Knowledge Exchange via Unified Communication Services: A Grounded Theory Approach

Research-in-Progress

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Abstract

Literature remains scant concerning the benefits of unified communication services (UCS) for the purposes of knowledge exchange in organizations. This study utilized the Grounded Theory approach to systematically analyze 3023 communication logs among 47 employees at a mid-size South Central company. Findings show that UCS knowledge exchange occurs with high frequency, has short duration and is done primarily through low synchronicity mediums. A theoretical model is also proposed to explain the dimensions of the exchanged knowledge exchanged.

Keywords

Unified Communication Services, instant messaging, Lync, knowledge exchange, knowledge dimensions, grounded theory

Introduction

While loss of organizational knowledge has been shown to weaken the competitive strength of firms, those that harness the power of knowledge exchange among their employees enjoy greater productivity and sustained competitive advantage (Davenport et al. 2003). Research suggests that organizations are proactively investing in technology to eliminate knowledge drain by fostering knowledge exchange between experts and novices (Wang et al. 2010). For example, in the United States alone, companies invested nearly $300 billion on ICTs in 2011 (U.S.Census 2013) in order to provide their employees with the chance to collaborate with their coworkers in the normal flow of their work.

Are ICT investments paying off? A number of studies report that the use of asynchronous systems (e.g. email) among employees is at an all time high. For example, Chui et al. (2012) found that employees spend as much as 60% of their work time on knowledge exchange with coworkers via ICTs. Nearly half of the time devoted to knowledge sharing is dedicated to reading and writing emails. In fact, Levenstein (2013) reported that in 2013, employees sent nearly 100 billion emails, and this number is expected to reach 132 billion by 2017. Clearly, employees are exchanging knowledge asynchronously.

Does a synchronous knowledge exchange occur? Chui et al. (2012) reported that the remaining half of the aforementioned knowledge sharing time is spent on knowledge search, communication and collaboration practices with their peers. Such practices undoubtedly require a synchronous communication system, and recent studies do show that organizations are turning to a new breed of technologies known as unified communication services (UCS) to facilitate this approach. UCS systems integrate the synchronous services (e.g. instant messaging, voice, video conferencing, and desktop sharing) into a single system (Fikry et al. 2012).

While according to some estimates, the UCS market is expected to exceed $61.9 billion by 2018 (TMR 2014), research is still scant on whether UCS technologies provide benefits to support the synchronous knowledge exchange practices among novices and experts. Some studies provide evidence to support the need for certain UCS capabilities. For example, Cleveland (2014) found that the instant messaging capability benefits organizations whose employees experienced role ambiguity. Cleveland et al. (2014) and Cleveland et al. (2015) also argued that ICT capacities have a moderating effect on knowledge flow. Still, there is a dearth of literature that examines the frequency and durations of knowledge exchange via the full suite of UCS capabilities. There is also the need to understand the dimensions of knowledge exchanged through such systems in order to determine its true benefits to the workforce.

As a result, the goal of this study is to enrich understanding on the use of UCS in the workforce for the purposes of knowledge exchange. Specific research questions include: 1) How do novices and experts use UCS for knowledge exchange? 2) What are the most frequently used UCS capabilities? and 3) What is the duration of knowledge exchange?

To answer these questions, a Grounded Theory approach was employed to analyze 3023 communication logs among 47 employees at a mid-size South Central company. The Grounded Theory approach was selected, because it enabled the researchers to explore available resources to propose a theory that is grounded in data rather than guided by previous research (Whyte et al. 2012). Microsoft Lync was selected for the purposes of this study, since this UCS is reported to be used by nearly 90% of Fortune 500 companies and was considered to be one of the best available low cost solutions on the market (Kerravala 2012).

The rest of the paper is structured as follows. First, a literature review is performed to examine the capabilities of the Lync application as well the sources of the knowledge. Analysis of the gathered data is performed, and a set of knowledge dimensions are proposed to explain the interactions through the UCS capabilities. Finally, future research is discussed.

Unified Communication Services

Capabilities and Interactions

UCS provide a bundle of media services to facilitate the communication processes between users. The principal capabilities of these systems provide users with the ability to transfer explicit knowledge and collaborate for the purposes of developing tacit knowledge (Glass et al. 2010). In this study, the focus is on four key capabilities that underscore the main functionality of these systems. These include:

- Instant messaging - this capability opens a real-time communication channel between the users for the purposes of specific knowledge exchange. The exchange is characterized by short, but frequent questions and answers between the seeker and the provider of information and comes in three flavors: 1) one-to-one – interaction between two users; 2) one-to-many – where a single participant interacts with two or more participants simultaneously; and 3) many-to-many – where multiple users communicate and collaborate with each other. For example, in a study of instant messaging used at a small hi-tech company, Quan-Haase et al. (2005) found that the one-to-one flavor was most frequently used by the employees. The majority of one-to-one interactions were initiated for the purposes of accessing specific information about work. The one-to-many and many-to-many interactions were used for the purposes of comprehensive problem solving between two or more people in order to examine solution strategies;

- Video/Audio conferencing – these capabilities facilitate a richer and more rapid exchange of knowledge between multiple participants in order to resolve a specific problem (Dennis et al. 2008);
- Screen sharing – this capability enables users to collaborate on problem-solving tasks by demonstrating artifacts, procedures, or diagrams (Sharp et al. 2012);
- File transfer - this capability allows users to transmit artifacts that represent codified knowledge for the purposes of building understanding on procedures, or processes required to solve a problem (Kirschman et al. 2002);

In this study, the researchers elected to examine data related to the following factors:

- Novices and experts – these interactions reveal knowledge exchange between junior and senior employees for the purpose of problem solving and sharing of lessons learned (Petter et al. 2008; Ropes 2012). In this study, we characterized novices as employees with company tenure less than three years and experts with tenure longer than three-years as argued by Andersson (2004);
- Duration and frequency – studies on these two factors suggest they play a key role in enhancing trust, collaboration, communication and knowledge sharing practices among individuals (Chan et al. 2013; Ensign et al. 2010).

Methodology

UCS system data logs were collected from a single mid-sized (4000 employees) organization headquartered in the South Central region of the United States. System usage was monitored among 47 employees (27 novices and 20 experts) who used Lync during the October through December 2014 period. The system logs recorded the specific function, frequency, and duration of all usage of the software. The subjects included employees within a structured work environment that held various levels of technological experience.   The company's work history data was cross referenced and joined using a business analytic tool to determine the user's role and tenure within the organization.   The user information was gathered for analysis purposes but will be presented anonymously to protect the confidentiality of each user. The data were coded into two categories: UCS capabilities and interaction processes (table 1). Common themes related to knowledge dimensions were discovered during the analysis and a grounded theory approach was used to derive understanding about the knowledge exchange practices of organizational UCS users.

Results

The first and second research questions sought to uncover the manner in which novices and experts use UCS for knowledge exchange and the frequency across the various capabilities. During the three-month period, a total of 3023 knowledge exchange sessions were captured from the four UCS capabilities. Of these exchanges, 89% (2684) occurred through the instant messaging capability, 6% (187) through video, 4% (121) through file sharing, 1% (19) through screen sharing, and less than 1% (12) through audio. Across all capabilities, 82% (2503) of sessions were initiated by novices (86% of all instant messaging, 68% of all screen sharing, 53% of all video, 49% of all file sharing and 25% of all audio sessions). In contrast, the majority of sessions initiated by the experts were largely through audio (75%) and file sharing (50%). Furthermore, novices initiated exchanges with experts and vice versa in 100% of audio, 96% of video, 84% of file transfer, 37% of screen sharing and 27% of instant messaging sessions. Only 3% of all exchanges were initiated by experts with other experts. In fact, with the exception of instant messaging and screen sharing, the majority of knowledge exchanges occurred between novices and experts.

The third research question asked: What is the duration of knowledge exchange? To answer this question, distribution of interactions initiated by novices or experts were examined across three different durations (less than 1 minute, between 1 and 10 minutes, and greater than 10 minutes) and between various UCS capabilities. In terms of duration, 75% of all sessions lasted less than 10 minutes. In fact, 100% of the audio, 98% of file transfer, 81% of screen sharing, 74% of instant messaging sessions and 67% of video sessions lasted less than 10 minutes. A quarter of these sessions occurred between novices and experts.

Finally, the majority of exchange sessions lasting longer than 10 minutes were observed between novices and experts in the instant messaging, screen sharing and video capabilities (table 1).

Screen Sharing

	To Novice			To Expert			
	<1	1-10	>10	<1	1-10	>10	Total
Novice	2	8	1	0	1	4	16
Expert	0	1	1	0	1	0	3
Total	2	9	2	0	2	4	19

File Transfer

	To Novice			To Expert			
	<1	1-10	>10	<1	1-10	>10	Total
Novice	17	2	0	31	10	0	60
Expert	52	7	2	0	0	0	61
Total	69	9	2	31	10	0	121

Instant Messaging

	To Novice			To Expert			
	<1	1-10	>10	<1	1-10	>10	Total
Novice	861	555	457	123	180	148	2324
Expert	119	66	81	69	20	5	360
Total	980	621	538	192	200	153	2684

Video

	To Novice			To Expert			
	<1	1-10	>10	<1	1-10	>10	Total
Novice	1	2	0	62	7	28	100
Expert	48	1	33	4	0	1	87
Total	49	3	33	66	7	29	187

Audio

	To Novice			To Expert			
	<1	1-10	>10	<1	1-10	>10	Total
Novice	0	0	0	3	0	0	3
Expert	9	0	0	0	0	0	9
Total	9	0	0	3	0	0	12

UCS Capability — *Interraction Processes*

Table 1. Interaction Processes across Different Capabilities

Discussion

Based on the analysis of the coded data, this study revealed that UCS capabilities aid the interaction process between employees and specifically between novices and experts. Furthermore, using the grounded theory approach, themes related to the dimensions of the knowledge emerged. These are addressed below along with a proposed theoretical model.

Conveyance and Convergence

Dennis et al. (2008) argued that communication processes are the integral parts of work tasks. In order for an employee to deliver on a specific work requirement, they must execute a series of steps that involve multiple communication interactions. Some of these interactions may involve the seeking of unknown knowledge with co-workers in order to reduce task uncertainty. Others may require verification of previously acquired knowledge to ensure the right set of expectations is met and that role ambiguity is reduced. Dennis proposed two processes to explain these interactions at the workplace: 1) conveyance – which involves employee's exchange of 'new' knowledge to "enable the receiver to create and revise a

mental model of the situation." (p. 580); and 2) convergence – the exchange of 'known' knowledge to validate common understanding. Furthermore, Dennis noted that the conveyance process requires the transmission of large amounts of raw information mostly in a single direction (the direction of the inquirer) since the inquirer 'soaks up' the knowledge in order to create a mental model. In contrast, the convergence process requires frequent exchanges of small amounts of knowledge between all the participants, for the purposes of validation of the mental model.

As a result, Dennis proposed that the conveyance process requires technology mediums characterized by capabilities for low synchronicity between the participants (e.g. instant messaging, screen sharing, and file sharing), while convergence requires technology mediums that facilitate high synchronicity (video and audio conferencing).

Dimensions of Knowledge

Since the media synchronicity theory does not explain the dimensions of the exchanged knowledge among novices and experts through the communication medium, the researchers adopted the four knowledge dimensions proposed by De Jong et al. (1996) to explain the knowledge transfer via UCS. Situational knowledge is related to specific work scenarios, contains explicit properties and requires prior awareness of an applicable model to resolve the problem at hand (De Jong et al. 1996). This knowledge type is automated in the mind through formal training and lends itself to transfer via quick interactions among knowledge sources. Similarly, the procedural knowledge, which constitutes a series of rules and recipes that are related to a work domain, can be explicated through codified diagrams, graphs or figures.

In contrast, the conceptual knowledge is relational in nature and its structure consists of a series of symbols and independent concepts. While it contains some explicit properties that may be transferable through diagrams and pictures, it relies heavily on previously acquired tacit understanding of a domain. As a result, it does not lend itself to quick transfer among users with limited domain knowledge. Correspondingly, strategic knowledge encompasses a variety of plans and actions that require a deep level of understanding of concepts and abstractions. This type of knowledge is more general than domain-specific and is structured through logical actions. As a result, this knowledge type requires rich demonstrations coupled with analysis and interpretation of artifacts.

Figure 1 provides the researchers' interpretive theory of knowledge exchange among notices and experts via UCS systems.
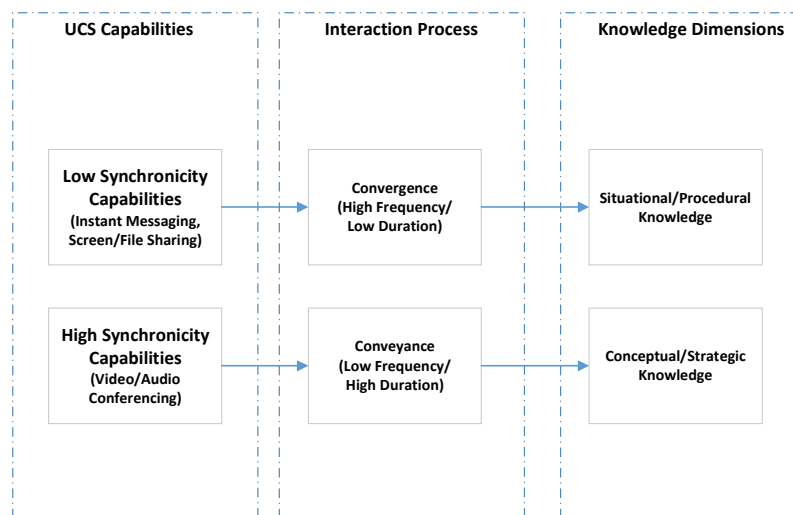

Figure 1. Proposed UCS Knowledge Exchange Model

Conclusion

The results of this study demonstrate that the majority of observed UCS interactions occur through low synchronicity mediums (instant messaging, screen sharing, and file sharing) with short durations (typically less than ten minutes). This suggests that users engage in a convergence process of exchanging mostly situational and procedural knowledge primarily to confirm rather than develop new mental models. In future studies, the researchers intend to perform structured interviews with the most frequent UCS users in order to verify the proposed dimensions of the exchanged knowledge. Future studies can also be conducted regarding the nature and consequences of different UCS capacities.

The contribution of this study is significant for both practitioners and academics alike. Companies can benefit from UCS' capabilities to facilitate the synchronous transfer of various types of knowledge among employees and to leverage all information available rather than only subsets of data. As a result, such companies will gain more insight, make better decisions achieve and achieve competitive advantage (Sighn, 2012). The study enriches the knowledge management body of knowledge by enhancing the understanding on the roles of specific capabilities and interaction processes on the dimensions of knowledge exchanged through UCS systems.

This research was limited by its generalizability, since the data was collected from a single organization. In addition, the subjects voluntarily participated in the use of the software, so it is difficult to determine if a representative population was utilized. Future work would include multiple firms in the analysis and a specified set of users.

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