed core set of users who manage the edit/entry process as well. Wikipedia is a completely open encyclopedia

because it provides not only the ability to track the changes of articles but also discuss issues. Wikipedia has a function as bi-modal; there is a “document” mode and “thread” mode (Leuf and Cunningham, 2001). Multiple authors edit and update the content of the document, and this content becomes shared knowledge or beliefs of contributors. Also, these contributors carry out revising in Wikipedia and eventually a group of threaded messages evolves.

Wikipedia’s service has sought to capitalize on the potential of the Internet to bring together diverse expertise rapidly and inexpensively (Sproull & Kiesler, 1991) in order to create general repositories of knowledge that are indigenous to the web. As of November 2004, almost 29,000 people considered themselves “Wikipedians;” they updated content in 109 different languages. There were 380,000 articles posted in English alone, and it has grown to 945,000 at February 2006 (David, 2004).

### ***Amazon.com***

Amazon.com ([www.amazon.com](http://www.amazon.com)) is another example of collective intelligence because Amazon provides free reviews of books. Although Amazon is a commercial business, it is also a community of people who are interested in the areas which are related to Amazon’s products such as literature, music and so on. This site has implemented numerous features on their web site that use knowledge collaboration, sharing techniques and online communities. Users of Amazon are encouraged to add to the publisher information and industry reviews of products by providing their own ranking of the products. The information collected by collective intelligence machines

from individuals transfer the knowledge, and this knowledge is spread to other customers as suggestions, such as: “Customers who bought this book also bought...” Internet services like chat rooms also support the development of knowledge. Therefore, if customers need to choose between a variety of options without any former experience, they will often rely on the opinions of others within this shopping community. The Listmania service, which is a top-list of users’ favorite products on Amazon, also gives collective information to users; this service help people find lists of person’s favorites in specific fields, and people could use those tips in their explorations.

### ***Ebay***

Another example of collective intelligence is Ebay ([www.ebay.com](http://www.ebay.com)). Ebay is an online auction which encourages trade among users; on the website, “eBay is The World's Online Marketplace®, enabling trade on a local, national and international basis. With a diverse and passionate community of individuals and small businesses, eBay offers an online platform where millions of items are traded each day (Ebay.com)” On Ebay, everybody can participate to the trade by buying things directly or bidding on items.

If one buys something at Ebay, that person is asked to evaluate the product. This evaluation is applied to the buyer side in order to evaluate the seller. Every participant of this online market place can look the evaluated report as a form of

preference badge at the page of product item. This badge shows how the percentage of people positively evaluated the buyer, and their detailed comments.

### **Web-Portal-Based Question-Answer Services**

The pioneer of web portal based question-answer services is LookSmart Live!, provided by LookSmart ([www.looksmart.com](http://www.looksmart.com)) in 1999 in the USA (Park, 2004).

Following this service, expert services such as Ask Jeeves, Yahoo! Experts and About.com were launched. These services are known as expert sites, knowledge networks, information exchanges or "ask-a" services; some of them are free whereas the others require some fee in order to get service (Janes, Hill, & Fofe, 2001 Park, 2000).

Bivens-Tatum(2001) divided expert services into two categories; expert service versus non-expert service, and free service versus pay service. Joo-Bum Park added knowledge area in this category, and she completed the table in the next page.

**Table 1. Question-Answer Services**

source: Joo-Bum Park, 2004

<b>Payment</b>	<b>Answerer</b>	<b>Knowledge Area</b>	<b>Characteristics</b>
----------------	-----------------	-----------------------	------------------------

No Free	Experts	General Topics	ExpertCentral (www.expertcentral.com): 18 topics Keen.com (www.keen.com): Phone, voice message, email service Google answers (answers.google.com): Research experts' answers Web Help (www.webhelp.com): Dialog by screen with search mediator
	Non-Experts	Specified Topics	Intota (www.intota.com): Technology related information Expert City (www.expertcity.com): Computer related information Professionalcity (www.professionalcity.com): Information service for special group Find/Svp (askus.findsvp.com): 1,100 experts consulting service over the world
Free	Experts	General Topics	Ask an Expert (www.askanexpert.com): Volunteer Experts Ask me (www.askme.com): Registered experts Ask Jeeves (www.askjeeves.com): Internal knowledge base search and meta search service
	Non-Experts	General Topics	All Experts (www.allexperts.com): Unverified experts e-How (www.ehow.com): How to information Knowpost (www.knowpost.com): Open board Yahoo! Answers (answers.yahoo.com): General people answerers

Even though several forms of collective intelligence services have been tried, web portal based question-answer services are not actively used in USA. Last January, Yahoo! USA launched “Yahoo! Answers,” a free question-answer search service. Users can post questions or answers by signing up for a Yahoo ID. Yahoo! USA introduces its service as following:

Yahoo!7 Answers beta complements Web Search by adding a human element that allows users to ask straightforward questions and receive specific answers based on the collective knowledge and experience of the online community... Brett Poole, Search Product Manager, Yahoo!7 said, "We are introducing this service in Australia following the successful launch of the site in the US. At Yahoo!7, we are huge believers in the power of community, and with the largest global base of Web users we are in a unique position to tap into the vast knowledge and experience of individuals to benefit the greater group. Yahoo!7 Answers lets users get their questions answered in a personalized way and share their knowledge with other Web users. Simply put, better search through people (Yahoo! USA, 2006).

In particular, Yahoo focuses on the reliability of knowledge by adapting evaluation systems such as (user-centric) voting and point systems. By stressing the quality of knowledge, Yahoo anticipates that Yahoo! Answers will provide a high level of community knowledge sharing by capitalizing on collective knowledge from the human brain.

Google launched the Google answers three years ago, but the process of collecting knowledge is very different with Yahoo. Only picked group of experts are allowed to answer any question in Google answer. Users must agree to pay a minimum fee of \$2.50 to get a query answered. In May 2005, the Google database currently receives more than 200 million requests for information every day, in some 89 languages, and sends back answers in billions of web pages and trillions of words (Google, 2006)

## **Question-Answer Services in Korea**

Korean web-portal-based question-answer services are a new trend which comes from an adapted service of Internet search engines. As the Internet has become more popular with wide broadband service in Korea, Internet users wanted to make best use of this search service for their practical purposes. However, when local enterprises of search engine service started their service, under the construction of language, there was little information on the web in Korean. Because of this language barrier, Korean knowledge and information seekers could not find enough data which were written in Korean. In order to supplement insufficient data, the enterprises reached the idea of focusing on human capital. If different forms of human capital combine knowledge, they can establish a strong and huge database which can be shared by everyone. As a result, the enterprises opened a space for sharing knowledge for everyone, and many Internet users voluntarily started to be involved in making knowledge databases.

Now, the web portals not only have become some of the top websites in Korea, but they have driven their search engines to hold dominant market share over Google. The Korean web portal market is dominated by question-and-answer type search services, which tend to have stronger customer loyalty than general web search services. Most of the big portal sites are now providing question-answer services including the major portal sites such as Naver ([www.naver.com](http://www.naver.com)), Empas ([www.empas.com](http://www.empas.com)) and Yahoo! Korea ([www.yahoo.co.kr](http://www.yahoo.co.kr)). A few thousand queries are registered everyday on each major search engine; a lot of questions could be found

now by just searching without asking questions as a result of their huge database which has been established by general users.

The number of Korean question-answer services provided by web portal services was about 20 in 2003. More than ten million users have been using question-answer services in 2003, and this is about one third of the total Internet users in Korea. About 184,5000 users are visiting Naver, 37,9000 users are visiting Empas, and 23,8000 users are using Yahoo! Korea question-answer services per day in January 2004 (Metrix.com, 2004).

**Table2. Major web-portal based question-answer services in Korea**

<b>Web portal based Question-answer services</b>	<b>Open and Characteristics</b>
Naver Knowledge iN (kin. naver.com)	2002. 10 The most huge database Wire and Wireless connection through mobile phone.
Neowiz Saytheme (saytheme. sayclub.com)	2003.2 Focusing on community, club, instant message, and chatting
Empas Knowledge Exchange Market (kdaq.empas.com)	2003.3 Anonymous answer function
Nate Knowledge Bank (kbank.nate.com)	2004.4 Wire and Wireless connection through mobile phone.
Freechal Knowledge Search (info. freechal.com)	2003.5 Community and knowledge service connection
Yahoo! Knowledge Search (kr.ks.yahoo.com)	2003.6 Expert answer service

Under the question-answer services, users can post their questions on the board and get answers by other web users and employees of the web search companies in a few hours or a few weeks. Log-in is needed for questioning and answering, but not

when users just want to do a search. If users type down some questions or keywords in the blank, the web portal site shows the result of searching under several categories.

Question-answer services are provided with other search results including news, blogs, cyber cafés, encyclopedias and other related research services. If users want to get results from all of these categories, they can write down a single keyword in the front page of the website. When they want to use just question-answer services, they can do it by clicking the service category and writing down related keyword.

Questions range from serious academic questions to social issues to light trivia. These categories include: 'knowledge search result', 'new search result', 'blog search result' and so on. Users can get information from any of these categories by clicking.

At this moment, question-answer services offer top level categories like:

- Computers & Communication
- Game
- Entertainment & Art
- Business & Finance
- Shopping
- Sports
- Health & Medicare
- Education & Reference
- Politics & Government
- Habit
- Society & Culture
- Travel

Each group has sub categories, and users can determine into which category their question goes.

The possible spread of incorrect information is a most important criticism of this service. Therefore, these portal sites have prepared several equipments to minimize

negative effects of the service. In order to solve the problem caused by unconscious knowledge, each service company has adapted supplement systems as following:

- Monitoring program by hiring specialists to supervise the contents
- Open discussion board about the answers
- Reporting program about false answers
- One line answer for evaluating

Completed knowledge would be reconfirmed by these systems, and these whole processes are opened to everyone. Hired special groups are in charge of questions and answers, and monitoring the updated contents at the real time. To encourage participation and reward great answers, most of these companies have evaluation and incentive systems. Incentive is given for the users by a moderation system which is evaluated by every user; Users vote for the best answer, and the people who do valuable answers get points and high levels. This system allows everyone to recognize how active and helpful they've been. Users can use these points for buying more e-mail space, free mobile phone cards, sending free instant messages through their mobile phones and watching VOD, etc. This system encourages experts groups to actively improve knowledge sharing through the service and help to make reliable databases.

According to the survey results, the next part of this thesis will explore top the three question-answer services in Korea: Naver, Empas, and Yahoo! Korea.

### ***Naver Knowledge iN***

Naver ([www.naver.com](http://www.naver.com)) launched the first portal based question-answer service in Korea, and it has been the most popular service until now. Since it started its

question-answer service in October 2002, it gets more than 35,000 questions and 65,000 answers everyday and almost 3,500,000 visitors per day (Jung, 2006). Currently, Naver has total 42,650,000 questions and answers in its database as of April, 2006 (Naver.com).

Washingtonpost recently introduced new metrics in Korean question-answer services as compared to Google:

Why is Naver so popular? One reason is that Naver can deliver more relevant search results than Google can, at least on its home turf.... "Google has a superb search engine," says Choi Jae Hyeon, NHN's search chief. "We have, however, built up know how and a database by extracting knowledge from users' brains." What he's talking about is a three-year-old initiative called "Knowledge-iN." The program lets users ask and answer questions on anything from recipes for kimchi to the composition of rocket fuel. Readers judge the responses, and the millions of folks who have answered questions are ranked as "ordinary," "knowledgeable," "highly knowledgeable," "supernatural," or -- for 22 truly prolific answerers -- "gods." "Naver is great because you get all sorts of detailed information in very specific questions and answers," says Song Han Sil, a 25-year-old pianist in Seoul. "Many of my friends don't even know that Google offers Korean-language service." The database now has some 37 million questions and answers that can get returned with search results. The idea is so popular among Koreans that most other search engines in the country, including Yahoo! Korea, now offer their own versions of Knowledge-In services (IhlWan, 2006).

Naver Knowledge iN provides a question-answer service and an open encyclopedia service which are open to everyone. Knowledge is evaluated and changed by users in terms of the quality and accuracy of knowledge. For question-answer services, users can manage their own knowledge database and handle their points by using the 'my knowledge' space. In order to encourage participation, points are provided to the people who actively participate to the knowledge activity, and some of them are awarded an 'honorary title'. Open encyclopedia service is a voluntary

knowledge sharing space for allowing free knowledge exchange on specific issues. In providing these services, Naver Knowledge iN is ranked as the number one question-answer service on many ranking websites.

### ***Empas Knowledge Exchange Market***

Empas (www.empas.com) launched its service in March 2003 by turning over Hangeoreh 'dbdic' which is well known as an original knowledge-sharing community. 80-100 knowledge advisers are recruited every quarter for answering, sharing their know-how and monitoring the Empas service. In order to encourage the creation of the database, Empas adapted 'Knowledge Brain' system from 2004 and it pays money to the people who provide 150 to 300 answers in one month. The characteristic of this site is its anonymous function different with the other sites which users have to open their name or nickname when they add comments.

### ***Yahoo! Korea Knowledge Search***

Yahoo! Korea (kr.yahoo.com) focused more on experts' knowledge services after opening its service at June 2003. Experts on specific areas or those with the high skills of a researcher can work for knowledge leaders: Yahoo! pays some amount of money to them for their work for monitoring, answering, handling of directories, and providing ideas on question-answer services. In addition, customer advisers called "opinion leaders" monitor and analyze the service. In order to provide credible

knowledge to customers, Yahoo! Korea established expert knowledge database in cooperation with other portal sites.

Yahoo! Korea also provides the “Wiki knowledge” service which allows users to edit knowledge. Users can edit or erase the others’ knowledge if they find it is not a right answer. In particular, Yahoo! shows related knowledge in the same page when the results are shown so that it helps to establish a knowledge map for users.

## **Chapter 5. Methodology**

This thesis seeks to understand the perceptions of Internet users regarding online question-answer services for learning purposes. The research questions of this study can be summarized as “Do people consider question-answer services as effective tools for learning?” In order to investigate people’s perception and assessment of question-answer services, a questionnaire survey was administered which focused on the users’ usage patterns and their opinion of these tools. To operate the ideas of respondents, four hypotheses were verified based on survey results. Statistical Package for the Social Sciences (SPSS) was used to analyze the data.

Data were collected using Survey Monkey ([www.surveymonkey.com](http://www.surveymonkey.com)), an online service which enables custom survey design. The survey was opened between March 3, 2006 and March 22, 2006, to Korean-speaking users of question-answer services. Invitations to complete the survey were distributed via e-mail and instant messenger systems; recipients were also asked to forward the message on to others. In the initial question, naïve respondents were asked whether they have had experience using question-answer services so that only practiced people could participate in the survey. A total of 206 responses were received and the results and demographic characteristics from this survey are discussed later in the chapter.

In order to analyze the data, Ordinary Least Squares Regression Analysis (OLS) was employed. OLS is a technique that helps to find out the relationship between independent variables and dependent variables; this multiple regression

analysis is useful for a causal analysis. The aim of a causal analysis is to see whether and how the independent variable is predicting the dependent variable. Overall question-answer services usage patterns will be regressed onto each independent variable.

R Squared value measures how well the model fits the data; in other words we can predict the dependent variable knowing only the independent variables in the model. As the R Square values come closer to 1, the behavior of dependent variables can be explained well by the behavior of independent variables.

Significant levels give the probability threshold for which the null hypotheses can be rejected. If the significance level is greater than 0.05, the null hypothesis is accepted, and if the significance level is less than or equal to 0.05, the null hypothesis is rejected. Coefficient is a measure of the degree in which two variables are linearly associated. The coefficient ranges from -1 to +1; a value of -1 means that two variables are perfectly negatively correlated, and the value of 1 means that positively correlated. With this methodological tool, this thesis will be used to seek to support the following hypotheses:

*H1: People generally consider question-answer services to be a useful tool for learning. This perception is related to satisfaction, trust about the knowledge and the idea of usefulness of the knowledge they get.*

*H2: The trust of knowledge is established based on users' actual experiences with searching for knowledge.*

*H3: The more trusting and the more satisfied people are with the knowledge acquired from question-answer services, the more use these services will be*

*used in the future for learning purposes. In addition, people's usage pattern of question-answer services for learning purposes is related to the practical components such as accuracy, usefulness, and quality of knowledge.*

*H4: People who consider question-answer services as a satisfactory tool will regard these services as providers of an effective community for learning. They also will anticipate that question-answer services will provide the effective community for learning in the future.*

## **Independent Variables**

Independent variables are related to users' opinions about question-answer services or the knowledge they acquire from these tools. These variables include satisfaction, trust, usefulness, accurate finding, best information, community and community expectation. The definitions of most of these variables follow.

- *Satisfaction* – This variable measures whether users feel satisfaction with question-answer services. Respondents indicated the degree to which they were satisfied with the question-answer services when they used it for the purposes of learning. Responses were recorded on a five-point scale. (1=Very satisfied, 2=Somewhat satisfied, 3=Neutral, 4=Somewhat unsatisfied, 5=Very unsatisfied.)

- *Trust* – This variable measures whether users believe the knowledge they received from question-answer services. Responses were recorded on a four-point scale. (1=Very satisfied, 2=Somewhat satisfied, 3=Somewhat unsatisfied, 4=Very unsatisfied.)

- *Usefulness* – This variable measures users’ ideas about the usefulness of knowledge they got from question-answer services. Responses were made on a four-point scale. (1=Very useful, 2= Somewhat useful, 3=Not so useful, 4=Very useless.)
- *Accuracy* – This variable measures how often users actually were able to find the knowledge they are looking for when they use the question-answer services for a specific learning purpose. Responses were made on a four-point scale. (1=Always, 2=Most of the time, 3= Only some of the time, 4=Hardly ever.)
- *Quality of knowledge*– This variable measures how often the respondent could get the best information possible on a particular topic. The value of quality of knowledge is measured on a four-item scale. (1= Very often, 2= Somewhat often, 3=Not so often, 4=Never.)
- *Community* – This variable measures the users’ opinions about how effectively the question-answer services are providing a community for learning. How the respondents felt was measured on a four-item scale. (1= Very effective, 2= Somewhat effective, 3=Not so effective, 4=Very ineffective.)
- *Community Expectation* - This variable measures users’ opinions about how effectively the question-answer services will provide a community for various

purposes. How the respondent feels is measured on a four item scale. (1= Very effective, 2= Somewhat effective, 3=Not so effective, 4=Very ineffective.)

### **Dependent Variables**

To find out the overall perception of question-answer services, the following four variables were chosen: useful learning, percentage, trust, and satisfaction. Trust and satisfaction were used as independent variables as well in different hypotheses. Each independent variable explains the dependent variables alone or in conjunction with others. These dependent variables are related to the usage patterns of question-answer services and the opinions and perceptions which are formed by the usage experience. These variables were adapted to explain people's overall perception about question-answer services.

- *Percentage* – This variable measures the percentage of users that take advantage of the question-answer service for learning purposes. The percentage level is measured on five item scale. (1=More than 90%, 2=More than 70%, 3=About 50%, 4=More than 30%, less than 50%, 5=Less than 30%).
- *Usefulness Learning* – Different from usefulness, which is used as an independent variable, usefulness learning measures the users' ideas about the helpfulness of knowledge they get from question-answer services, especially when users use it for learning purposes. Responses were made on four-point scale. (1=Very useful, 2= Somewhat useful, 3=Same with others, 4=Not so useful, 5=Very useless.)

## Conceptual and Operational Definitions

The following are conceptual definitions of terms which are used in this survey.

The term *Knowledge* means “an intangible resource that exists within the mind of the individual” (Sveiby 1997). There is a clear difference between knowledge and information. Even though both are grounded on data, knowledge is gained through the interpretation of information.

*Sharing* is a process by which a resource is given by one party and received by another. For sharing to occur, there must be an exchange; a resource must pass between source and recipient (Miller 2002).

*Learning* can be defined as people’s action that continually expand their capacity to create the results they truly desire and new and expansive patterns of thinking are nurtured (Senge, P. 1990). *Learning purpose* here means the situation in which somebody want to get some knowledge which is related to any topics. This learning purpose includes a process of getting a basic knowledge, a supplemental knowledge and a new idea.

*Trust* is the degree to which a member believes the community to be honest and reliable (Mayer et al. 1995). According to Mitzal, "trust, by keeping our mind open to all evidence, secures communication and dialogue" (Mitzal,1996). Where relationships are high in trust, people are more willing to engage in cooperative interaction (Nahapiet & Ghoshal, 1998).

*Satisfaction* about knowledge is considered to be a pleasure that a person feel when one get the knowledge that one really wanted to get (Wikipedia). This perception

can be evaluated as an absolute value by a person who is using knowledge for their personal purpose, and cannot be compared or objectified.

*Usefulness* of knowledge is defined as the "degree to which a person believes that using a particular system would enhance his or her performance" (Davis, 1989, 320). David found that perceived usefulness was significantly correlated with self-reported current usage and self-predicted future usage.

*Accuracy* is the degree of conformity of a measured (Wikipedia).

**Table 3. Conceptual and Operational Definitions**

Category	Concept	Definition
Knowledge Collective Environment	Knowledge	An intangible resource that exists within the mind of the individual (Sveiby,1997).
	Sharing	A process by which a resource is given by one party and received by another. For sharing to occur, there must be an exchange; a resource must pass between source and recipient (Miller, 2002).
	Learning	People’s action that continually expand their capacity to create the results they truly desire and new and expansive patterns of thinking are nurtured (Senge, P. 1990).
Knowledge Sharing Factors	Accuracy	The degree of conformity of a measured (Wikipedia)
	Usefulness	Degree to which a person believes that using a particular system would enhance his or her performance (Davis, 1989).
	Trust	The degree to which a member believes the community to be honest and reliable (Mayer et al., 1995).
	Satisfaction	To be a pleasure that a person feel when one get the knowledge that one really wanted to get (Wikipedia).

## **Chapter 6. Data and Findings**

This chapter shows survey findings with a description of survey frequencies, and regression models. A discussion of the significance of the findings and hypotheses follows. Detailed tables depicting survey results can be found in the Appendix.

### **Data Collection**

Data were collected via Survey Monkey, an online survey and research program. Survey participants were invited via e-mail and instant messenger invitations and to complete the survey. SPSS, a statistical analysis computer program, was used to analyze data. These data were tested with OLS regression analysis, which examines relationships between the dependent variable and multiple independent variables. A total of 206 responses were recorded.

### **Survey Demographics**

From the beginning, the demographics of the survey sample shows an imbalance toward people who are highly educated and professionally experienced, which ranged in ages from 20s to 30s. This disparity is due to the convenience nature of the survey sample of the peers readily available to the researcher. Despite of the limitation, this disproportion illustrates who the majority of active users of question-answer services actually are. These considerations should be taken into account when analyzing and applying the results of the survey to the general population. Note that the indicated percentages are the valid percents.

The age group was mainly comprised of 20- and 30-year-old respondents; the largest group was 30-34 years of age comprising 36.7% of the sample. The second largest age group was 25- to 29-year olds, consisting of 35% of the survey population. This sample group was randomly chosen, therefore, the imbalance in age may affect the main result.

For educational level, the survey sample was extremely skewed toward people with higher levels of formal education. The largest group of 54% had earned a graduate degree, and second largest group of 27% had higher than a graduate degree. Only 12.6% had a high-school degree, and 6.3% had college degrees. The imbalance in education may affect the measurement of attitudes and usage patterns in the subsequent analysis.

In the occupation category, the sample also skewed toward people who had jobs in knowledge related working environments. A plurality of them, 40.1% described themselves as salaried employees, 27.1% as students, and 18.1% as professionals. In particular, these people who have a job at this point have had several years of job experience. Among them, the largest group of 38.7% had 3 to 5 years of job experience', the second largest group of 33.3% had 6 to 10 years', and third largest had 1 to 2 years.

### **Question-Answer Services Usage Pattern**

The survey inquired about the question-answer services usage patterns of participants. Since the experience of using question-answer services are requirement

for participation in this survey, participants were asked if they had an experience using question-answer services. According to the survey, participants often use question-answer services, and most of them prefer to use a specific service tool on a regular basis. In particular, participants consider question-answer services as good sources for getting a basic or supplement knowledge about specific issues.

A majority of survey participants use question-answer services on a daily basis. The survey found that 59.3% of the participants used it several times a day and 23% use about once a day. In terms of usage habits, Korean question-answer services users were inclined to use specific service websites for their daily use. For a multiple check question, a large majority of survey participants, at 94.1%, said they used Naver Knowledge iN. This means Naver Knowledge iN is positioned as a major knowledge portal among Korean Internet users. In addition, of those who use question-answer services, 53% said they used two or three question-answer services on a regular basis, and 34.7% answered they used just one. About the reason for using specific question-answer services, 48.3% of the respondents said it is because of the convenience of use. For the question of use of specific question-answer services, half of survey participants (48.3%) agreed with the convenience of use, and 20.4% of them said their daily habits of use made them use the specific service. The trust of knowledge did not affect to the reason for choosing specific question-answer services, comprising of only 15.9% of answers. This result is believed that each of the question-answer services are providing similar knowledge evaluating systems to the others.

Survey results show that users are utilizing question-answer services to acquire basic and supplemental knowledge, rather than getting new ideas. This result means that question-answer services are considered to be initial gateways to getting knowledge. For the multiple-choice question about the main purpose for using question-answer services, 64.9% of participants responded that they use it to get basic knowledge on a specific issue, and 66% said to get supplement knowledge; 20.1% answered to get a new idea about specific issue, and 20.1% use question-answer services in order to confirm the knowledge which they already have.

In addition, users do not passively adopt the knowledge from question-answer services: they adopt or reject the knowledge on their own judgment when they meet the situation in which they have to choose among several choices. 61.6% of respondents have encountered situations in which the knowledge obtained from question-answer services is contradictory to the knowledge obtained through other sources. However, they also answered that they judge the trust of knowledge by themselves depending on the situation. 77.4% of respondents said that when they meet contradiction, they make a judgment depends on the situation. Among their standard of judgment, the source of knowledge which is generally shown with the knowledge plays a major role for a sizable group of respondents (24.6%). In addition, 24% of them said that they compare the knowledge from question-answer services to the knowledge and experience which they already have, while 22.4% of them compare the knowledge which they get to answers in other question-answer services. As shown above, users are positively

involved in the process of getting knowledge from question-answer services; their decision to trust that information depends on their standard of judgment.

What is important to consider here is the users' pattern of search services and their participation in knowledge creation. An overwhelming majority of respondents were using question-answer services just for searching and finding knowledge purposes, not making comments or creating knowledge. About the question of the main purpose of using question-answer services, an overwhelming majority (97.7%) checked the answer of "just for searching knowledge." Only a small percentage of users said they used the service for other purposes including posting questioning and providing answers. Survey results about satisfaction, the level of satisfaction with the answers for what they ask remained very high. Results indicated that 65.8% of them were satisfied with answers they got from the questions whereas 20.5% of them answered they were not satisfied.

This usage pattern is reflected in the users' activity for answering and questioning as well. 73.1% of the respondents acknowledged that they had never posted answers or comments to question-answer services. 19.2% of them had experiences with posting their comments between 1 and 2 times, and just 7.7% of the respondents said they did it more than twice. Similarly, users do not actively participate in making questions on the service board, either. 59.7% of them never posted their questions on the board, and 30.1% of them did so 1-2 times. Only 10.2% of them posted their questions more than twice.

About their motivation for posting comments to board, 62.5% of them said they did so to share knowledge with others, and 22.9% of them said they answered just for fun. Only 10.4% of them answered they posted answers in order to get some incentives which are provided by the service company. This result means that incentives fail as a major motivation for encouraging people to share their knowledge, but the pure motivation for sharing knowledge itself is enough of a reason.

In sum, the findings for participation and processes of knowledge creation illustrate that respondents are not active users in creating the contents themselves. Rather, they use question-answer services for looking for information which is already existed in the databases. In addition, the motivation for this activity is just to share their knowledge, not to get incentives.

## **Findings**

As described in the Methodology section, a multiple analysis process is used to study the relationship between one dependent variable and one or more independent variables. The regression results are organized into a chart with three columns: first, the independent variables, second, B (unstandardized coefficients) and beta (standardized coefficients). in parentheses, and third, the p-value. The purpose of having both unstandardized and standardized coefficients is to compare the coefficients across the wide array of variables more efficiently. Unstandardized beta coefficients are based on the specific unit of measurement for that particular variable, which makes it hard to compare. For example, one cannot compare one unit increase of income level

to a one year increase in schooling. Therefore, standardized coefficients place everything into a common unit of measurement: standard deviation (Allison, 1999, p.30).

Survey results support the Internet users' perception of collective intelligence for learning. As a whole, survey findings support the idea that people consider the question-answer services as satisfactory, useful, and trustful tools for learning.

*H1: People generally consider question-answer services to be a useful tool for learning. This perception is related to satisfaction, trust about the knowledge and the idea of usefulness of the knowledge they get.*

Survey results about satisfaction, the level of satisfaction with the existing answers remained very high. Results indicated that 65.8% of them were satisfied with answers they got from the questions whereas 20.5% of them answered they were not satisfied.

In addition, respondents agree with the idea that question-answer services are trustful source for learning. 58.7% of respondents said question-answer services are reliable tool for learning purpose. Even though 35.9% of them showed neutral position on this question, only 2.7% of them think it is somewhat unreliable or very unreliable. For the question about the general usefulness of question-answer services, 63.5% of respondents answered it is somewhat useful, and 31.8% said it is very useful. In addition, survey findings support the idea that people generally consider question-answer services to be useful tools for learning purposes. This positive view about

question-answer services is related to satisfaction, trust, and the usefulness of the knowledge they get from question-answer services.

Most of all, participants generally agree with that question-answer services are very useful for learning. Of all the survey participants, a large majority (63.5%) answered that question-answer services are somewhat useful for learning, while 31.8% of them considers them very useful. Very few of them (4.2%) said they are not so useful, and only 0.5% think that they are very useless.

This perception is affected by several factors such as overall satisfaction, trust, and the idea of general usefulness about question-answer services. These factors are positively related to the idea of question-answer services for learning. The regression for usefulness, trust and satisfaction produced statistically significant results.

As Table 4 indicates, unstandardized coefficient levels are strong enough to explain this relationship. The B values of coefficient are 0.305 for satisfaction, 0.363 for trust, and 0.181 for usefulness. Every value is clearly statistically significant, and these values provide strong evidence that each of these three independent values is co-efficient with how people consider the question-answer services for learning purposes.

The R-Square for this model is 0.421 which is very strong. This R-Square shows us that people's perception of question-answer services is explained very well by the variables of satisfaction, trust, and usefulness and explains 42.1% of the variance in the dependent variable. Under the unstandardized coefficients, the following equation can be predicted.

**Table 4. Hypothesis 1-OLS Regression**

Independent Variables	Unstandardized Coefficients (B)	Standardized Coefficients (beta)	Statistical Significance (p value)
Constant	.531		.003
Satisfaction	.305	.309	.000
Trust	.363	.317	.000
Usefulness	.181	.144	.043
R Square=.421 n=180			

$$Usefulness\ for\ Learning = 0.531 + 0.305 (Satisfaction) + 0.363 (Trust) + 0.181 (Usefulness).$$

The comparison between the standardized coefficients shows that the trust variable has the largest standardized coefficient. This explains that an increase of one standard deviation in the trust means an increase of 0.363 standard deviations in perception about the question-answer services for learning.

As a result, through the regression, H1 is supported. People generally consider question-answer services to be useful tools for learning. In addition, the satisfaction, trust and usefulness are clearly related to the perception about question-answer services for learning purposes, and this relationship is positive.

*H2: The trust of knowledge is established based on users' actual experiences with searching for knowledge.*

User's evaluations about question-answer services are very good even though a small member of negative opinions exist. Most of the respondents could find the best and most accurate answer for their questions from question-answer services. Regarding

the survey questions that asked about experiences with question-answer services, 75.4% of respondents said that they found the best information on a particular topic somewhat often, and 14.4% reported very often. More than 64.2% of respondents said that they could find the actual knowledge they are looking when they used question-answer services for learning purposes. In contrast, there was still a huge percentage of respondents(30.5%)who answered that they could do so only some of the time.

Table 5 shows that the trust the users get from question-answer services are formed by their perception from practical experiences, including whether they could find the actual and the high quality of knowledge they wanted to find. Regression analysis revealed that there is a significant relationship between trust and users' practical experiences. With strong R-Square of 0.300, the model significant p values show that this regression model is statistically significant. Coefficients was run among trust, accuracy, and quality of knowledge, and the results support the strong relationship of these variables. In particular, according to coefficients' value, how users find the answer they want to find (accuracy) is strongly related to the variable of trust.

**Table 5. Hypothesis 2-OLS Regression**

Independent Variables	Unstandardized Coefficients (B)	Standardized Coefficients (beta)	Statistical Significance (p value)
Constant	.872		.000
Accuracy	.458	.418	.000
Quality of knowledge	.241	.223	.001
R Square=.300 n=184			

$$\text{Trust} = 0.872 + 0.458 (\text{Accuracy}) + 0.241 (\text{Quality of knowledge}).$$

Therefore, these results of OLS regression support H2: the trust of knowledge is established on the basis of users' actual experiences in searching knowledge at a moderate level.

*H3: The more trusting and the more satisfied people are with the knowledge acquired from question-answer services, the more use these services will be used in the future for learning purposes. In addition, people's usage pattern of question-answer services for learning purposes is related to the practical components such as accuracy, usefulness, and quality of knowledge.*

The majority of the respondents are using question-answer services for learning purpose. Survey results found that 31.1% of respondents spend about 50% of their total usage of knowledge searches for learning purposes; 24.4% of them said they use them more than 70% of the total times for learning purposes. The users who answered that they use them between 30% and 50% comprised 22.3% of the total respondents, while 17.6% of them said that they use it for learning less than 30%. However, the people who use them for learning purposes more than 90% are only 4.7% of all participants.

The satisfaction of trust of knowledge that people get are important components which affect the use of question-answer services for learning purposes. Users of question-answer services are developing opinions based on trust and satisfaction, and they judge the question-answer services are suitable for learning based on these

components. Coefficients among these components are showing statistically significant. The coefficients for these variables are depicted in the following Table 6-1.

**Table 6-1. Hypothesis 3-OLS Regression**

Independent Variables	Unstandardized Coefficients (B)	Standardized Coefficients (beta)	Statistical Significance (p value)
Constant	1.447		.000
Trust	.485	.258	.003
Satisfaction	.296	.182	.032
R Square=.154 n=184			

$$\text{Percentage} = 1.447 + 0.485 (\text{Trust}) + 0.296 (\text{Satisfaction}).$$

As shown in Table 6-1, the trust has a stronger impact than satisfaction in explaining B. The coefficient for trust is 0.485 compare to 0.296 for satisfaction. The regression models were statistically significant based on the significant levels as listed in the Table. The R-Square of this model is 0.154 which is moderate, therefore, this regression model has a satisfactory overall goodness of fit.

In addition, this percentage is affected by practical factors: how users actually find the knowledge they are looking for, whether the question-answer services provide the best knowledge compared to other sources, and how users feel about the usefulness of knowledge they get from question-answer services. As Table 6-2 shows, R-Square in this model is moderately high as 0.254, which means that these values explain 25.4% of the dependent variable. In the table, the significance levels show that relationship between independent variable and independent variables in this regression is statistically significant. The coefficients table, under the unstandardized coefficients,

shows that the dependent value of percentage has positive relationship with three independent variables as follows:

**Table 6-2. Hypothesis 3-OLS Regression**

Independent Variables	Unstandardized Coefficients (B)	Standardized Coefficients (beta)	Statistical Significance (p value)
Constant	.721		.041
Accuracy	.335	.161	.025
Usefulness	.607	.294	.000
Quality of knowledge	.357	.175	.024
R Square=.254			
n=186			

$$\text{Percentage} = 0.721 + 0.335 (\text{Accuracy}) + 0.607(\text{Usefulness}) + 0.357 (\text{Quality of Knowledge}).$$

Among these three independent values, with B value of 0.607, the usefulness of knowledge that users get from question-answer services are the strongest predictor of the percentage of respondents using question-answer services for learning purposes. This fact is supported by the value of correlations with the dependent variable with strong significant level of 0.456. Under the correlations table, all relationship among three independent values are significant at the 0.01 level.

According to the survey data, a positive relationship is established between the percentage using question-answer services for learning purposes and trust, satisfaction about knowledge that users get from these services. In addition, this percentage is positively related to practical components such as how often users find the actual knowledge they need, as well as usefulness and quality of the knowledge. Survey

results and regression analysis support the idea that the more trust and satisfaction people have in the knowledge from question-answer services, the more they use these services for learning purposes. In addition, people's usage patterns of question-answer services for learning purposes are related to practical components such as accuracy, usefulness and quality of knowledge.

*H4: People who consider question-answer services as a satisfactory tool will regard these services as providers of an effective community for learning. They also will anticipate that question-answer services will provide the effective community for learning in the future.*

Survey questions measured the satisfaction of question-answer services for learning purposes and their function of providing a sense of community. The results show that people generally agree that question-answer services are effective in providing a learning an environment for community for Internet users. They also anticipate that these question-answer services will provide an effective community for a variety of interests in the future.

Survey findings show that 72.2% of the users admit question-answer services are somewhat effective in providing a community for learning. 14.8% of them said it is a very effective community, whereas 11.9% and 1.1% of them said it is not so effective and very ineffective respectively. For questions of future expectation about community, 65% of the people answered that question-answer services will provide a somewhat effective service for various interests, and 20.9% said it will do so in a very

effective manner. Only 11.9% of them doubted the possibility of community by answering ‘not so effective’, and 2.3% had very negative views about the future.

Statistically significant correlations were found between these variables. OLS regression model shows this relationship. The R-Square of 0.297 supports this model at a moderate level saying this model is a pretty fit. In addition, the overall results show knowledge-search-service users are more likely to be satisfied about its function as a community. This regression was statistically significant for the entire model has a significant level. The coefficient for this model is following.

**Table 7. Hypothesis 4-OLS Regression**

Independent Variables	Unstandardized Coefficients (B)	Standardized Coefficients (beta)	Statistical Significance (p value)
Constant	.794		.000
Community	.317	.263	.001
Community Expectation	.371	.345	.000
R Square=.297 n=176			

$$Satisfaction = 0.794 + 0.317 (Community) + 0.371 (Community Expectation).$$

Therefore, hypothesis 4 that people who consider the question-answer services as satisfactory tools for learning consider these services as good providers of an effective learning community. They also anticipate that the idea that question-answer services will provide an effective community for learning in the future is supported.

## **Summary**

The results of this study clearly illustrate that collective intelligence is strongly supported by Internet users. In addition, Internet users' attitude for learning through question-answer service shows that social learning theory and constructivist theory are applied to them. Users of question-answer services generally trust and satisfied with knowledge that was created by the collective work of general Internet users. This perception is established by users' voluntary judgment toward question-answer services based on their experience. In addition, this study gives us clear evidence that this perception has an effect on the usage of question-answer services for learning purpose.

## Chapter 7. Conclusion

This project has examined people's perceptions about question-answer services and the influences that a variety of external factors have in the formation of perceptions regarding the question-answer services as a learning tool.

This study supports the idea that people's general perceptions of question-answer services for learning are positively established. The role of perception in the use question-answer services was explored as well as the existence of factors that affect this perception in the process of creating and sharing of knowledge for learning purpose. These perceptions include satisfaction, usefulness, trust, and other factors that indicate people's practical experiences such as accuracy, usefulness, and quality of knowledge. These factors are presented within a theoretical model and the definitions have been operationally shown. Having ascertained the importance of perception in usage of services, the role of each factor has highlighted in order to extend the benefits of collective learning.

Following are general findings. First, question-answer services are believed by users to be satisfactory, useful, and reliable tools for learning. Users generally consult these services very actively for learning purposes, especially for getting basic and initial knowledge. Their decision for choosing service tools depends primarily on convenience of use.

The second major finding includes users' decision making patterns. As shown in the research results, users of question-answer services are not passive receivers; they

accept the knowledge from question-answer services after they have passed various decision-making standards. In this process, the source of the knowledge, already existing knowledge in their brain as well as quality of knowledge, play important roles for selecting and accepting of new knowledge. This finding indicates that the important factor needed for question-answer services to get the upper hand on the competition is to increase the overall quality and credibility of the knowledge they provide. For the same reason, many of the respondents commented that question-answer services should improve the trustworthiness by providing knowledge evaluation and involving experts in the process.

The third major finding was that people's pattern of participation in knowledge creation. Even though users are very active in searching and acquiring new knowledge from question-answer services, few of them participate in the creation of knowledge.

The fourth finding is that the usage pattern of these tools for learning purposes is related to many perceptual factors such as satisfaction, usefulness, and trust. In particular, the experiences of getting a practical result of knowledge from question-answer services encourage respondents to use the service for learning purpose. People's satisfaction and expectation about the sense of community through these services is very high as well.

Fifth, users generally agree with the idea that question-answer services are providing an effective knowledge community for learning, and they expect that this service will do so for other purposes as well.

Sixth, considering the education level of participants, highly educated users generally accept the question-answer services as useful, satisfactory, and reliable sources for learning. This means that public collective intelligence does have an effect on people with high individual intelligence.

As proved in this study, collective intelligence works positively in online learning societies. People actively use online spaces for their learning, and they get knowledge from the content which was created by collective work for learning purposes. Therefore, in order to establish effective learning online communities, a clear understanding of the factors that affect knowledge sharing through collective work is needed. In addition, by understanding collective intelligence through question-answer services, we can provide the desirable knowledge sharing and learning community models for developing countries which do not have enough knowledge databases of their own.

### **Limitations**

This thesis has several limitations. These include term ambiguities, shortage of past research, homogeneous group of respondents, self-estimated survey questions and not enough sample size for several questions.

Most of all, the terms used in this survey were not defined clearly. Even though definitions and terms must be informed to survey participants before or during the actual data collection, several terms were not explained well. For example, the term 'learning' was not specifically defined so that participants might have been confused

about what exactly this term means. This trouble of ambiguous terms applied to the translation process as well. In the process of translation from Korean to English, several terms could not clearly be translated because of the cultural and language differences.

In addition, because web-based question-answer services are relatively new formats, past research that focused on this specific tool was scarce. Even though similar tools, such as expert services, have been the case studies of former literature, the difference of concepts still exists. This may cause the unsuitability of their theoretical background for this study. In addition, the former research seldom discussed the relationship of specific purpose and people's perceptions.

As already mentioned, this survey shows only a glimpse at people's usage patterns and perceptions because of the composition of respondents. The survey sample did not yield diverse respondents due to the research's limitation in terms of geography and access to technology. The online survey was accessible for only the people who got e-mail or MSN instant message invitations, thus participation was very limited. As a result, although the survey was distributed randomly without any requirement from participants, survey respondents were skewed toward highly educated and white-collar people. Therefore, it might be hard to apply this study result to other demographic groups.

Another limitation has shown to be self-estimating answers. For the question "What is the percentage of use of the question-answer services for learning purposes?"

the assessment of their usage was left to the subjectivity of the respondents and was asked to be indicated in the form of a specific percentage.

About the sample size, the survey results related to people's participation for knowledge creation could not be analyzed with a small number of answers. Even though a total of 206 people participated in this survey, most of them answered that they do not participate to do questions and answers, and they just do research on ready-made databases. This usage attitude caused not big enough of a sample size to analyze participation-related survey questions such as "What is the motivation for posting comments to a question-answer services?" and "How confident you feel about your answers when you post them?" Therefore, survey results for these questions could not draw a meaningful explanation for the existing phenomenon.

### **Future Research**

This thesis project defined the collective intelligence created through web-based question-answer services and linked the perceptions and usage patterns based on questionnaire surveys. However, several additional research opportunities are available for future and extended analysis of the collective work in online environments. Continued research in the area of collective intelligence and online learning is important as more people are involved in open Internet spaces for learning opportunities. In order to be able to expand upon this research, several possible additions could be attempted.

First, future research might include a more comprehensive study about what components make an impact to collective work and learning in Internet environments. Studies would combine multiple perspectives such as technological environments, organizational structure and external barriers. The studies that consider environmental contexts would suggest more practical guidelines to establish successful knowledge sharing and learning organizations.

Another direction for future research would find several strategies for achieving a high-level collective intelligence model. How can a society collect and share certain level of intelligence? The answers of this question would be valuable guidelines for establishing a more sophisticated knowledge sharing society. Finally, this study might suggest possible examples of collective intelligence driven learning community models for practical application.

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## Appendix A-Survey Questionnaire

### A-1. Korean Version

안녕하십니까. 저는 조지타운대학교 대학원에 재학중인 이유선입니다.

이 설문은 지식검색서비스의 사용에 관한 대학원 학위 논문의 일부입니다. 이 논문은 지식검색서비스가 전문지식의 공유와 학습에 어떤 영향을 미치는지를 알아보기 위해 구성되었습니다. 이 설문에서 지식검색서비스는 사용자가 지식을 공유하기 위해 질문하고 답하는 형식의 지식iN, 지식거래소, 지식뱅크 등의 서비스를 포함합니다.

이 설문은 지식검색서비스를 사용해봤거나 사용하는 인터넷 유저들만 참여가 가능합니다. 설문 참여는 완전히 자율적으로 이루어지며, 참여자는 설문 도중 언제든지 설문을 중단할 수 있습니다.

여러분의 응답은 완전히 비밀이 보장됩니다.

설문에 관한 질문이나 우려 사항은 [ysl4@georgetown.edu](mailto:ysl4@georgetown.edu) 로 이메일을 주시거나 조지타운대학교 Communication, Culture and Technology 프로그램 주소 3520 Prospect St. NW, Washington DC, 20052로 연락주시면 됩니다. 감사합니다.

#### A. 지식검색서비스 사용 현황

1. 귀하는 평균 얼마나 자주 지식검색서비스를 이용하시나요?
  - a. 하루에 여러 번
  - b. 하루에 한두번
  - c. 일주일에 세네번
  - d. 일주일에 한두번
  - e. 한달에 한두번
2. 귀하는 다음 중 어떤 지식검색 서비스를 주로 이용하시나요? (여러 개 선택 가능)
  - a. 네이버 지식인
  - b. 엠파스 지식거래소
  - c. 야후 지식검색
  - d. 네이트 지식뱅크
  - e. 드림위즈 지식검색
  - f. 프리첼 지식검색
  - g. 세이클럽 지식검색

- h. 기타 -답변을 구체적으로 적어주세요. (            )
- 3. 귀하가 주로 방문하는 지식검색 서비스의 수는 몇 개나 되나요?
  - a. 한 개
  - b. 두개 또는 세개
  - c. 세개 이상
  - d. 주로 방문하는 사이트 없음
- 4. 귀하가 특정 지식검색 서비스를 주로 이용하는 이유는 무엇입니까?
  - a. 이용의 편리성
  - b. 지식의 신뢰성
  - c. 사이트의 지명도
  - d. 이용 습관
  - e. 기타 - 구체적으로 답변을 적어주세요. (            )

**B. 지식 공유와 활용**

- 5. 귀하가 특정 분야에 관련한 학습을 위해 지식검색 서비스를 이용할 때, 주요 목적은 무엇입니까? (여러 개 선택 가능)
  - a. 분야에 관한 초보적인 지식을 얻기 위해
  - b. 특정 분야에 관련된 보충 지식을 얻기 위해
  - c. 특정 분야와 관련된 새로운 아이디어를 얻기 위해
  - d. 이미 알고 있는 사실을 재확인하기 위해
  - e. 기타 - 답변을 구체적으로 적어주세요. (            )
- 6. 귀하는 지식검색서비스를 사용하는데 있어서 얼마나 많은 %를 특정 분야와 관련한 전문 지식 습득과 학습을 위해 사용하십니까?
  - a. 90% 이상
  - b. 70% 이상
  - c. 50% 정도
  - d. 30% 이상 50% 이하
  - e. 30% 미만
- 7. 귀하는 특정 분야와 관련한 전문 지식 습득과 학습에 있어서 지식검색서비스가 얼마나 유용한 도구라고 생각하십니까?
  - a. 매우 유용하다.
  - b. 어느 정도 유용하다.
  - c. 별로 유용하지 않다.
  - d. 전혀 유용하지 않다.

8. 귀하는 특정 분야와 관련한 학습에 있어서 다른 어느 곳에서도 얻을 수 없는 새롭고, 유용하고, 가치있는 지식을 지식검색서비스로부터 얻은 경험이 있으십니까?
- 매우 자주 그렇다
  - 가끔 그렇다
  - 거의 그렇지 않다
  - 전혀 그렇지 않다
9. 귀하는 귀하는 특정 분야와 관련한 학습에 있어서 지식검색서비스를 이용할 때, 얼마나 자주 귀하가 원하는 지식의 답변을 정확하게 얻을 수 있었습니까?
- 항상
  - 대부분
  - 가끔
  - 전혀
10. 귀하는 특정 분야와 관련한 학습에 있어서 지식검색서비스의 검색 결과에 얼마나 만족하십니까?
- 매우 만족한다
  - 어느정도 만족한다
  - 보통이다
  - 다소 불만족한다
  - 매우 불만족한다
11. 귀하는 지식검색서비스에서 얻는 지식들의 신뢰성을 어떻게 평가하십니까?
- 매우 믿을만하다
  - 대체로 믿을만하다
  - 보통이다
  - 별로 믿을만하지 않다
  - 전혀 믿을만하지 않다
12. 귀하가 지식검색 서비스를 이용할 때, 지식의 신뢰성의 판단 기준은 무엇인가요?
- 출처를 기반으로
  - 자신이 원래 갖고 있던 지식과 경험과 비교해서
  - 다른 검색을 통해 얻은 지식과 비교해서
  - 다른 사람들의 의견과 비교해서
  - 답변의 내용의 질을 보고 직접 판단
  - 기타 - 답변을 구체적으로 적어주세요. (                    )
13. 귀하는 지식검색서비스를 통해 얻은 지식과 다른 정보 소스를 통해 얻은 지식간에 마찰을 경험한적이 있습니까?

- a. 있다
  - b. 없다
14. 지식검색서비스로부터 얻는 지식과 다른 정보 소스를 통해 얻은 지식간 마찰이 있을때 귀하는 주로 어떤 것을 더 신뢰하십니까?
- a. 지식검색서비스로부터 얻은 지식
  - b. 다른 소스로부터 얻은 지식
  - c. 상황에 따라 다름
15. 귀하는 지식검색서비스에서 제공하는 지식의 실용성(실제 활용할 수 있는 정도)에 대해 어떻게 평가하십니까?
- a. 매우 높다
  - b. 높은 편이다
  - c. 보통이다
  - d. 낮은 편이다
  - e. 매우 낮다
16. 특정 분야와 관련한 학습을 위해 지식검색서비스가 가장 먼저 보완해야 할 점은 무엇이라고 생각하십니까?
- a. 정보 평가 시스템 및 전문가 집단 참여를 통해 정보의 신뢰성 높이기
  - b. 각종 인센티브를 통해 참여도 높이기
  - c. 사용자간에 적극적으로 의견을 나눌 수 있도록 적절한 커뮤니티 공간 제공
  - d. 지식의 종류와 양 늘리기
  - e. 기타 (답변을 구체적으로 적어주세요.)

### C. 지식검색 참여도

17. 귀하는 주로 지식검색서비스를 어떻게 활용하십니까?
- a. 검색을 주로 하는편
  - b. 질문을 주로 하는편
  - c. 답변을 주로 하는편
  - d. 검색, 질문, 답변을 골고루 하는편
18. 귀하는 지식검색서비스에 얼마나 자주 자신의 답변을 게재하셨습니다습니까?
- a. 개제한적 없다
  - b. 한두 번
  - c. 두번 이상
19. 귀하가 지식검색서비스에 자신의 답변을 게재하는 동기는 무엇입니까?
- a. 내가 가진 지식을 다른 사람들과 공유하기 위해

- b. 지식검색서비스 포털에서 제공하는 각종 인센티브를 얻기 위해
  - c. 재미로
  - d. 기타- 답변을 구체적으로 적어주세요. (                    )
20. 귀하가 지식검색서비스 특정 분야에 자신의 답변을 게재했다면 스스로를 그 분야에 있어서 어떻게 정의하시겠습니까?
- a. 그 분야의 전문가
  - b. 그 분야의 경험자
  - c. 그 분야에 지식이 있는 일반인
  - d. 그 분야에 지식은 없지만, 관심이 있는 일반인
  - e. 그 분야에 지식도 없고 관심도 없지만, 답변을 즐기는 사람
  - f. 기타-답변을 구체적으로 적어주세요. (                    )
21. 귀하가 지식검색 서비스 특정 분야의 질문에 대해 답변을 게재했다면, 귀하는 귀하의 의견에 대해 어느정도 확신을 갖고 게재하십니까?
- a. 매우 확신
  - b. 어느 정도 확신
  - c. 그다지 확신할 수 없음
  - d. 전혀 확신할 수 없음
22. 귀하는 지식검색서비스에 얼마나 자주 귀하의 질문을 게재하십니까?
- a. 개제한적 없다
  - b. 한두 번
  - c. 두번 이상
23. 귀하가 지식검색서비스에 귀하의 질문을 게재하고, 답변을 받았다면, 그 답변은 귀하에게 얼마나 유용했습니까?
- a. 매우 유용했다
  - b. 어느 정도 유용했다
  - c. 별로 유용하지 않았다
  - d. 전혀 유용하지 않았다

**D. 지식 커뮤니티**

24. 귀하는 지식검색 서비스가 귀하의 관심분야와 비슷한 관심을 갖고 있는 사람들간에 상호 학습을 위한 공간을 얼마나 효과적으로 제공하고 있다고 생각하십니까?
- a. 매우 효과적이다
  - b. 어느 정도 효과적이다
  - c. 별로 효과적이지 않다

d. 전혀 효과적이지 않다

25. 귀하의 경험에 비추어 볼 때, 귀하는 여러 흥미 분야의 커뮤니티 형성에 있어서 지식검색서비스가 효과적이라고 생각하십니까?

- a. 매우 그렇다
- b. 어느 정도 그렇다
- c. 별로 그렇지 않다
- d. 전혀 그렇지 않다

#### D. 인구통계학적 정보

26. 귀하의 연령은?

- a. 15세 미만
- b. 15-19 세
- c. 20-24 세
- d. 25-29 세
- e. 30-34 세
- f. 35-39 세
- g. 40-49 세
- h. 50세 이상

27. 귀하의 교육 수준은 어느정도입니까?

- a. 고졸
- b. 전문대졸
- c. 대졸
- d. 대학원 재학 이상

28. 귀하의 직업은?

- a. 일반 기업체 회사원
- b. 전문직
- c. 자영업
- d. 공무원
- e. 학생
- f. 주부
- g. 기타 - 답변을 구체적으로 적어주세요. (      )

29. 귀하는 몇 년간의 직업 경험을 갖고 있습니까?

- a. 1년 미만
- b. 1-2 년

- c. 3-5 년
- d. 6-10년
- e. 11-20년
- f. 20년 이상

## **A-2. English Version**

This survey is a part of my Master's thesis that examines the use of question-answer services. This thesis is designed to explore how question-answer services make an impact on knowledge sharing and learning. For the purposes of this thesis, question-answer services are defined as applications which provide the online forum for users to ask and answer questions on anything. This service includes Naver Knowledge iN, Empas Knowledge Exchange Market, Yahoo! Korea Knowledge Search, etc.

A participant should be a user of question-answer services. Participation is entirely voluntary and participants may choose to stop responding to the survey at any point. Your responses to the survey will remain entirely confidential.

If you have any questions or concerns you may contact me, Yu Sun Lee at [yul4@georgetown.edu](mailto:yul4@georgetown.edu). I can also be contacted at Yu Sun Lee, Communication, Culture and Technology, 3520 Prospect St. NW, Washington DC, 20052. Thank you.

### **A. Question-Answer Services Usage Pattern**

1. How often do you use web-portal-based question-answer services on the Internet?
  - a. Several times a day
  - b. About once a day
  - c. 3-4 times a week
  - d. 1-2 times a week
  - e. 1-2 times a month
  
2. Which question-answer service do you use the most often?
  - a. Naver Knowledge iN
  - b. Empas Knowledge Exchange Market
  - c. Yahoo! Knowledge Search +--
  - d. Nate Knowledge Bank
  - e. Dreamwiz Knowledge Search
  - f. Freechal Knowledge Search
  - g. Sayclub Knowledge Search
  - h. Others – please specify your answers. (                    )
  
3. How many different question-answer services do you use on a regular basis?
  - a. Just one
  - b. Two or three
  - c. More than three
  - d. Do not use any question-answer services on a regular basis

4. What is the purpose of using specific question-answer services?
- a. The convenience for use
  - b. Reliability of knowledge
  - c. Name value of the site
  - d. Habit of use
  - e. Others – please specify your answers. (                    )

**B. Knowledge Satisfaction**

5. When you use question-answer services for learning purposes for a specific issue, what is the main reason? (Check all that apply)

- a. To get basic knowledge about that issue
- b. To get supplement knowledge about that issue
- c. To get a new idea about that issue
- d. To confirm the knowledge which I already have
- e. Others – please specify your answers. (                    )

6. What is the percentage of use of question-answer services for learning purposes?

- a. More than 90%
- b. More than 70%
- c. About 50%
- d. More than 30%, less than 50%
- e. Less than 30%

7. What do you think about the usefulness of question-answer services?

- a. Very useful
- b. Somewhat useful
- c. Not so useful
- d. Very useless

8. Have you ever gotten knowledge from question-answer services that you regard as being the best information on particular topic?

- a. Very often
- b. Somewhat often
- c. Not so often
- d. Never

9. How often can you actually find the knowledge you are looking for when you use question-answer services for specific learning purposes?

- a. Always
- b. Most of the time
- c. Only some of the time
- d. Hardly ever

10. Are you satisfied or dissatisfied with the answers through question-answer services for specific learning?
- Very Satisfied
  - Somewhat Satisfied
  - Somewhat Unsatisfied
  - Very Unsatisfied
11. In general, do you think the information from question-answer services is reliable?
- Very reliable
  - Somewhat reliable
  - Somewhat unreliable
  - Very unreliable
12. How do you decide about the reliability of the knowledge from question-answer services?
- From the source
  - Compare to the knowledge and experience which I already have
  - Compare to the knowledge which I get from other question-answer services
  - Compare to people's ideas
  - The quality of knowledge
  - Others – please specify your answers. (                      )
13. When you use the question-answer services, have you ever encountered some situations in which the knowledge contradicts to the knowledge obtained through other sources?
- Yes
  - No
14. Which do you believe more when you encounter a contradiction? Knowledge from question-answer services or from the other sources?
- Knowledge from question-answer services
  - Knowledge from the other human sources
  - Depends
15. What do you think about the usefulness of question-answer services for learning purposes?
- Very useful
  - Somewhat useful
  - Same with the others
  - Not so useful
  - Very useless

16. What do you think it should be added to the question-answer services for learning purposes?

- a. Improving the reliability of knowledge by adding evaluation systems and involving experts in the knowledge making
- b. Increasing the participation through various incentive systems
- c. Providing communities for sharing ideas among users
- d. Increasing the kind and quantity of knowledge
- e. Others – please specify your answers. (                    )

### **C. Participation**

17. What is your main purpose for using question-answer services?

- a. To search for knowledge
- b. To ask a question
- c. To answer questions
- d. All of above

18. How many times have you posted your comments to question-answer services?

- a. None.
- b. 1-2 times
- c. More than 2 times

19. What is the motivation for posting comments to question-answer services?

- a. To share knowledge with others
- b. To get incentives which are provided by the service provider
- c. Just for fun
- d. Others – please specify your answers. (                    )

20. If you have posted your comments in any particular subject, how would you define yourself?

- a. Expert in that particular area
- b. Experienced person in that particular area
- c. General person who has knowledge in that particular area
- d. General person who has an interest, but not knowledge in that particular area
- e. Person who has no idea and no interest in that particular area, but just loves to answer
- f. Others – please specify your answers. (                    )

21. How confident do you feel about your answers when you post the answers to questions?

- a. Very confident
- b. Somewhat confident
- c. Not too confident

- d. Not confident at all
22. How many times have you posted questions to question-answer services?
- a. None.
  - b. 1-2 times
  - c. More than 2 times
23. What do you think about the usefulness of the answers that you get for your questions?
- a. Very useful
  - b. Somewhat useful
  - c. Not so useful
  - d. Very useless
24. How effectively are question-answer services in providing a community for learning?
- a. Very effective
  - b. Somewhat effective
  - c. Not so effective
  - d. Very ineffective
25. With your experience, do you think that question-answer services are effective for providing communities for various interests?
- a. Very effective
  - b. Somewhat effective
  - c. Not so effective
  - d. Very ineffective

**D. Demographic Questions**

26. What is your age?
- a. Under 15
  - b. 15-19
  - c. 20-24
  - d. 25-29
  - e. 30-34
  - f. 35-39
  - g. 40-49
  - h. Over 50
27. What is your education level?
- a. High school degree
  - b. College degree

- c. Graduate degree
- d. Higher than graduate degree

28. Professionally, you would describe yourself as?

- a. A salaried employee
- b. A professional
- c. Self-employed
- d. A public official
- e. A student
- f. A housewife
- g. Others – please specify your answers. (                    )

29. How many years of professional experience do you have?

- a. 0
- b. 1-2
- c. 3-5
- d. 6-10
- e. 11-20
- f. More than

## Appendix B-Frequency Table

1. How often do you use web-portal-based question-answer services on the internet?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Several times a day	121	58.7	59.3	59.3
	About once a day	47	22.8	23.0	82.4
	3-4times a week	18	8.7	8.8	91.2
	1-2 times a week	11	5.3	5.4	96.6
	1-2 times a month	7	3.4	3.4	100.0
	Total	204	99.0	100.0	
Missing	.00	2	1.0		
Total		206	100.0		

2. Which question-answer service do you use the most often? (Multiple choice)

3. How many different question-answer services do you use on a regular basis?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Just one	70	34.0	34.7	34.7
	Two or three	107	51.9	53.0	87.6
	More than three	21	10.2	10.4	98.0
	Do not use any knowledge search service on a regular basis	4	1.9	2.0	100.0
	Total	202	98.1	100.0	
Missing	.00	4	1.9		
Total		206	100.0		

4. What is the purpose of using specific question-answer services?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	The convenience for use	97	47.1	48.3	48.3
	Reliability of knowledge	32	15.5	15.9	64.2
	Name value of the site	21	10.2	10.4	74.6

	Habit of use	41	19.9	20.4	95.0
	Others	10	4.9	5.0	100.0
	Total	201	97.6	100.0	
Missing	.00	5	2.4		
	Total	206	100.0		

5-1. When you use question-answer services for learning purpose for specific issue, what is the main reason?-To get basic knowledge about that issue

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	126	61.2	61.2	62.1
	No	80	38.8	38.9	100.0
	Total	206	100.0	100.0	

5-2. When you use question-answer services for learning purpose for specific issue, what is the main reason?-To get supplement knowledge about that issue

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	128	62.1	62.1	62.1
	No	78	37.9	37.9	100.0
	Total	206	100.0	100.0	

5-3. When you use question-answer services for learning purpose for specific issue, what is the main reason?-To get a new idea about that issue

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	43	20.9	20.9	20.9
	No	163	79.1	79.1	100.0
	Total	206	100.0	100.0	

5-4. When you use question-answer services for learning purpose for specific issue, what is the main reason?-To confirm the knowledge which I already have

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	39	18.9	18.9	18.9
	No	167	81.1	81.1	100.0
	Total	206	100.0	100.0	

5-5. When you use question-answer services for learning purpose for specific issue, what is the main reason?-Others (please specify your answers)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	4	1.9	1.9	1.9
	No	202	98.1	98.1	100.0
	Total	206	100.0	100.0	

6. What is the percentage of use of the question-answer services for learning purpose?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	More than 90%	9	4.4	4.7	4.7
	More than 70%	47	22.8	24.4	29.0
	About 50%	60	29.1	31.1	60.1
	More than 30%, less than 50%	43	20.9	22.3	82.4
	Less than 30%	34	16.5	17.6	100.0
	Total	193	93.7	100.0	
Missing	.00	13	6.3		
Total		206	100.0		

7. What do you think about the usefulness of question-answer services?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very useful	61	29.6	31.8	31.8
	Somewhat useful	122	59.2	63.5	95.3
	Not so useful	8	3.9	4.2	99.5
	Very useless	1	.5	.5	100.0
	Total	192	93.2	100.0	
Missing	.00	14	6.8		
Total		206	100.0		

8. Have you ever gotten knowledge from question-answer services that you regard as being the best information on a particular topic?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very often	27	13.1	14.4	14.4

	Somewhat often	141	68.4	75.4	89.8
	Not so often	15	7.3	8.0	97.9
	Never	4	1.9	2.1	100.0
	Total	187	90.8	100.0	
Missing	.00	19	9.2		
Total		206	100.0		

19. What is the motivation for posting comments to a question-answer services?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	To share knowledge with others	30	14.6	62.5	62.5
	To get incentives which are provided by the service provider	5	2.4	10.4	72.9
	Just for fun	11	5.3	22.9	95.8
	Others	2	1.0	4.2	100.0
	Total	48	23.3	100.0	
Missing	.00	158	76.7		
Total		206	100.0		

20. If you have posted your comments in any particular area subject, what would you define yourself?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Expert in that particular area	2	1.0	4.3	4.3
	Experienced person in that particular area	20	9.7	42.6	46.8
	General person who has knowledge in that particular area	16	7.8	34.0	80.9
	General person who has an interest, but not knowledge in that particular area	9	4.4	19.1	100.0
	Total	47	22.8	100.0	
Missing	.00	159	77.2		
Total		206	100.0		

21. How confident do you feel about your answers when you post the answers to questions?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very confident	21	10.2	44.7	44.7
	Somewhat confident	25	12.1	53.2	97.9
	Not too confident	1	.5	2.1	100.0
	Total	47	22.8	100.0	
Missing	.00	159	77.2		
Total		206	100.0		

22. How many times have you posted questions to question-answer services?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	105	51.0	59.7	59.7
	1-2 times	53	25.7	30.1	89.8
	More than twice	18	8.7	10.2	100.0
	Total	176	85.4	100.0	
Missing	.00	30	14.6		
Total		206	100.0		

23. What do you think about the usefulness of the answers that you get for your question?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very useful	7	3.4	9.6	9.6
	Somewhat useful	48	23.3	65.8	75.3
	Not so useful	15	7.3	20.5	95.9
	Very useless	3	1.5	4.1	100.0
	Total	73	35.4	100.0	
Missing	.00	133	64.6		
Total		206	100.0		

24. How effectively are question-answer services in providing for the community for learning?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very effective	26	12.6	14.8	14.8
	Somewhat effective	127	61.7	72.2	86.9
	Not so effective	21	10.2	11.9	98.9

	Very ineffective	2	1.0	1.1	100.0
	Total	176	85.4	100.0	
Missing	.00	30	14.6		
	Total	206	100.0		

25. With your experience, do you think the question-answer services are effective for providing communities for various interests?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very effective	37	18.0	20.9	20.9
	Somewhat effective	115	55.8	65.0	85.9
	Not so effective	21	10.2	11.9	97.7
	Very ineffective	4	1.9	2.3	100.0
	Total	177	85.9	100.0	
Missing	.00	29	14.1		
	Total	206	100.0		

26. What is your age?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	15-19	3	1.5	1.7	1.7
	20-24	29	14.1	16.4	18.1
	25-29	62	30.1	35.0	53.1
	30-34	65	31.6	36.7	89.8
	35-39	12	5.8	6.8	96.6
	40-49	5	2.4	2.8	99.4
	Over 50	1	.5	.6	100.0
	Total	177	85.9	100.0	
Missing	.00	29	14.1		
	Total	206	100.0		

27. What is your education level?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High school grad	22	10.7	12.6	12.6
	College degree	11	5.3	6.3	19.0
	Graduate degree	94	45.6	54.0	73.0

	Higher than graduate degree	47	22.8	27.0	100.0
	Total	174	84.5	100.0	
Missing	.00	32	15.5		
	Total	206	100.0		

28. Professionally, you would describe yourself as?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A salaried employee	71	34.5	40.1	40.1
	A professional	32	15.5	18.1	58.2
	A self-employed	1	.5	.6	58.8
	A public official	6	2.9	3.4	62.1
	A student	48	23.3	27.1	89.3
	A housewife	5	2.4	2.8	92.1
	Others	14	6.8	7.9	100.0
	Total	177	85.9	100.0	
Missing	.00	29	14.1		
	Total	206	100.0		

29. How many years of professional experience do you have?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	9	4.4	8.1	8.1
	1-2	13	6.3	11.7	19.8
	3-5	43	20.9	38.7	58.6
	6-10	37	18.0	33.3	91.9
	11-20	7	3.4	6.3	98.2
	More than 20	2	1.0	1.8	100.0
	Total	111	53.9	100.0	
Missing	.00	95	46.1		
	Total	206	100.0		