

The Exploratory Study of On-Line Knowledge Sharing by Applying Wiki Collaboration System

Ya-Chin Kang¹, Guan-Li Chen², Chao-Tan Ko², Chung-Hsiung Fang²

¹ChingKuo Institute of Management and Health; ²National Taiwan Normal University, Taipei, Taiwan, China.
Email: yckang@ems.cku.edu.tw

Received March 25th, 2010; revised May 6th, 2010; accepted July 29th, 2010.

ABSTRACT

The purpose of this study was to present the experience of knowledge sharing by applying wiki collaboration system as an experiment in a Taiwan Company. The findings of this study might be the reference resources to those who want to employ wiki system as the on-line knowledge-sharing tool in organizations. In this research, the researchers followed the Phenomenological research methodology to describe "What is the content and context of experience of on-line knowledge sharing through wiki application system for those people in case company?" The results shown that the essences of experience of knowledge sharing by applying wiki collaboration system come into four themes: mass collaboration with co-workers to construct knowledge, infrastructure of wiki collaboration system, collaborative knowledge sharing design, and scaffolding as the learning facilitator.

Keywords: Experience, Knowledge Sharing, Wiki Collaboration System

1. Introduction

The first stage of the web is a static web sites and an accessing content. Web 2.0 is a trend in World Wide Web technology, and web design, a second generation of web-based communities and hosted services such as social-networking sites, wikis, blogs, and folksonomies, which aim to facilitate creativity, collaboration, and sharing among users [1]. In contrast, Web 2.0 breaks the traditional boundaries between the information providers and the passive audiences. One of the advantages of these technologies is that they are accessible whenever and wherever user needed them, which means just-in-time learning [2].

O'Reilly [3] defined Web 2.0 is the network as platform, spanning all connected devices; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an architecture of participation, and going beyond the page metaphor of Web 1.0 to deliver rich user experiences.

With the rapid evolution of blogs, wikis, social net-

working and bookmarking, and related applications offer rich users' experiences where the process of knowing is a community-based, collaborative endeavor [4]. Web 2.0 has a more robust platform to share knowledge and it is the users who add value and expand the value of the venue, enhancing the initial knowledge base [2].

The term "wiki" refers to a social computing system that allows a group of users to initiate and evolve a hyper-linked set of Web pages using a simple markup language [5]. The ultimate goal of sharing employees' knowledge is its transfer to organizational assets and resources [6].

This study attempted to discover the experience of how participates sharing their knowledge when joined the experiment of wiki collaboration system as the tool on constructing document technical reports in the case company.

2. Literature Review

Web 2.0 breaks the traditional boundaries between the information providers and the passive audiences. An advantage of these technologies is that they are available when and where the user is available (just-in-time learning) [2]. Web 2.0 has a more robust platform to share knowledge and it is the users who add value and expand the value of the venue, enhancing the initial knowledge

base [2]. The knowledge transmission and interchange mutual of users. Web 2.0 is a second generation of web-based communities and hosted services such as social-networking sites, wikis, blogs, and folksonomies, which aim to facilitate creativity, collaboration, and sharing among users [1].

A successful online example of this phenomenon is Wikipedia, a free online encyclopedia that enables anyone with Web access to post articles on any topic, edit them or challenge their relevance [7]. A wiki provides an extremely fast and efficient way to collaborate and communicate knowledge among virtually anyone interested without the constraints of place or time [8].

The open principle solicits the constant interaction of wiki contributors through editing page syntax or content, and adding or correcting posted knowledge- elements that foster the social ties vital for knowledge sharing. A wiki environment is conducive to the constructivist learning theory, where trust enables an individual to express knowledge in order to construct it, and influence helps to refine knowledge [5,9]. Therefore, the purpose of this research is to understand the knowledge sharing experience of employees of a company through the Wiki collaboration system.

2.1. Knowledge Sharing

Garcia' and VanO [10] argue that the issues surrounding the complex environment can be summarized and condensed into two major challenges: that of dealing with the global marketplace; and that of trying to manage an organization's knowledge. Knowledge, it is frequently argued, is the intangible resource that can give an organization competitive advantage [11,12] that can be sustained [13-15] and is difficult to duplicate [16].

Driven by a knowledge economy, many organizations have recognized knowledge as a valuable intangible resource that holds the key to competitive advantages [17]. It is the ability of firms to create, to transfer and to adopt knowledge rather than their allocating efficiency that determines their longrun performance [18]. Recently, the studies about knowledge sharing involve a lot of fields, such as education, hotel industry, business, technology, and so on [19,20]. Besides, knowledge sharing is not only using for the industry or organizations, but also influencing to individual. There are researches which indicate that knowledge sharing is related to individuals, including personality traits and individual attitudes [6,21]. In addition, knowledge sharing can applied to project-based organizations [22].

Knowledge sharing can define as a social interaction culture, involving the exchange of employee knowledge, experiences, and skills through the whole department or organization [23]. In addition, knowledge sharing in-

volves individuals sharing organizationally relevant experiences and information with one another [24]. And, Bartol and Srivastava [25] defined knowledge sharing as the action in which employees diffuse relevant information to others across the organization [6]. Knowledge sharing as a reciprocal process of knowledge exchange and examines factors that help explain why individuals are willing to engage in this process. Knowledge sharing is very important for organizations, because knowledge sharing is able to help organizations to develop their skills and competences, increase value, and maintain their competitive advantage [26].

Kim and Lee [27] demonstrate three positions about the effects of knowledge sharing, they are: 1) knowledge-sharing activities create opportunities for private organizations to maximize their ability to meet customers' changing needs and to generate solutions to gain competitive advantage; 2) knowledge sharing is one of the most important factors affecting organizational agility and performance; 3) knowledge sharing further entails the development of storage and retrieval mechanisms for quick and easy access to information that is used for adjusting strategic direction, problem solving, and improving organizational efficiency. Lin [23] also shows three points about the effects of knowledge sharing, including: 1) for individual employees, knowledge sharing is talking to colleagues to help them get something done better, more quickly, or more efficiently; 2) for an organization, knowledge sharing is capturing, organizing, reusing, and transferring experience-based knowledge that resides within the organization and making that knowledge available to others in the business; 3) knowledge sharing is essential because it enables organizations to enhance innovation performance and reduce redundant learning efforts. In addition, Knowledge-sharing systems have been implemented in various companies during the last few years. However, many of them have failed because they were limited to technical solutions and did not consider the organizational and environmental factors that are necessary to make a knowledge-sharing platform successful [28]. Whereas knowledge sharing can improve an organization's competitiveness, a lack of knowledge sharing can cause serious problems for an organization [29]. Modern processes and systems enable the sharing of organizational knowledge in new ways [30]. A wiki environment is conducive to the constructivist learning theory, where trust enables an individual to express knowledge in order to construct it, and influence helps to refine knowledge [5,9]. The open principle solicits the constant interaction of wiki contributors through editing page syntax or content, and adding or correcting posted knowledge-elements that foster the social ties vital for knowledge shar-

ing. Therefore, the purpose of this research is to explore the knowledge sharing experience of employees through Wiki collaboration system.

2.2. Wiki Collaboration System

The term “Wiki” was sourced by language of Hawaii, which means “super-fast”. Wikipedia is the website to let any users or visitors from anytime, anywhere can edit freely. “Wiki collaboration system” or “wiki Software” could operate and develop to accomplish the concept of mass collaboration. Wiki Software includes all the Wiki related software, such as web server, management database and Wiki Engine [1].

A wiki is a website that allows, and in fact encourages, users to share information by freely writing new content, adding to existing content, and editing or commenting on content. It can be viewed as an electronic version of a brainstorming session among colleagues when it works well, and it has the advantage of extending the session around the globe so that like-minded individuals can contribute productively to a discussion.

Gorman [31] provided a brief viewpoint on wikis. A wiki is a web site that allows and encourages users to share information by freely writing new content, adding to existing content, and editing or commenting on content. It is also an opinion piece based on the author’s own experiences. Reflecting the chaotic nature of the web world in which wikis exist, the reality of the situation is that they often do not operate in a positive environment. The author’s experience as a wiki participant on several occasions has been far from positive.

Wiki collaboration systems encourage student-centered learning environments, because they encourage students to be co-creators of course content. However, there are several problems with the traditional wiki paradigm for use in the classroom. This paper identifies these problems, and describes a system we implemented to solve them.

3. Methods

In order to exploring and describing the knowledge sharing experience of the participants in wiki collaboration system, we took Phenomenology as the perspective to analyzing corpus. This study adopted single case to analyze the data descriptively. This single case is about a company applying Mediawiki, the software of wiki system, to co-write the technical reports for RD staffs. We desire to introduce this exploratory experiment in order to demonstrate the innovative application in the concept of web 2.0. Quinn, Anderson *et al.* [32] note that employees readily use ad hoc networks for projects, because their compensation is tied to peer review of team be-

havior. It shows the same stage on the case company that expresses in the following paragraph. This phenomenological study focuses on exploring the meaning of lived experiences as phenomena. The data was collected through individual face-to-face interviews with participants in wiki project of the case company. Eligible participants included individuals joined in the discussion board as the on-line knowledge-sharing tool in the case company during the past three years. This target group was selected for two primary reasons. First, they were voluntary to participate in the wiki project, which implied they might own the stronger motivation for sharing their knowledge. Second, the case company had built up the discussion board for employees to solve their problems and communicate their experiences by sharing. That might be the prior knowledge of how to share with others for these participants. The qualitative in-depth interviews were guided by a semi-structured interview guide, with open-ended questions and as few prompts as possible to elicit rich descriptions of experiences. The interview guide included several general prompts to ensure that the interview maintained a general focus and that major themes of interest were explored. Specifically, we asked our informants questions about their personal experiences of sharing knowledge in wiki collaboration system, perceptions regarding community interactions, their understanding of shared knowledge, the influence of experiences on their self-perceptions, and strategies to facilitate more discussion of knowledge in wiki project setting. For example, participants were asked “Can you tell me about some of your experiences of sharing knowledge in the wiki system?” “How do you understand your experiences of sharing knowledge in the wiki system?” and “Does your wiki experiences influence you about willingness to share knowledge?” The specific phrasing of interview questions varied slightly across participants depending upon the interview contexts. With permission from the participants, the in-depth interviews were audio taped and transcribed. The transcribe data were coded and analyzed using N-Vivo, a computer software program for qualitative data analysis. Each interview lasted for approximately 90 minutes. At the end of each interview, the background information of participants was collected. Emerging themes were discussed among the researchers for dependability and confirmability. Initially, the researchers’ past or present experiences as wiki participants were bracketed [33] so that the themes were allowed to emerge from the data. Next, to examine the credibility and confirmability of emerging themes, e.g. [34], the preliminary findings of this study were presented and reviewed by all participants. This member checking provided one means of increasing trustworthiness by ensuring that participants’ experiences

have been appropriately represented. The researchers were the main research tools for gathering data. Through the phenomenological viewpoint, researchers attempted to understand the meaning of interviews conveyed.

4. Findings and Discussion

There are six aspects that composed factors affecting individual to share knowledge on-line, which were organizational culture, infrastructure of wiki collaboration system, rewarding system, work pressure, knowledge sharing design, and willingness of sharing knowledge [35]. We apply these dimensions as the foundation to develop four items of experience as the finding in this research.

4.1. Mass Collaboration with Co-Workers to Construct Knowledge

There were more barriers for experienced employees to operate this system for co-write the technical report. The knowledge transfer will be limited through technical problems.

The tool itself provides convenience to end users including writers, readers, and managers inside the company. In the viewpoint of sharing resources in the organization, the wiki collaboration system combines with the organization intra-structure will lead more feasibility. All the employees joining in the project build the benefits of applying wiki collaboration system. The outcomes of the project are the processes that participants working together to cohere. The information renewal of wiki collaboration system use the way of branching to modifying the data. The benefits are leading to a more efficient pattern comparing with traditional file system management. New information will be accessed by users who exactly needed by just-in-time concept. The ultimate objective is that organizational employees are communitized by the project. All members could collaborate with each other. Knowledge that shared in the discussion board needs to be adapted and induced by gatekeeper. In the other hand, wiki collaboration system presents the entire modifying log for anyone to perceive.

4.2. Infrastructure of Wiki Collaboration System

The case company adopted free wiki software to develop the intra-wiki co-write system such as Mediawiki and shareport. Language of wiki is a difficult barrier for RD staffs to use. For example, the double quotes are a specific part of wiki, which made RD staffs confused quite often. Some systematic issue should be tailored, in order to eliminate the impact of corporation. Hyperlink in intra-net will be a convenient part for users to apply. In application viewpoint, managers can assign several cer-

tain topics to share and interact. Then managers can review the discussing log through the process, which is the most valuable part of wiki system in the web 2.0 environment.

4.3. Collaborative Knowledge Sharing Design

The wiki system is easier to collecting data than other platform, such as Google the search engine because of the data convergence. But, the correctness of the content will be important concern, especially the no-supervisor condition. When thinking about implementing the wiki knowledge sharing system, organization design side will consider to developing by itself to customize to the organization design. In the application way, the functions and integrity of more than 256 kinds of wiki engines are different. From technical viewpoint, the database format will be the important issue to regard as as well as the compatibility with the intra-net system. Some employees are still used to web custom. They need more experience in practice. The wiki participants are qualified in the characteristics and experience. The content validity to be delivered will be confirmed.

4.4. Scaffolding as the Learning Facilitator

The facilitators need to recommend this system to the executive level to let them realize the benefit of the wiki system for sharing the synchronous knowledge with openness. Users will feel free to use this system when they become conscious that the system will help the workflow so well. Inside the organization, the employees are used to communicate by phone or face-to-face. The success factors will follow the development of environment. When the web 2.0 concept becomes maturely in the business side, the wiki will be adopted to working process without more barriers. The willingness of sharing knowledge will be more openly and actively.

5. Conclusions

The on-line knowledge sharing using wiki collaboration tool is a new model of knowledge management. The case company applied experimentally the open source - Mediawiki as the software system to co-write technical reports within intra-net. The experiment showed good expanding functions for RD staffs to discuss and interact intelligence and experience from on-line discussion board to intra wiki collaboration system. The oriented training program of new system usage for participants is needed when conducting new system into the organization. Although the volunteers were very familiar to the on-line discussion board, they still had some difficulties to get used to the wiki collaboration system. Which means the operating process is the important guide to

promote the willingness of users to adopting wiki collaboration system as the on-line knowledge sharing tool. It will also be an important issue to implement the wiki collaboration system to the entire company. The intra-net discussion board as the on-line knowledge-sharing tool has made the interaction patterns for RD staffs in the case company. To successfully applying the wiki collaboration system, the facilitators need to distinguish both the functions between wiki collaboration system and discussion board. As well as deal the barrier of adopting the wiki system such as familiar to wiki language.

The experiences were explored by this study. The meaning and explanation of knowledge sharing by applying wiki collaboration system are highly recommended to be the further research topic.

REFERENCES

- [1] Wikipedia. http://en.wikipedia.org/wiki/Web_2.0#Characteristics_of_22Web_2.0.22
- [2] T. J. Liesegang, "Web 2.0, Library 2.0, Physician Learning 2.0," *Ophthalmology*, Vol. 114, No. 10, 2007, pp. 1801-1803.
- [3] T. O'Reilly, "What is Web 2.0: Design Patterns and Business Models for the Next Generation of Software?" Retrieved 25 June 2008. <http://www.oreillynet.com>
- [4] B. Alexander, "Web 2.0: A New Wave of Innovation for Teaching and Learning?" *Educause Review*, Vol. 41, No. 2, 2006, pp. 8-9.
- [5] C. Wagner and N. Bolloju, "Supporting Knowledge Management in Organizations with Conversational Technologies: Discussion Forums, Weblogs, and Wikis," *Journal of Database Management*, Vol. 16, No. 2, 2005, pp. 1-8.
- [6] J. T. Yang, "Individual Attitudes and Organizational Knowledge Sharing," *Tourism Management*, Vol. 29, No. 2, 2008, pp. 345-353.
- [7] A. Deshpande and A. Jadad, "Web 2.0: Could it Help Move the Health System into the 21st Century?" *The Journal of Man's Health & Gender*, Vol. 3, No. 4, 2006, pp. 332-336.
- [8] J. Bairstow, "Is There a 'Wiki' in Your Future?" *Laser Focus World*, Vol. 39, No. 7, 2003, p. 140.
- [9] D. E. Leidner and S. L. Jarvenpaa, "The Use of Information Technology to Enhance Management School Education: A Theoretical View," *MIS Quarterly*, Vol. 19, No. 3, 1995, pp. 265-291.
- [10] M. Garcia and F. L. Van O, "Organisational Learning in a Global Market," *Human Systems Management*, Vol. 21, No. 3, 2002, pp. 169-182.
- [11] E. W. Coakes, J. M. Coakes and D. Rosenberg, "Co-Operative Work Practices and Knowledge Sharing Issues: A Comparison of Viewpoints," *International Journal of Information Management*, Vol. 28, No. 1, 2008, pp. 12-25.
- [12] T. Erikson, "Entrepreneurial Capital: The Emerging Venture's Most Important Asset and Competitive Advantage," *Journal of Business Venturing*, Vol. 17, No. 3, 2002, pp. 275-290.
- [13] E. Alexopoulos and B. Theodoulidis, "The Generic Information Business Model," *International Journal of Information Management*, Vol. 23, No. 4, 2003, pp. 323-336.
- [14] N. Bontis, N. C. Dragonetti, K. Jacobsen and G. Roos, "Assessing Knowledge Assets: A Review of the Models Used to Measure Intellectual Capital," *International Journal of Management Reviews*, Vol. 3, No. 1, 2001, pp. 41-60.
- [15] J. Liedtka, "Linking Competitive Advantage with Communities of Practice," *Journal of Management Inquiry*, Vol. 8, No. 1, 1999, pp. 5-16.
- [16] E. Coakes, "Storing and Sharing Knowledge: Supporting the Management of Knowledge Made Explicit in Transnational Organizations," *The Learning Organization*, Vol. 13, No. 6, 2006, pp. 579-593.
- [17] R. M. Grant, "Toward a Knowledge-Based Theory of the Firm," *Strategic Management Journal*, Vol. 17, No. 10, 1996, pp. 109-122.
- [18] R. Du, S. Ai and Y. Ren, "Relationship between Knowledge Sharing and Performance: A Survey in Xi'an, China," *Expert Systems with Applications*, Vol. 32, No. 1, 2007, pp. 38-46.
- [19] C. C. H. Law and E. W. T. Ngai, "An Empirical Study of the Effects of Knowledge Sharing and Learning Behaviors on Firm Performance," *Expert Systems with Applications*, Vol. 34, No. 4, 2008, pp. 2342-2349.
- [20] V. P. Magnini, "Practicing Effective Knowledge Sharing in International Hotel Joint Ventures," *International Journal of Hospitality Management*, Vol. 27, No. 2, 2008, pp. 249-258.
- [21] K. Matzler, B. Renzl, J. Müller, S. Herting and T. A. Mooradian, "Personality Traits and Knowledge Sharing," *Journal of Economic Psychology*, Vol. 29, No. 1, 2008, pp. 301-313.
- [22] W. F. Boh, "Mechanisms for Sharing Knowledge in Project-Based Organizations," *Information and Organization*, Vol. 17, No. 1, 2007, pp. 27-58.
- [23] H. F. Lin, "Knowledge Sharing and Firm Innovation Capability: An Empirical Study," *International Journal of Manpower*, Vol. 28, No. 3-4, 2007, pp. 315-332.
- [24] C. P. Lin, "To Share or not to Share: Modeling Knowledge Sharing Using Exchange Ideology as a Moderator," *Personnel Review*, Vol. 36, No. 3, 2007, pp. 457-475.
- [25] K. Bartol and A. Srivastava, "Encouraging Knowledge Sharing: The Role of Organizational Rewards," *Journal of Leadership and Organization Studies*, Vol. 9, No. 1, 2002, pp. 64-76.
- [26] B. Renzl, "Trust in Management and Knowledge Sharing: The Mediating Effects of Fear and Knowledge Documentation," *Information & Management*, Vol. 36, No. 2, 2008, pp. 206-220.
- [27] S. Kim and H. Lee, "The Impact of Organizational Con-

- text and Information Technology on Employee Knowledge-Sharing Capabilities,” *Public Administration Review*, Vol. 66, No. 3, 2006, pp. 370-385.
- [28] S. C. Voelpel, M. Dous and T. H. Davenport, “Five Steps to Creating a Global Knowledge-Sharing System: Siemens’ ShareNet,” *Academy of Management Executive*, Vol. 19, No. 2, 2005, pp. 9-23.
- [29] C. P. Lin, “Clarifying the Relationship between Organizational Citizenship Behaviors, Gender, and Knowledge Sharing in Workplace Organizations in Taiwan,” *Journal of Business and Psychology*, Vol. 22, No. 3, 2008, pp. 241-250.
- [30] V. Anand, W. H. Glick and C. C. Manz, “Thriving on the Knowledge of Outsiders: Tapping Organizational Social Capital,” *Academy of Management Executive*, Vol. 16, No. 1, 2002, pp. 87-101.
- [31] G. E. Gorman, “Editorial: Is the Wiki Concept Really Wonderful?” *Online Information Review*, Vol. 29, No. 3, 2005, pp. 225-226.
- [32] J. B. Quinn, P. Anderson and S. Finkelstein, “Managing Professional Intellect,” *Harvard Business Review on Knowledge Management*, Harvard Business School Publishing, Boston, 1998.
- [33] K. Caelli, “Engaging with Phenomenology: Is it more of a Challenge than it Needs to be?” *Qualitative Health Research*, Vol. 11, No. 2, 2001, pp. 273-281.
- [34] J. Drisko, “Strengthening Qualitative Studies and Reports: Standards to Promote Academic Integrity,” *Journal of Social Work Education*, Vol. 33, No. 1, 1997, pp. 185-197.
- [35] C. H. Fang, C. T. Ko, Y. C. Kang and G. L. Chen, “Constructing On-line Knowledge Sharing Model for R&D Staff: An Empirical Study in Taiwan,” *Proceeding of International Conference on Industrial Engineering and Engineering Management*, Singapore, 2008.