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An activity-theory analysis of corporate wikis

Helen M. Hasan

University of Wollongong, hasan@uow.edu.au

Charmaine C. Pfaff

University of Wollongong, cpfaff@uow.edu.au

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Abstract

Purpose: Wiki technologies, which are popular in social settings, are beginning to contribute to more flexible and participatory approaches to the exploitation of knowledge in corporate settings. Through the lens of activity theory, this paper aims to investigate contentious challenges to organizational activities that may be associated with the introduction of corporate wikis, in particular the potential democratization of knowledge work. **Design/methodology/approach:** From a study of several cases of corporate wiki adoption, this paper presents and interprets two representative cases sampled to provide more generalized results. Qualitative data were collected through semi-structured interviews and observation. The analysis followed a systematic process of data reduction, display, and rich interpretation using the concepts of activity theory. **Findings:** This research provides new understandings of the undervalued activities of knowledge workers, their challenges as wiki users and resulting implications for organizational transformation and improved organizational performance. **Research limitations/implications:** There is potential bias and limited scope as the choice of cases was determined through organizations known to the researchers and involved some action research. However, the authors justify this approach for a dynamic, emergent topic worthy of immediate investigation and direct applicability of findings to corporate practice. **Social implications:** This paper addresses the implications of new Web 2.0 technologies for the democratization of knowledge management in the workplace. **Originality/value:** The novelty of this work lies in using activity theory to explore reasons why some organizations are more successful than others in implementing wikis. This work contributes to research on how social and technological interventions may lead to improved exploitation of knowledge as a corporate resource.

Keywords

analysis, activity, corporate, theory, wikis

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Findings

This research provides new understandings of the undervalued activities of knowledge workers, their challenges as Wiki users and resulting implications for organizational transformation and improved organizational performance.

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There is potential bias and limited scope as the choice of cases was determined through organizations known to the researchers and involved some action research. However, we justify this approach for a dynamic, emergent topic worthy of immediate investigation and direct applicability of findings to corporate practice.

Social implications

This paper addresses the implications of new Web 2.0 technologies for the democratization of knowledge management in the workplace.

Originality/value

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Keywords: Knowledge Work, Knowledge Management Systems, Wiki, Activity Theory, Case Study

Introduction

In accord with the requirements of increasingly complex work activities, modern human enterprises are now placing greater urgency and priority on improving collective knowledge capabilities (Ali et al., 2002; Allee, 2003). These activities can be perceived as an intricate system “located within the space defined by the *doing, thinking and communicating* dimensions” of knowledge work (Burstein and Linger, 2003). Determining what knowledge is of value for particular enterprise activities, and how to create, acquire, access and disseminate it, are becoming more challenging in the current dynamic business environment. The Wiki, one of the more sophisticated of Web 2.0 technologies used in social settings, has the potential to play an exciting role in meeting the evolving needs of knowledge workers.

Web 2.0 technologies create an architecture of participation that gets better the more people use it, adding value to the applications as they use it (O’Reilly, 2005). Wikis, in particular, afford a new open approach not only to contributing knowledge but also defining its structure and scope. In civil society, Wikis allow dispersed groups of individuals to co-create of knowledge where contributors are permitted to use their own views and judgment in manipulating content. Wikis are now being appropriated from their popular use in civil society to support activities of knowledge work in commercial and government enterprises (Hasan et al., 2007).

The traditional division of labor in corporate settings restricts the responsibility for knowledge management (KM) activities to a chosen few. The open architecture of Wiki participation enables and encourages organizational KM activities to become more flexible, adaptable and networked (Senge, 1994) where all employees contribute as knowledge workers. This poses two challenges: firstly whether traditional corporate cultures will be receptive to the open nature of the Wiki and, secondly, whether the introduction of a Wiki can change a corporate culture to be more democratic with respect to the creation and use of knowledge.

This paper presents and interprets two contrasting illustrative cases of Wiki adoption using the rich concepts of Activity Theory. We aim to contribute to the understanding of the technical and social dimensions of organizational transformations associated with the new forms of activities enabled by Wiki technologies. The research addresses the undervalued and poorly understood activities of knowledge workers in regard to the needs, rights, capabilities and responsibilities that are becoming an integral part of their corporate lives. Based on our interpretation of the research we suggest that the ‘democratization’ of KM encouraged by the adoption of Wikis can enable enterprises to prosper in the current uncertain and turbulent global environment.

Justification and overview of the research

According to the Australian Standard Vocabulary (HB189-2004, p.23), a new breed of systems known as Knowledge Management Systems (KMS) “create a corporate ICT environment, a contextualized base and infrastructure that takes into account the complex nature of knowledge and thus supports the handling of knowledge in organizations.” This implies that managers should not see KMS as simple knowledge repositories that collect and store knowledge in the same way as a database manages data and an information system processes information. Rather corporate knowledge should be co-created and understood both as a thing to be stored and as a flow to be shared (Hasan, 2003). To complicate the situation

KM initiatives are only valuable if they involve improvements to the organization that are often difficult to attribute directly to KM activities (AS5037-2005).

A Wiki-based KMS has the potential to threaten the traditional control of corporate knowledge by the organizational executive and place the responsibility for KM on all employees as knowledge workers (Pfaff and Hasan, 2012). Knowledge work involves participants working together on organizationally defined tasks that rely on knowledge as an input from a high degree of professional expertise of participants and has outputs where knowledge creation is an essential component (Davenport, 2005). A 'knowledge worker' describes someone who processes existing information to create new information which can be used to define and solve problems (Drucker, 1998). Their performance is maximized by capitalizing on their strengths and their knowledge rather than trying to force them into molds. They do best in organizations that support openness to change/innovation culture in self-directed teams where knowledge workers are left alone to work, with sufficient support and resources available, should they require them (Crawford et al., 2008).

Resistance to the use of new technologies for collaborative, knowledge sharing is not new. An early example of this resistance appeared in the definitive study by Orr (1990) on improvisation by Xerox's photocopier and in Orlikowski's (1993) research on the need for cultural alignment in knowledge sharing with Lotus Notes. Grudin and Palen (1995) reported the successful adoption of groupware products, in particular meeting scheduling systems, when use was discretionary and not mandated by management. However, as Grudin and Poltrock (2012, p.11) observe, the term *groupware* "was commonly used to describe the (se) technologies in the 1990s but lost currency a decade later, when group support features could appear in virtually any application." In respect of Wiki technologies these authors note that "the first Wiki introduced into an organization could represent a fundamentally different way of looking at collaboration" (p.26).

A revolutionary systems approach to KM, involving an integrated use of people, processes and technology to automate or support various types of work activities, is evident in a number of studies (Alavi and Leidner, 2001; Markus et al., 2000). These studies show that outmoded organizational contexts and cultures underlie the reluctance of employees to engage in activities that contribute knowledge to repositories. There are many unanswered questions and criticism about the applicability of Wikis so that straight-forward success factors are unlikely. The questions addressed in this research, to which we provide answers in this paper, are as follows:

1. How do organizations understand and meet the challenges posed by the introduction of Wiki-based KMS?
2. How do corporate Wikis support productive knowledge work activities which potentially democratize the creation and use of organizational knowledge?

The research uses an activity-based approach to analyze the essence of 'knowledge work' as a set of organizational activities where a Wiki is the supporting tool in a cooperative and democratic work paradigm (Hasan et al., 2007). It seeks to determine whether the corporate Wiki can redefine the activities of the knowledge worker for whom managing their collective knowledge about their work is an integral part of the work itself and critical to the performance of the organization. Re-alignment of contextual issues of such activities may have implications that result in changes to the organizational culture and may be critical to a Wiki's success. In this paper we describe two cases of the corporate use of a Wiki. The first

organization retained its conservative mindset towards innovative technologies and the Wiki was not successful. The second organization has transformed itself with the Wiki from a traditional hierarchical structure with top-down control to a more emancipated, network-centric configuration of loosely connected self-directed teams whose agility and flexibility adapt to the ever changing market place (Crawford et al., 2008).

The activity theoretical approach

As we focus on the *activities* of knowledge work that exploit corporate knowledge, we turn to *Activity Theory* (Leont'ev, 1981) for an understanding of how transformative tools, such as Wikis, *mediate* those *activities*. The tools available to an activity determine how it is carried out and lessons from activities inform advances in the tools (Hasan, 1998). Taking *activity* as a holistic unit of analysis is particularly appropriate for the dynamic mediating relationship between ICT and the contradictions of modern activities (Engeström, 1987). The theory allows a realistic and holistic understanding of emerging phenomena by distinguishing purposeful *activity* from more routine *actions* toward specific goals that contribute to that purpose (Leont'ev, 1981). It thus supports a holistic perspective across the doing, thinking and communicating dimensions of the knowledge work space as described above.

Activity Theory has its roots in the cultural-historical psychology of Vygotsky (1978) who introduced the concept of artifact-mediated and object-oriented activity. *Activity* is an English translation of the Russian *deyatelnost* denoting a high-level, long-lived construct unlike its English meaning. Following Vygotsky, Leont'ev (1981) developed a hierarchical model of human activity. He differentiated between purposeful activity, goal-oriented action and supporting operations. An activity is defined by the dialectic relationship between the human and a purposeful object of focus and is mediated (changed) by tools (physical and psychological e.g. language) and the community which encapsulates the context, environment and culture. This dynamic dialectic relationship is both objective, in the specific tasks to be done, and subjective, with various motives and perceptions of the participants. The practical application of Activity Theory has been strongly influenced by the framework in Figure 1a, made popular by Engeström (1987), a derivative, Figure 1b, will be used here.

[Insert Figure 1 about here]

As we use Activity Theory to underpin research, *activity* becomes the unit of analysis to understand dialogue, multiple perspectives and traditions, and networks of interacting activities each interpreted through the elements depicted in Figure 1b. The activity-based analysis is essentially interpretive and iterative where Activity Theory is used as a sense-making tool. Each activity is identified through the dialectic relationship between subject and object where the object encompasses focus and purpose while the subject, a person or group engaged in the activity, incorporates the various motives involved. A project team would be a *collective subject* composed of a group of individuals who bring different skills and understandings to bear on the project whose purpose, as the team interprets it, is the *common object*. The analysis often begins with the identification of the central activity with an explication of its composite elements and then looks at those activities that are linked to it (Engeström 1987; Kuutti and Virkunen, 1995). It is acknowledged that contradictions will inevitably occur within or between activities (Engeström, 1993) in any complex situation and

that, far from being a problem to solve, contradictions can be a source of learning, growth and innovation. The Activity Theory lens allows us to investigate the human emotions that are induced by using certain tools and the resulting attitude towards such tools. Introducing new tools such as the 'social' Web 2.0 technologies into formal workplaces is an inherent contradiction which will modify the activity system, thus resolving or creating new contradictions between the different components in the system.

Research design and method

This research was designed as a series of case studies with the objective of revealing a rich understanding of current practice. We adopted an in-depth interpretive case study approach (Orlikowski and Baroudi, 1991) in order to incorporate individual, organizational and social phenomena. The cases became known to us through our network of industry contacts and, as we assisted in the design; implementation and use of several of the Wikis, we employed action research in those cases. The action research method accepts participation from the researcher to be part of the study so that their knowledge brings 'meaning' to the observation, making them part of the experimental data (Baskerville, 1999), although acting in this capacity has the potential to introduce bias in reporting. The detailed analysis of the set of case studies has been reported elsewhere (Pfaff and Hasan, 2012) describing how mixed methods of qualitative data collection were adopted as appropriate. As reported, the findings from the set of case studies confirmed the complexity and ambiguity of the phenomena due to the many factors involved, and the interactions among these factors.

From this multi-case study, we now present and interpret typical representative cases sampled to provide more generalized results. Yin (2003) describes this as "analytic generalization". However, all cases contributed to our learning through the Activity Theory analysis. As we endeavored to make sense of findings through the lens of Activity Theory two distinct patterns of activities emerged, one of ongoing success and one of declining use. The research design and methods for the two cases chosen to represent these different patterns are as follows.

Case 1 involved action research where data was collected through participant observations and from interviews with a variety of stakeholders in the project targeting middle-level and line managers, and selected knowledge workers. The researchers assisted in creating the Wiki and its users were observed over a period of 6 months after the initial launch. To overcome the potential participant bias of action research we devised methods during the reflection phase of the action research, where we saw ourselves as learners and our corporate participants as having "inside" knowledge and portraying the reality of the knowledge workers, organizational culture and technology we were studying. The aim was to guide the organization in setting up a Wiki and observe the emergent organizational response. Case 2's Wiki already existed and interviews with participants were the primary data source. Qualitative interpretations of local behaviors, norms, and practices were developed systematically through content analysis of data derived from interviews. The semi-structured interview questions were asked corresponding to the items in column 1 of Table 1.

Empirical evidence for the analysis

The two samples cases are summarized in Table 1 and described as follows:

Case 1: A Traditional Hierarchical Bureaucracy

Case 1 involves a medium-sized non-governmental Australian organization which develops industrial standards for public benefit and national interest. All managers interviewed agreed that it had a traditional bureaucratic culture in the way it dealt with industry-sector knowledge gained over many years. Its proprietary intellectual capital includes business standards and guidelines which are developed either in-house or through licensing. Inputs from relevant external businesses and associations are essential to this process but the organization did not have a KMS to facilitate this. A particular set of external stakeholders are those involved with the creation and application of small business standards.

A Project Manager approached us to help create a “small business space” to become “a one stop resource site for information on topics such as governance, KM and risk management, for small business owners.” He suggested that a public Wiki to be used “to recommend marketing tactics and services to attract small businesses, capture feedback from the small business community and develop small business-related documents.”

The CEO approved a prototype Wiki in “Wikispaces”¹, an externally hosted application for the implementation. A committee of potential internal and external users was established to seed the Wiki with press releases, company policies, and other relevant material so that the Wiki could achieve a critical mass in order to sustain itself. The Wiki would continue to be monitored and edited by committee members and made available at no cost to suitable members of the small business community who were invited to build up a relevant body of knowledge on standard related small business topics. The Wiki was used for several months but with little executive sponsorship, the Wiki was not recognized internally as a key business tool. Apart from those in the initial committee, other employees and external users in the small business community never became engaged as they did not have a clear direction from the Project Manager or the necessary incentives to contribute to the Wiki. Interest in the Wiki waned as people questioned the point of maintaining a system that did not benefit their careers or have a clear corporate purpose and the project was suspended. From the internal perspective the system hosted on Wikispaces was not seen as corporate. Following our recommendations, the organization was planning to implement an internal KMS using Microsoft SharePoint that would allow collaboration to be managed at a central corporate server where all data would be exchanged via a central point of access. However this would exclude the external users and so have limited value for genuine knowledge sharing in the small business area.

Case 2: A more Network-Centric Organization

Case 2 is a large public utilities company based in the U.K. Their 4000 employees ranged from industrial chemists to financial analysts. Driven by a heavy research focus, the organization was keen to effectively, manage and maintain their networked environments, innovative operational models and design tools to assist them in making more informed decisions. Case 2’s KMS prior to the Wiki was IBM Lotus QuickPlace and they used Lotus Notes for their intranet. The knowledge workers disliked Lotus Notes because “it was ridiculously complicated, even free email programs allows the user to keep their email in different folders, but Lotus Notes made it a complicated process.” Lotus QuickPlace had been adopted to pool knowledge and compare notes with others by sharing ideas, discussing

¹ www.wikispaces.com

projects and preparing work documents. The Project Manager remarked that it “was very restrictive on editing and lacked decent search facilities.”

The Project Manager decided to install the open source Mediawiki engine made popular by Wikipedia making it essentially free to implement internally. The Wiki project started with the intention of “co-authoring the teams’ monthly report”. Each team member updated the reports with highlights from projects that they were working on for discussion during meetings. The Wiki’s page history provided a useful archive of their reports. They reported to us that the department used data from a variety of internal sources for modeling purposes. “With no centrally maintained metadata store it was difficult to track (or even be aware) of data across the organization. An encyclopedia of all the data we used, and were aware of, was compiled on the Wiki,” said the Project Manager. The Project Manager commented that “developing plans on the Wiki with other team members meant that the goals and timelines were realistic.” Knowledge workers said that, “no excuses could be made if you are on the Wiki”, “issues and complaints did not drop off the radar”, and “team members were always aware of the mission, tasks, and accountabilities.”

Initial success was attributed to getting approval from top management and having free access to a server to trial the Wiki. Take-up was based on positive feedback through word of mouth. The Project Manager was confident that “if the Wiki was successful the word would spread and other departments would begin to use it.” The R&D team ran “Wiki Wednesdays” once a month which were publicity and training workshops to encourage employees to use the Wiki. Detailed instructions were posted on the Wiki explaining how to perform common tasks such as editing pages, uploading images, and formatting sites. Short segments of QuickTime video tutorials helped new users to familiarize themselves to the various functions of the Wiki. When top management saw how well the Wiki was working, it was decided that the whole R&D team would trial the Wiki and other Web 2.0 technologies e.g. RSS, blogs, and mash ups for other project teams to increase organizational performance.

[insert Table 1 about here]

Comparison of the Case Studies

Common themes emerged from the two case studies. First, there was high dissatisfaction with the existing KMS and other KM processes. Second, there was a common desire for more flexible, responsive way of organizing and accessing organizational knowledge. The organizations wanted to replace mechanical management of knowledge with distributed capability to act flexibly in a dynamic environment. Third, there was a strong emphasis upon improved knowledge sharing and that without remedial action to replenish the knowledge stock; they would lose their ability to perform effectively in the current climate. Finally, there was an imperative for a tool that allowed knowledge workers to communicate with each other. It was this need which motivated the initial or attempted introduction of a Wiki in both cases although their approaches and experiences were different. However, the purpose and context of the Wiki was different in each case. Case 1 wanted to create a small business space with public access which brought external clients into the internal knowledge generation processes. Case 2 developed an internal Wiki to conduct report writing, discussion forums, a knowledge repository and a data encyclopedia. Through the lessons learnt from all the cases typified in

these two samples, Activity Theory is now used to examine those knowledge work activities that relate to the Wiki.

The activities of knowledge work using Wikis

We begin with the determination of the core activity of the topic of study with the basic premise that each Wiki was developed in order to exploit knowledge to improve the performance of an organization, enable it to learn and even transform itself to meet the changing demands of its environment. All of our cases were adjudged to involve knowledge work, where knowledge creation and use are essential components of work. Based on the literature we denote the core activity ‘knowledge work’ (the *object*) undertaken by ‘knowledge workers’ (the *subject*). The relationship between subject and object is mediated and transformed by the Wiki in the corporate context (Figure 2).

[Insert Figure 2 about here]

The subject-object relationship of the knowledge work activity implies a dialectic relationship between knowledge and work, i.e. between what people do and what they know. The knowledge work activity is a synthesis of both and this is becoming more prevalent as online spaces become more complex with an intertwining of learning and work activities (Thompson, 2010). This dialectic is expressed by a continuous cycle of co-creating work-related knowledge in a form that is meaningful for them that can be accessed as needed, and through which learning occurs. This results in more knowledgeable doing. The desired *outcome* of the Wiki-mediated activity of knowledge work involve evolutionary changes to the organization that, like all KM initiatives, are difficult to measure and for which there are no commonly-agreed criteria on which to assess *outcomes* (Anantatmula and Kanungo, 2006). It is rarely possible to attribute effects to a direct cause. Some possible outcomes are indicated in Figure 2. The mediating elements include the Wiki as an organic, interactive store of user-generated organizational knowledge together with the learning processes within the organization and the organizational community which defines the social context for the activity.

Drawing from experiences described in the case studies, Figure 3 shows some of the components of an activity system where the Wiki-based knowledge work activity is the core activity surrounded by other related or supportive activities. These secondary activities impact on the four elements (subject, object, tool, community) of the core activity and the relationships between these elements as describe below.

[Insert Figure 3 about here]

Secondary Activities impacting on the Object - Recognize, Understand, Value

As described above, we designated the *object* of the core activity mediated by a Wiki as ‘knowledge work’. Associated with this *object* are activities concerned with recognizing,

valuing and understanding that knowledge about the job is as important as doing the job itself. While KM literature acknowledges this, few job descriptions in corporate settings include the KM aspects of work so that employees are only indirectly rewarded for creating and using knowledge well. All our cases showed to some extent that the introduction of a Wiki to which all workers are expected to contribute, makes the KM aspect of work more visible to different extents. In Case 1, the senior managers showed little interest in using the Wiki themselves indicating that it was not seen as important. Internally, only the Project Manager recognized and understood its potential value. Their competitive organizational culture did not provide a collaborative context for knowledge work activity. Case 2 was a more collaborative network-centric organization, where the CEO, senior and line managers together with knowledge workers had similar understanding of the value of knowledge work activities. A recurring theme during the interviews was that staff “learn from each other”; “saved time not re-inventing the wheel” and developed an “appreciation of strengths and weaknesses” and the recognition that an individual “may not hold a monopoly of organizational knowledge” which supported further democratization in organizational knowledge.

Secondary Activities impacting on the Subject – Train, Motivate, Reward

Subject-related activities include the recruiting, training and incentivizing of participants in the Wiki initiative. Better outcomes result when a variety of constituencies are given a stake in the Wiki rather than concentrating on a ‘chosen few’. Case 1 management’s attempts to ‘seed’ information into the Wiki proved to be detrimental reinforcing the elitist view of KM responsibilities. Case 2 allowed a more emergent process to engage users across diverse parts of the organization. Their Wiki champion recruited colleagues to train and educate users on how and what to contribute. Case 1’s managers regard the Wiki as the Project Manager’s personal project and he would be the one to benefit if the Wiki was successful. In Case 2, using the Wiki became what was expected. A lack of incentives was given as of the reason for the failure in the adoption of the Wiki in Case 1. Case 2’s Wiki users participated because it was part of their job description and recognized the value in supporting interesting knowledge work.

Secondary Activities impacting on the Tool – Maintain the Technology and Monitor the Content

The activities related to the Wiki tool include technical concerns on the choice of software product, as well as ongoing maintenance and monitoring of its content. In Case 2, a Wiki software product was acquired and hosted internally, so these activities include installation and maintenance under corporate control. In contrast Case 1 opted for a Wikispaces option as a private space on an externally hosted application. This reduces the cost and effort of the tool supporting activities but reduced security and control, which was a major concern for Case 1. Having an internally controlled system may also have contributed to the strong management support in Case 2. Neither Case had given consideration to the potential need to monitor the content, presumably, as professional organizations, trusting users to be responsible in their postings. Case 1 was however careful in choosing who had access to the Wiki.

Secondary Activities impacting on the Mediation of the Core Activity by the Tool – Usability and Usefulness

As with any piece of technology, usability and perceived usefulness are critical to acceptance. Wiki technology needs to meet knowledge workers’ needs and fit into their ways of working and communicating. Case 2 recognized that not all knowledge workers were equally receptive

to technological change and it was left up to knowledge workers to decide how they used the Wiki. Case 2's managers did not try to impose their own ideas about how organizational knowledge should be structured and what constituted organizational knowledge. Unlike Case 1, it did not just put a group of users in front of a Wiki and expected to thereby achieve the goals of knowledge creation and learning. Most of the knowledge workers employed in Case 2 had the ability to teach themselves through their own initiative but training helped those who were novice users. Interest and an open attitude helped novice Wiki users overcome their initial nervousness in learning a new tool.

In all our cases illustrate, the Wiki was introduced in an exploratory manner without a clear acknowledgement or understanding of its usefulness in the long term. Through workshops and meetings, Case 2 ensured that knowledge workers understood the need for change, their role in the process, what is expected of them and provided a means to contribute and influence the process. Case 2 showed that the bottom-up approach had a better chance to become self-sustaining over time and evolve a meaningful purpose for the activity of its use. Bottom-up adoption tapped into social incentives for contribution and fostered a culture of working openly that had greater strategic benefits in the long run. Case 1's top-down approach by the Project Manager was ineffective in engaging participation where the Wiki was seen as not useful.

Secondary Activities impacting on the Community - Cooperation and Collaboration

The literature tells us that knowledge work is inherently a collaborative activity, as a key component of KM is knowledge sharing (Hasan, 2003). Knowledge work is thus socially and culturally situated since individuals belong to the organizational community which influences their behaviors.

At the time the Wiki was implemented, Case 2 had already begun activities to cultivate an intellectually stimulating and innovative environment where senior managers encourage knowledge workers to think through issues and problems for themselves. In this environment, Case 2's Project Manager took the initiative to create and implement a Wiki within his team because the need was there. In contrast, the behavior we observed led us to believe that Case 1's Project Manager expected to be told what to do by his superiors because he was constrained by the fear of making mistakes which would not be tolerated by the company. This type of culture did not encourage people to collaborate on the Wiki content and structure.

In Case 2's network-centric organization key aspects of its democratic culture were a commitment to total quality management, a focus on organizational learning and employee empowerment, as well as a long-term time orientation. The Project Manager suggested that younger knowledge workers were more predisposed to being group-oriented and reasonably web-savvy. Case 2 had developed a culture which was quick to leverage their enthusiasm to advantage when it came to using the Wiki. This is consistent with the observations of Goggins et al. (2010) that examinations of *Wikipedia* consistently highlight the disciplined practices that evolve in this virtual space.

Secondary Activities impacting on the Mediation of the Core Activity by the Community – Changing the Culture

The rejection of the Wiki in Case 1 indicated that the traditional bureaucratic culture was resistant to change. This suggests that skepticism towards a Wiki is typical of the culture of traditional, hierarchical organizations where there is little motivation to learn and use more

advanced technology within a social system. The decision to adopt Microsoft SharePoint as its internal KMS might be more appropriate for a traditional organization such as Case 1 that insists on retaining control. Case 2 seemed to both recognize the need for change and be comfortable that the Wiki would support change leading to a democratization of organizational knowledge. This suggests that if an organization wants knowledge sharing and innovative behavior to ultimately become part of its culture, effective managers will constantly look for opportunities to demonstrate and reinforce cooperative behavior. Paradoxically while the implementation of the Wiki seems naturally more suited to a bottom-up grassroots approach, support from senior managers to follow through on actions and modeling appropriate responses to change seems crucial for a new democratic knowledge culture to flourish.

Issues related to the Outcomes of the Core Activity

Our study did not follow through to observe specific outcomes of each case of Wiki implementation. We assumed that the desired *outcome* of the Wiki activity system would be the same as that for all KM initiatives as stated in the Australian KM Standard (AS5037-2005) i.e. improved innovative organizational performance through KMS supported knowledge work and organizational learning. It is likely that organizational learning will occur as the Wiki evolves over time and new knowledge accumulates as employees grow in the process of performing knowledge work. As organizational sense makers (Crawford et al., 2008) self-directed knowledge workers are in the best position to record the dynamic changes in their immediate business environment. Knowledge workers can participate as writers and peer reviewers, giving them opportunities to define problems and generate their own solutions, evaluate and revise their solution-generating processes.

Conclusion

As articulated in the research question, we have sought new understanding of the activities of knowledge workers in organizations that are grappling with the emergent and collaborative nature of Wiki-based KMS. We investigated how Wikis are accepted or not into corporate settings and how they can realize their potential in supporting productive knowledge work activities while democratizing organizational knowledge.

The research gathered data by studying several cases of real implementations of Wiki-based KMS from which two were chosen to represent contrasting patterns of contexts and activities. Activity Theory was used to explicate the system of activities in greater depth to order to give the overall picture and dynamics of a general complex Wiki-based activity system. The study showed the importance of a cooperative-knowledge friendly atmosphere for such projects to succeed. The outcomes of Wiki adoption/implementation are seen to be more successful when a collaborative organizational culture exists and there is top management involvement. The study suggests that adopting a Wiki for knowledge work may also help to democratize organizational knowledge through bottom-up development and emergent behaviors. Knowledge workers often drive the adoption of Web 2.0 technologies in the workplace, without the involvement of the senior executives. However, for the long term survival and sustainability of the Wiki to take place, incentivization, approval and support should come from top management.

The research findings indicate that as a result of new Web 2.0 technological developments, new organizational cultures and practices may be required that violate existing cultural norms.

New needs, rights, capabilities and responsibilities of knowledge workers demand employee-driven modifications to the way the job is done, providing knowledge workers with some control over their workload and the way they share knowledge resources. Wikis provide a way for organizations to establish a rapport with knowledge workers expanding their know-how and strategic thinking. Harvesting knowledge from many knowledge workers improves its quality and the collective effort ensures Wiki sustainability.

Our study shows a major contribution to demise of the Wiki in Case 1 was the bureaucratic culture of the organization. A Wiki is more suitable for organizations like Case 2 which adopt a network-centric, evolutionary approach to becoming learning organizations. The Activity Theory interpretation of the cases is holistic and systemic, revealing the interconnections of knowledge-work activities to the transforming influence of the Wiki on other related activities. An activity-based perspective can identify opportunities for the evolution of the Wiki to include activities that may be enabled by other Web 2.0 technologies. The structures, practices, habits and ways of thinking in an organization are all shaped and produced in the historical development of that particular organization. Resistance to change is normal human behavior, but so is innovative behavior where this is sanctioned and encouraged. The two cases of Wiki implementations presented here depict diverse approaches to preparing organizations for future sustainability and competitive advantage. Based on our interpretation of Case 2 we suggest that the ‘democratization’ of corporate knowledge encouraged by the adoption of Wikis and similar Web 2.0 technologies can enable enterprises to prosper in uncertain and complex environment.

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Table 1 Summary of the Two Sample Cases		
	Case 1	Case 2
Type of organization	Non-governmental, industry legislation	Public Utilities
Size of organization	SME (<200 employees)	Large (4000 employees)
Current KMS	No KMS. Website operates as a source of information	Lotus QuickPlace, Lotus Notes
Time KMS was used	10 years	6 years
Failure of current KMS	No personal/department spaces Web-pages created by IT staff	Complicated, poor information quality, different websites, poor search engine
Main purpose for Wiki implementation	Create small business space with public access	Report writing, discussion, archives, data encyclopedia
Uses for the Wiki	One stop information resource site	Easy access to information, quick document search, data repository
No./Age of Users	10 employees 25–40 years	50 employees, 20–55 years
Time Wiki used	6 months	5 years
Organizational Culture	Autocratic	Task-Oriented
Management Type	Bureaucratic	Consultative
Challenges/Barriers	Perceived usefulness Competition Lack of incentives, no democratic culture. Recruiting, training and educating Copyright and legal liabilities Information security	Perceived usefulness
Recommendations	Store business documents, attractive features to build up critical mass e.g. link Wiki to other Web 2.0 tools	Publicity, training workshops QuickTime Videos Job descriptions to include Wiki work Incorporating RSS, social networking sites and mash ups

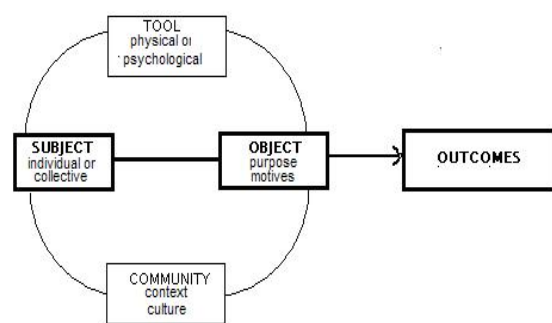
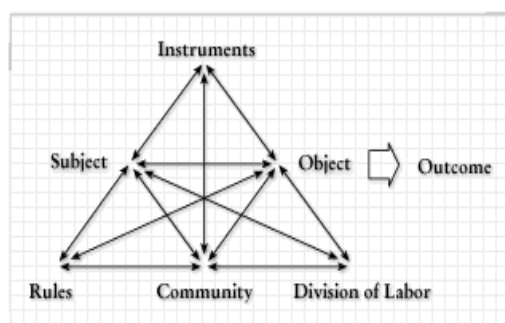


Figure 1 a, b. Two representations of an activity show the central dialectic relationship of subject and object (a person doing something) mediated by tools and community. Activities can have both intended and unintended outcomes.

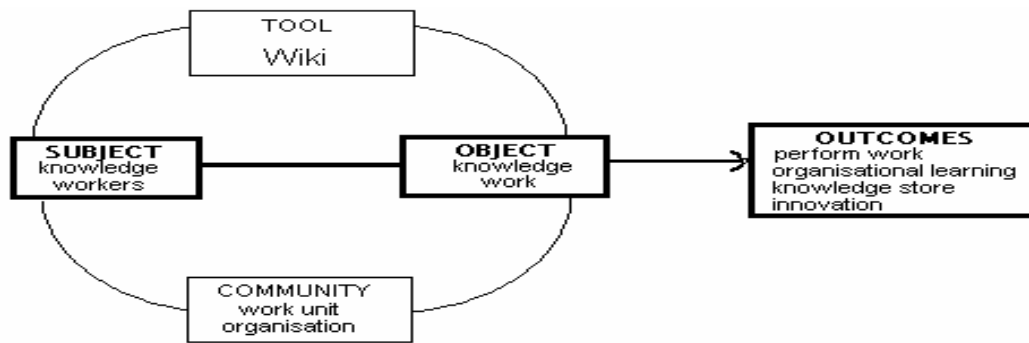


Figure 2. The Core Activity of Knowledge Work Mediated by a Wiki with indicative outcomes

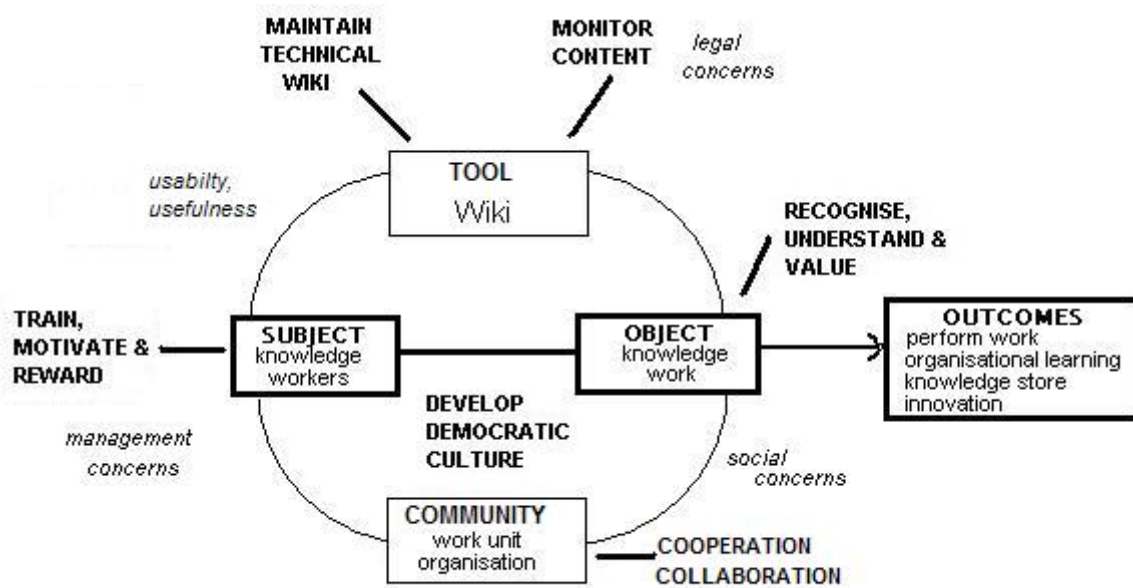


Figure 3. Components of the whole Knowledge Work Activity System mediated by a Wiki