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# Beyond ubiquity: co-creating corporate knowledge with a Wiki

Helen M. Hasan
*University of Wollongong*, hasan@uow.edu.au

Joseph A. Meloche
*University of Wollongong*, jmeloche@uow.edu.au

Charmaine Pfaff
*University of Wollongong*, cpfaff@uow.edu.au

David Willis
*University of Wollongong*, dwillis@uow.edu.au

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## Abstract

Despite their reputation as an evolving shared knowledge repository, Wikis are often treated with suspicion in organizations for management, social and legal reasons. Following studies of unsuccessful Wiki projects, a field study was undertaken of a corporate Wiki that has been developed to capture, and make available, organizational knowledge for a large manufacturing company as an initiative of their Knowledge Management program. A Q Methodology research approach was selected to uncover employees subjective attitudes to the Wiki so that the firm could more fully exploit the potential of the Wiki as a ubiquitous tool for tacit knowledge management.



## Keywords

Beyond, Ubiquity, creating, Corporate, Knowledge, Wiki


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# Beyond Ubiquity: Co-creating Corporate Knowledge with a Wiki

Helen Hasan, Joseph A Meloche, Charmaine C Pfaff, David Willis
*University of Wollongong*
*hasan@uow.edu.au; jmeloche@uow.edu.au; ccp02@uow.edu.au; dwillis@uow.edu.au*

## Abstract

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**Key Words**
Ubiquitous computing, Ubiquitous knowledge, Wiki, Q Methodology, Knowledge Management

## 1. Introduction

The term 'ubiquitous computing' is commonly used to refer to the 'invisible' computers embedded in a multitude of modern devices. This deviates from the original meaning of the word 'ubiquitous' as being or seeming to be everywhere at the same time. With reference to this original meaning, the Internet is enabling data, information and knowledge to have a ubiquitous quality. Members of the resulting civil digital culture take for granted their ability and right to access, and to contribute to, the ubiquitous global knowledge repository that is the World Wide Web. Within corporations, knowledge management (KM) initiatives strive to collect organizational knowledge to be available as a strategic resource, but corporate cultures are often not well disposed to the sharing of knowledge [1]. Learning organizations are seeking the capability to co-create knowledge repositories that are more than ubiquitous, where all workers are motivated and empowered to take responsibility for their own KM processes.

In the context of ubiquitous computing, this paper critically examines the prospects for Wiki technology to be a tool to support a contemporary, yet challenging, view of corporate KM that is participatory, holistic, collective and contextual. Emerging from the social arena into the corporation, the Wiki is bound to challenge management authority by attempting to engage the knowledge worker in a more participatory KM capability and environment.

The paper will begin with an overview of changing user perceptions of KM through the use of a Wiki, and creating receptive environments for a Wiki in organizations. The Wiki is defined and lessons from unsuccessful corporate Wiki projects are presented. The context of a field study of a more successful Wiki implementation is introduced together with an outline of the Q methodology approach adopted for the study. Findings from the study are presented and discussed.

## 2. Background

### 2.1 Wiki Ubiquity and Knowledge

A working definition of a Wiki is an evolving knowledge repository where users are encouraged to make additions to this repository by adding new documents or working on existing ones [2]. A Wiki is a collection of interlinked HTML web pages and has crosslinks between internal pages where each page can be edited, keeping a complete record of such changes. Thus a Wiki can be accessed from any web browser and no other special tools are needed to create and edit existing pages. Any change can be easily reverted to any of its previous states.

In the spirit of 'ubiquitous computing' Derballa and Pousttchi [3] defined ubiquity as the possibility to send and receive data anytime and anywhere eliminating any spatiotemporal restriction. As mobile devices such as mobiles and PDAs are carried by users nearly every time and everywhere, it gives users access to the Wiki which is available online. However a Wiki is more than that. It transforms users into active participants receiving and creating ubiquitous knowledge. Wiki

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technology can take advantage of the collaborative efforts of all members of the organization to create an effective library of knowledge. Users can create knowledge collaboratively in groups or through individual efforts and to disseminate knowledge anywhere and anytime.

Weiser [4] argues that users live through their practices and tacit knowledge so that the most powerful things are those that are effectively invisible in use. By invisibility, he means that the tool does not intrude on human consciousness but the focus is on the task and not the tool. The challenge is making the invisibility visible through the study of human factors and the user interface.

## 2.2 Initial Wiki research

Our initial research [2,5,6] reported corporate Wiki projects that were unsuccessful. This research identified management, social and legal issues that are mitigating against the easy uptake of Wikis in corporations. The informal network approach that is currently favored in a Wiki, implies loss of central management control of corporate knowledge and changes to organizational structure and culture [6]. The Wiki is described as a 'social software' [7], implying that there are social factors that must undergo some changes before the Wiki will be accepted to improve the organization's knowledge management. Legal issues concerning rights to intellectual property and possible libelous material see a Wiki as a risky endeavor.

## 2.3 Current Research

In this paper we report the findings of an exploratory field study of a corporate Wiki called a Technology Encyclopedia (TE) that has been developed and implemented to capture organizational knowledge for a large manufacturing company and make it widely available as an initiative of their Knowledge Management (KM) program. A Q Methodology research approach, as will now be described, was selected to uncover employees' subjective attitudes to the TE so that the firm could more fully exploit the potential of the Wiki as a ubiquitous tool for tacit KM.

## 2.4 Q Methodology

Due to the Wiki being an emergent technology, Q methodology was selected in order to reveal the ubiquitous nature of its use and to better understand how Wiki technology can contribute to the area of KM. This approach can help to expose issues, which may otherwise be invisible. Q Methodology has been frequently associated with quantitative forms of analysis due to its involvement with factor analysis of Q-sort technique. However it is important to note that the Q methodology uncovers the *range of views,* such as the users' subjective views, attitudes, opinions, understandings, and experiences on a specific topic of investigation, as opposed to most methods that offer one composite view. The following will describe the concourse, the sorting procedure, and the analysis of the results from the sort process that form the Q Methodology.

A Q study normally starts with the concourse, which involves having the participants provide their thoughts and views. This activity of statement generation may not occur in a single session but may transpire over time or amongst various groups, but always on the same topic/s. A Q sample of 30 to 50 individuals has the ability to produce meaningful results i.e. provide an accurate picture of the range of views on a topic [8].

The Q sort involves eliciting the individual views of participants by choosing amongst the statements called a Q sample, and demonstrating the extent of their agreement or disagreement with them. For example they may be instructed as follows:

"You are being asked to sort statements in accordance with your degree of concurrence/agreement with the statements. Where +4 is high agreement and –4 is high disagreement and the scales between –4 and +4 reflect shades/levels of agreement. You will find the statements on a pack of cards that will be given to you. You are asked to sort the cards in accordance with the rating given to each card. The largest number of statements will be placed in the centre and the least amount of statements at each extreme point," [9].

The following diagram is similar to the sample form that you will need to record your ranking of the statements:

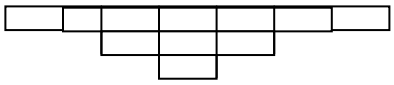

Figure 1: Q Sort Triangle Sample for ranking of the Statement

The analysis stage occurs when all participants have completed the individual sorting process. The Q Sorts are statistically analyzed by any of the standard Q factor analysis computer programs to find correlations and identify Factors that are common to the sorts of several individuals [10]. The results contain clusters of those individuals who appear to hold similar views in their ranking of the statements.

## 3. The Wiki Case Study

This research project was initiated by the manager of the unit where the TE is implemented and who is its main sponsor. He approached the other authors, researchers of KM at the local university, to conduct a study of employee attitudes in contributing to the TE in order to suggest interventions that might improve their involvement.

### 3.1 The Concourse

A Concourse was held with a selected group of employees at their worksite. It consisted of a general discussion with the members of the research team and the client representative on what they would like or expect of a TE**.** Using ZING Technology, which is a group decision support tool, participants were asked to supply their ideas for the topic as brief statements. A total of 57 statements were collected and researchers organized these statements into categories that included usefulness, ongoing, acknowledgement, time, ease of use, security, mainstream, support, and exposure to risk (see Table 1). These categories helped in the subsequent analysis but were not shown to the individuals who participated in the sort.

**Table 1 Categories of statements as determined by the researchers responding to the question: *"What would (from your point of view) help you to contribute to the TE?"***

| Category Type | Num-ber | Example Statement |
|---|---|---|
| Usefulness | 11 | If I could see tangible benefits to customers |
| Ongoing | 2 | Knowing that this type of system is going to be around " for the long haul" and not be a "flavour of the month" |
| Acknowledgement | 10 | If contributions were recognised and rewarded |
| Time | 2 | If I had the time to contribute |
| Ease of Use | 12 | If I could easily get attachments in right format before entering |
| Security | 5 | If confidentiality issues are resolved |
| Mainstream | 5 | If it was universally regarded as a necessary job function |
| Support | 6 | (39) If it had a specialist entry person / editor |
| Exposure to Risk | 4 | (16) If I knew it wouldn't make me redundant |

### 3.2 The Sort

The statements generated by the concourse concerned "What would (from your point of view) help you to contribute to the TE?" and individuals sorted the statements in accordance with the instructions "the extent to which you agree or disagree with the statements." A "forced sort" methodology was applied where each statement need to be placed in one of the provided squares on the Q Grid. The process involves correlation and by-person factor analysis where the analysis is performed not by variables, such as traits, or statements, but rather by persons, where people correlate to others with similar views based upon their sorts. The three factors (opinion types with reference to contributing to the TE) were titled as shown below in Table 2.

**Table 2 *18 sorts in 3 factors***
***** *(Reflected Negative Factor)*

| | Interpreted as: | Sorts per Factor |
|---|---|---|
| **1** | Corporate Knowledge Worker (CKW) | 7 |
| **2** | CKW with Customer Focus * | 4 |
| **3** | Main Stream View * | 7 |

The following section includes the high agree (positive) and the high disagree (negative) statements from each of the Factors and the respective Factor scores, which indicate the relative level of the statements. The aim is two fold: first, to see the continuality among the high and positive statements: and second, compare the prior with the high negative statements and the contrast between them. This comparison is done with each of the Factors in turn so as to allow for a more rigorous examination of the Factors, both individually and in comparison with each other.

***Factor 1 – "Corporate Knowledge Worker" (CKW)***

For Factor 1, the ten (10) statements given the highest weighting are shown in Table 3.

| Table 3 *Factor 1 - Strongly Agree Statements* | | |
|---|---|---|
| **High Positive Statement** | **Z-Value** | **Category** |
| If I thought the system wasn't going to be redundant in couple of years | 2.064 | Ongoing |
| If its usefulness was apparent | 1.595 | Usefulness |
| If I could see tangible benefits to customers | 1.539 | Usefulness |
| If it was of more value | 1.520 | Usefulness |
| If I had the time to contribute | 1.520 | Time |
| Knowing that this type of system is going to be around "for the long haul" and not be a "flavour of the month" | 1.388 | Ongoing |
| If the system allowed direct entry of existing data without the need to re-format | 1.351 | Ease of use |
| If I thought someone was going to read what I wrote | 1.295 | Usefulness |
| If it accepted dot points/not essay | 1.051 | Ease of use |
| If I could easily get attachments in right format before entering | 1.051 | Ease of use |

| Table 4 *Factor 1 - Strongly Disagree Statements* | | |
|---|---|---|
| **High Negative Statement** | **Z-Value** | **Category** |
| If I knew it wouldn't make me redundant | -1.013 | Exposure to Risk |
| If contributions were recognised and rewarded | -1.032 | Acknowl-edgement |
| If it had an improved authentication process | -1.220 | Security |
| If contributions were tracked to me so that my boss can see my contributions | -1.257 | Acknow-ledgement |
| Knowing who was reading it | -1.370 | Acknow-ledgement |
| If it provided the ability to make anonymous entries | -1.426 | Exposure to Risk |
| If I could use it in focus groups with limited team members | -1.539 | Security |
| If there was a Wiki award | -1.782 | Acknow-ledgement |
| If guys in the control room could browse it in the middle of the night | -1.895 | Usefulness |
| If there was a Wiki newsletter | -2.008 | Acknow-ledgement |

For Factor 1, the ten (10) statements given the lowest weighting are shown in Table 4

Factor 1 contains the statements most aligned with a good corporate knowledge worker - concerned with the value and usability of the TE.

The main concern of the individuals is the ongoing use/status/reliability of the TE. The other positive statements reflect a desire for ease of use and for client feedback. The negative statements indicate that CKWs are not concerned about acknowledgement, awards and job security.

***Factor 2 – Reflected (Negative Factor) CKW with Customer Focus***

The following statements are the strongest agreement statements for Factor 2; the ones following these are the strongest disagreement statements. For Factor 2, the nine (9) statements given the highest weighting are shown in Table 5.

| Table 5 *Factor 2 - Strongly Agree Statements* | | |
|---|---|---|
| **High Positive Statements** | **Z-Value** | **Category** |
| If it gave something back to the organisation | 1.995 | Usefulness |
| If I had the time to contribute | 1.448 | Time |
| If the system captured info requests - so you could write on a topic for a known audience. | 1.408 | Support |
| If confidentiality issues are resolved | 1.215 | Security |
| If customers could access the information | 1.201 | Usefulness |
| If it was of more value | 1.188 | Usefulness |
| If I could see tangible benefits to customers | 1.161 | Usefulness |
| If the objectives was made clear | 1.128 | Usefulness |
| If I thought the information was useful to the users | 1.121 | Usefulness |

For Factor 2, the nine (9) statements given the lowest weighting are shown in Table 6. Factor 2 also reflects the views of the CKW and its focus on customers. There is concern and a desire for assurance, that confidentiality issues will be resolved and that the objectives be made clear, i.e. tangible benefits of the TE. The negative statements showed a disregard for additional rewards or acknowledgement. They were

not concerned with acknowledgement, publicity, or any possible negative impact on their job security.

| Table 6 *Factor 2 - Strongly Disagree Statements* | | |
|---|---|---|
| **High Negative Statements** | **Z-Value** | **Category** |
| If I was not limited by my ability to contribute | -1.101 | Exposure to Risk |
| If I knew it wouldn't make me redundant | -1.188 | Exposure to Risk |
| Having people who could capture information for me as its produced | -1.368 | Support |
| If it had a specialist entry person / editor | -1.448 | Support |
| If I thought the system wasn't going to be redundant in a couple of years | -1.415 | Ongoing |
| If it provided the ability to make anonymous entries | -1.502 | Exposure to Risk |
| If it was linked to STI (an incentive scheme) | -1.515 | Acknow-ledgement |
| If there was a Wiki newsletter | -1.949 | Acknow-ledgement |
| If there was a Wiki award | -2.276 | Acknow-ledgement |

***Factor 3 –Negative Factor - Main Stream View***

For Factor 3, the five (5) statements given the highest weighting are shown in Table 7

| Table 7 *Factor 3 - Strongly Agree Statements* | | |
|---|---|---|
| **High Positive Statements (Reflected)** | **Z-Value** | **Category** |
| If I had the time to contribute | 1.752 | Time |
| If it was universally regarded as a necessary job function | 1.700 | Mainstream |
| If it was linked to STI | 1.607 | Acknow-ledgement |
| If there was a higher level of commitment to Wiki from management | 1.246 | Mainstream |
| Knowing that this type of system is going to be around "for the long haul" and not be a "flavour of the month" | 1.129 | Ongoing |

For Factor 3, the three (3) statements of Table 8 were given the lowest weighting:

| Table 8 *Factor 3 - Strongly Disagree Statements* | | |
|---|---|---|
| **High Negative Statement (Reflected)** | **Z-Values** | **Category** |
| If I thought that customers wanted information added as part of their project | -1.002 | Usefulness |
| If it provided the ability to make anonymous entries | -1.433 | Exposure to Risk |
| If I knew it wouldn't make me redundant | -1.677 | Exposure to Risk |

Factor 3 reflects the views of those who want the TE to be "mainstream" and acknowledged as an ongoing part of their work. It contains the individuals whose statements are both concerned about their status, how they will be acknowledged and whether the TE will fully supported by management. Note, however, that the statement "If it was linked to STI" could be a surrogate for mainstream rather than a concern about acknowledgement and reward since STI job goals are always assigned in key performance areas. They are not concerned with being made redundant or being able to make anonymous entries.

## 4. Analysis of the results

The study revealed factors representing clusters of participants with similar opinions.

**Factor 1:** contains the individuals whose statements are most aligned with a progressive 'corporate knowledge worker' who are concerned with how useful the TE is and that it is easy to use. It is interesting to note that CKWs in this particular organization are not concerned with acknowledgement. Wiki critics have pointed that this is a disadvantage of the Wiki as there is no recognition of authorship in a Wiki because pages can be freely written or edited by anybody, which goes against the innate need by workers for recognition [2]

**Factor 2:** convey similar views to those expressed in Factor 1, concerned with its value and its usefulness plus this factor has a strong customer focus in its selection of "usefulness" statements**.** The Wiki challenges the opponents of different viewpoints to build consensus so that work is done. The openness of the Wiki invites opportunities for improvement. Coordination and corporate learning across product groups and departments will become easier. The usefulness of the Wiki depends on its CKWs to contribute and maintain this growing repository of knowledge in the organization. In response to CKWs

concerns about assurance and confidentiality issues, it is assumed that management hires competent employees, and thus any inaccurate entries will either be corrected voluntarily by the original contributor, or by others. Qualified peers will be responsible for information quality and for acquiring information with a strong customer focus. The Wiki is, therefore, an information repository whose relevance and accuracy undergoes continuous peer review.

**Factor 3:** share the concern on how mainstream the TE is. As CKWs are time poor, management can mandate that the maintenance of the Wiki should be part of the organizational business process and specify the type of content that it is intended to contain. For instance, reports, reference articles and other useful information pertaining to their research and projects could be made available on the Wiki so that the Wiki will 'write itself'. The Wiki could become an information commons where project managers can include regular updated information of their projects on the Wiki and encourage CKWs to make it part of their ongoing work routine to put up new reports and edit old entries to update the data. Another concern is whether the TE will be fully supported by management. As the impending retirement of Baby Boomers loom closer, the retention of corporate knowledge becomes more crucial. The path to decentralization of IS control is seen as a pragmatic, step-by-step approach, which can achieve its aim only in the long run. The Wiki is in line with such a pragmatic approach to the incremental evolution of corporate KM. It is in the management's interest to support the Wiki as a KMS because the Wiki will be maintained by CKWs and acquire and disseminate "living knowledge". For future sustainability and a demonstration of management support, corporate incentives should be given so that CKWs will be motivated and fully committed to contributing and maintaining a Wiki. Management is encouraged to take a discretionary approach in terms of rewarding participation, productivity, quality articles and good ideas.

## 5. Conclusion

The Wiki has been described as a democratization of knowledge [5]. In previous research with corporate Wikis, organizations that favor a top down management approach can be seen as undermining the process of the democratization of knowledge. Management of this case study acknowledged this fact and is committed to finding a solution to maximize the potential of their CKWs through the use of the Wiki. The feedback obtained from employees has given management a valuable insight into CKWs' expectations of the value and usability of a Wiki and greater management support is required for the sustainability and further development of the Wiki. In keeping with the theme of democracy and promoting a non-threatening, ubiquitous environment for employees to elicit helpful feedback, Q methodology was chosen. The Q study demonstrated its effectiveness to community building activities, open discussion, reflection, individual decision making and providing outcomes that can guide the development and use of ubiquitous knowledge creation and dissemination technologies.

## 6. References


[1] Warne L., Hasan H. Ali. I. "Transforming Organizational Culture to the Ideal Inquiring Organization", in J. Courtney, J. Haynes, D. Paradice (Eds.), *Inquiring Organizations: Moving from Knowledge Management to Wisdom.* (pp. 316-336) Hershey, PA: 2005

[2] Pfaff, C.C. Hasan, H. "Overcoming Organizational Resistance to Using Wiki Technology for Knowledge Management". *Proceedings of the 10th Pacific Asian Conference on Information Systems*, July. 2006

[3] Derballa, V. Poustti, K. "Extending Knowledge Management to Mobile Workplaces". *Proceedings of the 6th international conference on Electronic Commerce*, March, 2004.

[4] Weiser, M. "Hot Topics: Ubiquitous Computing". *IEEE Computer*, October. 1993.

[5] Hasan, H. Pfaff, C.C. "Emergent Conversational Technologies that are Democratizing Information Systems in Organizations': the case of the corporate Wiki", *Proceedings of the ISF*, Canberra, 2006

[6] Pfaff C. Hasan, H. "The Wiki: a tool to support the activities of the knowledge worker". *Proceedings of the Transformational Tools for 21st Century* (TT21C) 2006 Conference 2006 p38-48.

[7] Swisher, K. Boomtown: "Wiki" may alter how employees work together. *Wall Street Journal*, Jul 29, (2004) p. B1.

[8] McKeown, B.F. Thomas, D.B. *Q Methodology. Quantitative Applications in the Social Sciences*, Vol. 66. Newbury Park, CA: Sage. 1988

[9] Meloche J Crawford K. "A Metaphorical Approach to Information Seeking, a Q Study". *14th Annual Conference of the Internal Society for the Scientific Study of Subjectivity,* Seoul Korea. 1998.

[10] Stephenson, W. "Postulates of behaviorism". *Philosophy of Science,* 20, 110-120. 1953.