Determining Microblogging Effectiveness for Capturing Quality Knowledge

Research-in-Progress

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ABSTRACT

Over three million baby boomers will retire by 2020. Along with their departure, valuable experiential knowledge will disappear. This issue is even more prevalent in the information systems arena in which a majority of software and systems projects do not keep archives of accumulated experience and lessons on what went right or wrong during project executions. While post-project review meetings, stories, and lessons learned documents have been demonstrated to facilitate knowledge creation, organizations lack sufficient time to engage in these practices. Microblogging has been proposed as a platform for capturing knowledge instantaneously due to its ubiquitous nature; however, there is a lack of research on whether microblogging would effectively facilitate the creation of quality knowledge in the form of personal notes, reflection, stories, and lessons learned. This study proposes a model to address this research gap.

Keywords

Microblogging, personal notes, reflection, stories, lessons learned, topical categorization, knowledge creation, quality knowledge

INTRODUCTION

According to some estimates, 3.6 million baby boomers will leave the work force by 2020 (Toossi, 2012). With their departure, valuable experiential knowledge that has been accumulated over many years will also disappear. The challenge then is to uncover ways to capture and transfer this quality knowledge to the generation of employees who will inherit the roles and responsibilities of the departing baby boomers. This issue is even more prevalent in the information systems arena where the majority of software and systems projects do not keep archives of accumulated project experience (e.g. lessons learned) that capture details of what went right or wrong during project executions. Personal notes, reflection, stories, and lessons learned documents have already been suggested as tools that can facilitate knowledge capture (Clough, Jones, McAndrewand Scanlon, 2008; Koskinen and Aramo-Immonen, 2008; Lindner and Wald, 2011; Mainga, Yan, Hamde and Blomquist, 2011; Matturro and Silva, 2010; Tukel, Rom and Kremic, 2008; Voigt and Earnest, 2010; Whyte and Classen, 2012); however organizations don’t engage in these practices due to time constraints (Williams, 2008), loss of resources (Matturro and Silva, 2010), or lack of constructive atmosphere (Disterer, 2002). Due to its ubiquitous nature, microblogging has been proposed as a platform for capturing knowledge (Cleveland, 2012; Duh, Hirao, Kimura, Ishiguro, Iwata and Yeung, 2012; Wright, 2010). However, there is a lack of research on whether microblogging can facilitate capture of quality knowledge in the form of notes, reflection, stories, and lessons learned.

This study addresses the challenge of capturing knowledge by developing an answer to the following question: Does microblogging facilitate the capture of quality knowledge in the forms of personal notes, reflection, stories, and lessons learned? To answer the question, a review of the organizational knowledge creation theory is performed. Analysis of relevant literature on knowledge creation, knowledge quality, microblogging, and knowledge capturing processes is provided, followed by a discussion on the topical categorization process and its moderating effect on knowledge quality. The paper concludes with recommendations for future research.
LITERATURE REVIEW

Knowledge Creation

Nonaka (1994) argued that experiential knowledge (tacit knowledge) is difficult to document because it is rooted in the minds of individuals. To transfer this tacit knowledge into explicit form, Nonaka and Takeuchi (1995) proposed the SECI model consisting of four distinct patterns of knowledge conversion (socialization, externalization, combination, internalization). The socialization pattern involved individuals in continuous interaction and imitation of experts to convert tacit knowledge into tacit knowledge. Externalization involved the conversion of tacit into explicit knowledge using ideas, concepts, images, and written documents; in the combination pattern explicit into explicit knowledge is converted via information systems, meetings, and conversations to categorize and join knowledge. Finally, the conversion of explicit into tacit knowledge occurs in the internalization pattern through individual and collective reflection.

Proper information and communication technologies (ICTs) infrastructure can facilitate knowledge creation and is of tremendous importance for capturing new knowledge and improving learning. For example, Lopez-Nicolás and Soto-Acosta (2010) demonstrated in a study of 297 small-medium sized enterprises that adoption and support of ICTs enhance knowledge creation and organizational learning. This in turn positively influences the processes of socialization, externalization, combination, and internalization.

Microblogging has emerged as an effective ICT for capturing and disseminating usage practices (Hanseth and Lytinnen, 2004). Microblogging allows users to post small messages that are distributed by mobile devices or the Web (Java, Finin, Song and Tseng, 2007). The most popular microblogging platform today is Twitter, which had over 300 million registered users in 2011. One characteristic of Twitter is that it limits each post to 140 characters, which, surprisingly, has been shown to be adequate for meaningful, reflective messages that can enhance interaction among users and foster a sharing culture (Yang and Chang, 2011). Some studies show that microblogging leads to deeper cognitive engagement with scientific topics and dialogue that support transfer of learning between formal and informal learning contexts (Ebner and Maurer, 2008; Ebner, Lienhardt, Rohs and Meyer, 2010). This multifaceted nature of microblogging offers promise for positively supporting processes for organizational knowledge creation.

To demonstrate this, we turn to Alavi and Leidner (2001), who proposed that knowledge can acquire the properties of both an object (can be acquired, processed, and codified) and a process (for sharing expertise). In each of these scenarios, microblogging can facilitate knowledge creation. Two examples are useful to demonstrate this:

1) Knowledge as object and process: Microblogging knowledge creation within the user’s domain of experiential knowledge;

2) Knowledge as object and process: Microblogging knowledge creation outside the user’s domain of experiential knowledge.

In the first example, let’s assume that the writer is an experienced information systems (IS) project manager who uses microblogging to create objects of knowledge (e.g. notes, lessons, and stories about a specific project). Other IS project managers familiar with the IS project management domain can easily acquire knowledge from the knowledge objects as a result of domain understanding. Without knowledge of the domain, the objects wouldn’t make much sense to readers, especially with the limit on characters for each posting (e.g. Twitter limits posts to 140 characters). Even if the readers use the microblogging platform to engage the writer in a conversation in order to understand the approach, lack of knowledge of the domain will hinder the process of converting the knowledge. Microblogging can facilitate knowledge creation through the development of new content, replacement of existing content through the reflection, or socialization practices. The platform can serve as the tool to enhance collaboration, communication, teamwork, and understanding between individuals working within the same domain and be used for storage and retrieval of organizational knowledge (in the form of objects such as notes, quick lessons, metaphors, and short stories). Therefore, in the cases where the writer and reader share understanding of a common domain, microblogging can be used for gathering, storing, and transferring knowledge (as an object), as well as a tool for linking knowledge sources (as a process).

In the second example where the reader lacks understanding of the domain (for example how specific business unit functions), knowledge acquisition through the microblogging platform would be impossible because the reader
would need a lot more formal and informal learning to make sense of the captured knowledge (e.g. courses, on-the-job learning and face-to-face discussions with specialists from that unit). In this case, microblogging can only be used as process for contacting specific sources of knowledge.

**Quality Knowledge**

According to Alavi and Leidner (2001), individuals convert information into knowledge as a result of cognitive processing. When new stimuli are introduced, individuals who share a similar knowledge base arrive at the same understanding of received information. Therefore, quality products and innovative solutions depend on knowledge shared among those involved in the product development. When low quality knowledge is shared, it can be expected that low quality innovations, services, and products will be produced. Yoo, Vonderembse and Ragu-Nathan (2011) demonstrated the existence of a positive relationship between knowledge quality and innovation. Their research showed that in order for knowledge to be considered of quality it should be contextually relevant (e.g. relevant, appropriate, and value-adding), intrinsically accurate (e.g. accurate, reliable, and timely), and practically actionable (e.g. expandable, adaptable, or easily applied). Kankanhalli, Lee and Lim (2011) established a relationship between knowledge reuse and quality knowledge. Their study showed that repository knowledge reuse as a result of better quality knowledge improved customer service, reduced response time, and reduced time needed for new employee training.

In the realm of microblogging, Andre, Berstenin and Luther (2012) studied what users considered quality posts. They collected ratings on 43,738 microblog posts from 1,443 users and discovered that on a per-user basis, the average user found 41% of microblogging posts worth reading (e.g. containing useful information). These posts therefore could be regarded as containing quality knowledge. Ha and Ahn (2011) studied factors that affect individuals’ information processing and sharing behavior in microblogging. Data from 84 Twitter users was collected and analyzed. The results showed that the higher the user’s perception of a posting’s argument quality, the higher the perceived information usefulness of the received tweet, and the higher the user’s perception of the received tweet’s information usefulness, the higher the intention to share this posting with others. This demonstrates that information usefulness is related to information sharing and that information usefulness is also related to argument quality of microblogging posts. The study showed that clear and complete microblogs are shared by users because they are found to be useful and this usability is associated with the antecedents of quality knowledge.

**Personal Notes**

Cleveland (2013) argued that personal notes can facilitate the knowledge capturing process. Koskinen and Aramo-Immonen (2008) found that personal notes were used for problem-solving, memory aids, and information sharing by 97% of the note takers. Mehmet (2010) found that Read, Encode, Annotate, and Ponder (REAP) note taking technique increases learning success and facilitates common understanding among peers.

Reinhard, Ebner, Beham and Costa (2009) conducted a survey among 41 participants of five different conferences. They found that over 40% of them used Twitter to jot down personal notes for knowledge building and in order to share information with others who could gain value from the experience. Pepe and Mayernik (2012) studied whether microblogging can be used by scientists to document field research data. Their results showed that microblogging was regarded as most useful for taking notes as short text messages on the spot while in the field.

These studies suggest that microblogging can facilitate capture of useful personal notes. Therefore, it is proposed that:

P1. Microblogging personal notes will have a positive relationship with quality knowledge.

**Stories**

Stories have been shown to capture and facilitate knowledge transfer and experiences among individuals by allowing them to gain lessons from past experiences (Jonassen and Hernandez-Serrano, 2002; Newell, 2004). Individuals engage in storytelling to share lessons on an average of every 20 minutes (Goffin and Koners, 2011), because a story allows the storyteller to share his identity and facilitates the categorization and recombination of historical knowledge into new patterns and best practices (Cleveland, 2013).
The social curation phenomenon allows users to organize microblogging posts into stories that add value to the microblogging community. Web services like Togetter and Storify provide content organizers the ability to collect and mold a story from a list of microblogging posts. Duh et al. (2012) collected 10.2 million microblogging posts from 800,000 users and discovered 96,000 lists. Of these, 9% were used as diaries, 16% for problem solving, 18% as blended conversations to summarize an event, 19% for long articles, and another 19% for recording conversations on specific topic. This gives credence to the idea that despite a character posting limit, the microblogging platform can facilitate useful storytelling. As a result, it is proposed that:

**P2.** Microblogging stories will have a positive relationship with quality knowledge.

**Reflection**

Reflection has been proposed as a method to capture important lessons, facilitate organizational learning, and assisting with innovation (Knipfer, Kump, Wessel and Cress, 2012). Using reflective guides contributes to capturing best practices, implicit, and explicit knowledge (Matturro and Silva, 2010), while reflective journals enhance the creation of soft-skills such as team building, conflict management, and leadership skills (Loo, 2002).

Wright (2010) examined whether microblogging via mobile devices can be used for self-reflection purposes. Participants in the study posted microblogs three times each workday regarding their experiences including answers to the questions: What am I learning now?; What do I need to overcome or solve?; What am I going to do next?; What is getting in the way right now?; and What am I thinking about right now? A total of 494 participant postings were made via Twitter over the seven-week period with an on average of 60 tweets per participant. The results showed that microblogging postings captured participants’ reflective thinking in a chronological order, while at the same time reduced isolation and fostered a sense of community. Participants found that the 140-character posting limit helped them focus their thinking to reflect purposefully on their experiences. They also noted that supporting posts were of particularly high value. Therefore, it is proposed that:

**P3.** Microblogging reflection will have a positive relationship with quality knowledge.

**Lessons Learned**

In the project management domain, lessons learned documents are powerful knowledge creation tools, because they foster conversion of tacit into explicit knowledge (Cleveland, 2013). Lessons learned increase individuals’ competency levels, improve project success, and contribute to project strategy (Williams, 2008).

Microblogging can facilitate conversations between users for the purpose of sharing lessons as well as the capturing specific knowledge. Ebner et al. (2010) demonstrated that microblogging can be used for informal and project-oriented communication, which supports social interactions in group work. Their study showed that learning is possible through microblogging as it gave users the ability to become a part of another user’s process of learning by reading, commenting, or discussing various topics. The process also allowed users to participate in a tight community working to resolve specific problems and as such it can be regarded as a mechanism that is positively related to quality knowledge. Therefore, it is proposed that:

**P4.** Microblogging lessons learned will have a positive relationship with quality knowledge.

**Topical Categorization**

With 140,000,000 Twitter posts daily (Zangerle and Gessler, 2011) it is extremely difficult for a user to locate useful posts and acquire new knowledge on a specific domain. Twitter has introduced the concept of hashtags (denoted by the # symbol) that users append to posts to make them topic specific. However, while only 40% of tweets are original in nature (60% are repeated by the general Twitter population), only about 20% of all tweets have hashtags (Kywe Hoang, Lim and Zhu, 2011). Furthermore, 86% of all hashtags are used in fewer than five tweets, while the most popular hashtags were used in only 8% of all messages containing hashtags. These percentages suggest that very few hashtags enjoy high popularity and a lot of hashtags are new. As a result, finding useful knowledge in microblogging is contingent upon its proper categorization. Therefore, it is proposed that:
P5. Topical categorization (hashtags) will have a moderating effect on the relationships between microblogging notes, microblogging stories, microblogging reflection, microblogging lessons learned and quality knowledge.

DISCUSSION

Based on the literature review and propositions, this paper presents the following theoretical model (Figure 1).

![Proposed model demonstrating relationship between variables](image)

To validate the model, an experimental study divided in two parts is proposed: 1) Use of a Delphi group to categorize microblogging posts; and 2) Evaluation of quality knowledge and topical categorization for each category through a survey.

First, a collection of microblogging postings will be performed on the topic of project management from Twitter since 80% of project management related conversations on the social web take place on this microblogging platform (Getapp.com, 2012). The postings will be from the most influential project management Twitterers (based on rankings by Brandwatch, PeerIndex and Klout) and the most used project management categories (based on highest rankings from Hashtag.com). Duplicate postings, spam, and self-marketing tweets will be removed from the final set.

An expert group (also known as Delphi group) will be formed to evaluate the final set of microblogging posts. Delphi groups have been used extensively in the IS field to determine difficult topics of learning (Goldman, Gross, Heeren, Herman, Kaczmarszyk, Loui and Zilles, 2008), or estimate lines of code (Aggarwal, Yogesh, Pravin and Manimala, 2005). Thombs (2010) used a Delphi group to determine whether notes from work orders were valuable source for knowledge. Stankovic, Rowe and Laublet (2011) used an expert group to manually classify tweets to specific conference talks. In their study, three experts evaluated 200 randomly selected tweets in two rounds until they reached a satisfactory level of agreement on which tweet represented which conference.

The proposed study will employ a similar approach, by selecting a group of experts. Based on Rowe and Wright’s study (1999), the expert group will consist of at least five experts who will undergo at least two rounds of evaluations. Each expert will be provided with the same microblogging posts and asked to assign each post into one of four categories: 1) microblogging personal note, 2) microblogging story, 3) microblogging reflection, or 4)
microblogging lessons learned. The experts will also be asked to propose topical categorization (hashtag) for each posting based on the PMI’s process group and knowledge area (PMI, 2008). The final rankings of the microblog posts (based on equal weight of all experts’ recommendations) will become the test data set for the second part of the study.

In part two of the study, a purposive and homogeneous sample of project managers will be presented with the data set collected from the first part of the study. They will be asked to evaluate each topic’s quality knowledge via a survey based on the quality criteria proposed by Yoo et al. (2011). Specifically, they will be asked to rank each post in terms of its intrinsic quality (whether the postings’ knowledge is accurate, reliable, objective, believable, and current), its contextual quality (whether it adds value for decision making), adds value to their project team’s operations, is relevant to their tasks, is appropriate to their jobs), and its actionable quality (whether it is actionable, adaptable, applicable to their tasks, and whether it increases effective actions, and whether it provides the capacity to react to circumstances). The respondents will also be asked to rate whether the topical categorization (hashtags) played a role in evaluating each topic’s quality knowledge.

CONCLUSION

If the results support the proposed model, the implications for organizations are abundant. For example, organizations can invest in social media tools in order to prevent further loss of knowledge. Employees will engage in more frequent communication and collaboration practices via microblogging in order to enhance the person-to-person learning. This in turn will remove information silos and make discovery of quality knowledge easier. Moreover, employee training can be based on knowledge captured in the microblogging platform and can improve innovation and transformation of products and services in organizations.

REFERENCES

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