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# EMPLOYING WIKI AS A COLLABORATIVE INFORMATION REPOSITORY IN A MEDIA AND ENTERTAINMENT COMPANY: THE NBC UNIVERSAL CASE

*Teaching Cases*

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## **Abstract**

*Wiki has been widely accepted by educational institutions, homes, and corporations, and is expected to grow continuously. Business enterprises quickly recognize the value of shared content: Some of the largest corporations, such as Google and IBM use wikis to manage daily operations and to share information among employees. This case study presents how NBC Universal developed a wiki, and used it to enhance knowledge-sharing, thereby achieving significant cost-savings, performance improvement and employee satisfactions. This case shows Wiki can bring greater value to an organization with a dynamically changing structure in which capturing and sharing of tacit knowledge is critical for its success. By clearly demonstrating benefits of collaborative information repositories in the widely-recognized media and entertainment firm, this case will provide valuable learning opportunities to both professional and academic audience.*

**Keywords:** Wiki, collaborative information repositories, Web 2.0, and case study

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<sup>1</sup> Young Eun Lee is the corresponding author. Teaching note will be provided upon request.

## **Introduction**

There was a time when Wikipedia, the user generated online encyclopedia, was the only wiki people knew - times are changing. Wiki is defined as “a freely expandable collection of interlinked Web pages, a hypertext system for storing and modifying information — a database where each page is easily editable by any user with a forms-capable Web browser client” (p. 14)(Leuf et al. 2001)<sup>2</sup>. Wiki, the Hawaiian word for quick, has been widely accepted by educational institutions, homes, and corporations, and is expected to grow continuously (Raman 2006)<sup>3</sup>. For instance, wikis in schools will pass the burden of learning from the teacher to the student. Student access to collaborative knowledge will change the landscape of science projects, portfolios, and most significantly textbooks (Forte 2006). Fields that rely on high intelligence and hands-on experience also stand to benefit from the increasing use of wikis. NASA, CIA, Northrop Grumman and the U.S. Armed Forces are all highly specialized and rely on hands-on experience in the field. Wikis can revolutionize the way this information is shared. Furthermore, the value of shared content is quickly recognized by business enterprises: Some of the largest corporations, such as Google and IBM use wikis to manage daily operations and to share information among employees. So how did this uncomplicated concept of Wiki, “click and type,” grow from just a few people, to tens of thousands of users?

In 1994, computer programmer Ward Cunningham created an online database with a basic set of rules for creating and editing sharable content. Ward designed the system to be easy to use by a non-technology savvy audience – no programming expertise was needed; no technical jargon was required. With little effort one could create or edit a number of intertwined web pages using a simple markup language. Each page is linked, so anyone could easily refer to other pages and contribute anywhere they wanted. Such an easy and flexible method of creating content would allow people to work together to build and improve the site. Once Cunningham released his wiki engine to the Internet in 1995, it did not take long for people to take notice (Leuf et al. 2001). Through the culture of cooperative innovation, the Open Source community expanded and improved the concept, allowing Wiki to flourish and spread. Now, over a decade since its inception, Wiki is transforming the way corporations disseminate information and employees communicate<sup>4</sup>. By the end of 2010 it is estimated that 50% of all U.S. corporations will be using wikis in one or more varieties and will continue to use mapping and customization of templates to allow new wikis to connect to existing company websites<sup>5</sup>

The popularity of Wiki has spawned a number of studies on the benefits, success, and acceptance of Wiki in diverse organizations, from educational institutions and knowledge-intensive firms (e.g., software development companies) to government agencies (Boulos et al. 2006). However, few previous studies have examined use of Wiki in a business corporation which has a highly fluid organizational structure, such as one in the media and entertainment industry. The media and entertainment industry has a dynamic organizational structure in that freelancers and daily contractors are constantly joining and leaving the firm, and their number often exceeds the number of full-time long-term employees. The constantly changing structure inhibits cultivation of a collaborative culture for knowledge sharing. Furthermore, the nature of the work – i.e., production of TV programming– requires creativity, originality, and insight to capture fickle viewers’ tastes and interests; such tacit knowledge cannot be captured easily by any extant knowledge management tool, while sharing of tacit knowledge brings greater benefits to the organization than objective and procedural information does (Alavi et al. 2001).

We chose NBC Universal as our case to demonstrate how Wiki fosters the culture of collaboration, thereby enabling sharing of tacit knowledge in a highly fluid and dynamic organization. In addition, the NBC Universal case illustrates the importance of a grassroots movement of end-users, IT leadership, and support from top management in the success of Wiki acceptance.

The current case study is organized as follows: We first present a brief history of Wiki, followed by its benefits to business organizations as compared to other online collaboration tools. Next, we present the NBC Universal case in which we describe the inception of NBC’s wiki application by the IT team, low initial acceptance rate, recognition

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<sup>2</sup> Following Raman (2006), the authors differentiate between the terms Wiki (uppercase W) and wiki: the former is used to describe the concept or refer to the technology in general, and the latter is used to refer to a particular application of the technology.

<sup>3</sup> See Figure 1 for the recent growth of Wikipedia.

<sup>4</sup> <http://www.ikiw.org/2008/01/08/7-effective-wiki-uses-and-the-companies-that-benefit-from-them>

<sup>5</sup> <http://blogs.zdnet.com/Hinchcliffe/?p=382>

by top IT management and a grassroots movement of an NBC division, Peacock Productions, which prompted the exponential growth and spread of the wiki throughout NBC Universal.

## **Wiki: Collaborative Information Repository**

### **What is Wiki?**

After the dot-com bust in 2001, the Internet began to take on a new shape and different purpose. Recognizing this imminent change but not quite knowing what it would be, Tim O'Reilly and MediaLive International created a conference to address the future of the Internet and called it "Web 2.0" (O'Reilly 2007). Over time, the phrase has come to signify the shift of the Internet from individual websites to a platform with multiple sites connected to one another through interactive links. The creation of these links is being shaped by the demand of the Internet user. Furthermore, with the emergence of collaborative software, the Internet user is directly creating his or her own custom platform for any conceivable content; from managing a traditional website to creating an online community (O'Reilly 2007).

The functioning of a wiki centers on the idea of community. Wikis are designed to promote collaboration by any community of individuals, all of which are encouraged to contribute. For many websites such as Wikipedia and WikiWikiWeb, the original wiki, anyone who wants to be a member is allowed to be part of the community. Changes and additions to a wiki can be made anonymously or by identified users, and the content is regulated by the group's own members. Wikis are created through groupware packages that are readily available for download over the Internet for little or no cost. There is a focus on simplicity in wiki creation. However, the information contained in a wiki is not simplistic in nature; rather, accessing and adding on to the information is as simple and straight forward as possible so that everyone has the ability to participate<sup>6</sup>.

In order to run a collaborative online wiki, one needs only three things: servers, bandwidth and a willing group of individuals to participate. The cost of running a wiki remains relatively low because the content is self-governed. The main cost is only initial development and implementation. The primary benefit of a wiki is that information is available in a central location allowing instant collaboration among its members who can be widely dispersed. Wikis erase the challenges of disseminating current, correct and consistent information across the globe. Also, the focus on simple design and the use of a simple markup language puts the emphasis on content and eliminates the challenge of needing tedious technical expertise (Matias 2003). The links created on a wiki can be connected to wiki pages that either have extensive content or might not exist yet. When a user clicks on that link, he or she will be taken to the new, blank page and permitted to begin building it by adding his or her own personal knowledge. Many advanced wikis show the history of edits and contributions made to a page. Any incorrect data or malicious content can be easily removed. Additional links can be included in the new page as well. In this manner, the wiki can take on whatever shape its users find most helpful (Matias 2003).

### **The Rewards and Risks in the Context of Business Use**

Wikis offer unprecedented advantages. Today's business hierarchy is flattening and a wiki continues the trend by giving employees managerial type access to edit and contribute ideas to a central database (Hasan et al. 2006). A wiki aids in the creation of an internal knowledge base and allows faster action on new ideas which can increase a company's overall competitive advantage. The quality of work performed improves through ideas and employee empowerment (Hasan et al. 2006). Also, a wiki can help reduce data redundancy (Morris 2007). Through the use of email and intranets, data can be out of date, inconsistent or repetitive. Many times important information is even lost, buried in a file. Wikis centralize the data and the resultant reduction of data redundancy reduces that effect (Morris 2007).

Retaining top employees is a priority to all companies. Wikis allow peer review, management exposure, reduced hierarchy of control, and most importantly evolve with the changing needs of the employees and the company (Hasan et al. 2006). Employees suffer from less frustration, which comes with the lack of efficient resources, and

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<sup>6</sup> <http://computer.howstuffworks.com/internet/basics/wiki.htm>

are able to increase their knowledge base, helping them to move up the hierarchy sooner. Companies benefit by saving information they would have otherwise lost as a result of employee turnover.

A 2009 survey of 168 corporate wiki users showed that wikis have three primary benefits: enhance reputation, make work easier, and help organizational processes (Majchrzak et al. 2006). By enabling users to communicate and collaborate efficiently anytime and anywhere, wikis help companies save time and money. Per Wiki vendor, customers can reduce their email volume by up to 30% by using wikis consistently (Majchrzak et al. 2006).

A wiki's collaborative knowledge sharing format provides a unique alternative to other recent technologies, which have gained popularity over the past decade, but fail to offer the same flexibility that enable wikis to evolve consistently and effortlessly. Since the Internet boom, information sharing has been dominated on web pages by blogs, forums, intra/extra nets, and through one-on-one communications, such as emails and instant messaging. These collaborative information sharing tools provide benefits as compared to traditional knowledge management systems (See table 1 for the summary of benefits). However, Wiki stands out among these tools in terms of reach, flexibility, and user friendliness. Table 2 summarizes the advantages and disadvantages of Wiki-based applications as knowledge sharing platforms.

Blogs are a popular information sharing platform, with famous bloggers ranging from Fortune 500 executives to gossip guru Perez Hilton, but are typically limited to one author providing knowledge and viewpoints on an array of issues that often convey bias perspectives. Feedback on blogs is limited to a comments section, and while useful as a brainstorming tool with sequential postings, they are often controlled by the author to reflect their own opinions and can digress from the topic. While forums offer more flexibility and impartiality than blogs, information sharing here is best described as conversational and very informal. Various users can edit and comment on an array of topics; however, inaccurate posts can't be edited by other users and forum posts are often difficult to locate, as they are frequently archived. Intranets and extranets have become a popular platform for sharing information within Corporate America. Often, content managers dictate the content of standard intranet platforms; however, many organizations are seeking a competitive advantage on readily available information for employees. Table 3 presents a summary of the differences between these alternative information sharing tools.

Wiki also has several potential drawbacks. The open access and editing ideals on which wikis were designed open the door for potential security issues (Bean et al. 2005). The complete disclosure of knowledge may prove too problematic for companies that rely heavily on need-to-know documents. With improper oversight, open editing poses potential risks for Internet attacks (viruses, worms, SPAM, etc). In addition, wikis grow and evolve as the number of users and their contributions rise. While this maturation significantly enhances the value of wikis, it also means they may evolve in a more chaotic manner than was originally intended (Bean et al. 2005).

## **A Case Study: A Wiki at NBC Universal**

### ***The Rise from Obscurity: The Birth of a Wiki at NBC Universal***

The wiki for NBC Universal started as a grassroots movement within the walls of the company's IT department in 2005. Table 4 presents the timeline of events for the wiki implementations. In 2005, Wikipedia was gaining momentum with its growing popularity, and the overall Wiki concept was at the peak of the Gartner Hype Cycle and gathering mindshare. Bill Endow was the director of the Software Engineering and Delivery team at NBC Universal. Bill Endow's team had programmers in multiple locations, including both the West and East Coast of the US, India, and Mexico; accordingly, communication among programmers across disparate locations was the top priority for the team. As a solution, one of Bill Endow's programmers suggested a wiki as a platform for exchange of ideas and internal communication. It was the beginning of a wiki community at NBC Universal that revolved around easy communication and open collaboration among programmers geographically dispersed across multiple locations.

### ***Development of a Wiki***

Prior to adopting a wiki, Bill Endow's team was using Support Central, an application developed in-house specifically for General Electric (NBC's parent company). Support Central is an online forum which allows employees to post a question and/or an issue; personnel in charge of the issue can post a reply. Support Central's functionality was not sufficient to meet Bill Endow's team's communication requirements, because it allowed only a

limited number of people to publish (i.e., document owners). It also had a limited search feature and unintuitive and cumbersome user interfaces which allowed users to browse only a limited set of document formats, such as Microsoft Word documents. Due to these inadequate features, Support Central encouraged document uploads rather than interactive, online content creation.

Due to the limitations of Support Central, it was not widely used by Bill Endow's team members. The feature-poor document management system (i.e., Support Central), or the lack thereof, caused Bill Endow's team to spend a substantial amount of time transferring knowledge from person to person. "Prior to the wiki, our most widely-used knowledge management tool was email. It left a lot to be desired," said Bill Endow. They needed a knowledge management tool that would allow quick and easy knowledge capture, transfer, and update in a variety of forms (text, images, PDFs, uploaded files, video, etc.).

As a solution, Bill Endow decided to use a wiki as the primary information repository within his team. Wiki provides easy navigation, makes more document formats searchable, and reduces the overhead of content management, which could otherwise grow to an unsustainable level. In addition, Wiki provides an opportunity for different departments to share specific knowledge - knowledge that would be useful for others in the organization - currently stored only in people's heads or perhaps their e-mail. The specific knowledge sharing objectives which Bill Endow's team planned to achieve through use of a wiki are listed in Table 5.

At the time, Bill Endow had many different wiki software vendors to choose from because Open Source communities had embraced the Wiki concept. However, Bill Endow recognized the inherent problem with Wiki: the lack of hierarchy to categorize documents into appropriate groups. Any enterprise (unless it is entirely cross-sectional and team-based) has functional divisions such as Human Resources, Procurement, and Production; thus, different documents are handled by different divisions. Wiki, however, has no hierarchy or systematic mechanism to organize documents. Easily put, Wiki is more like Google versus a systematic management tool for information. Confluence, a product of Australian-based Atlassian, had become the market leader for stand-alone enterprise wikis. Confluence gave Bill Endow the structure he needed while providing a powerful search engine - something that was absent from the Support Central site and was hard to find in other wiki alternatives. Also, the subscription fee was reasonable: a one-time initial cost of approximately \$12,000 USD to purchase the software, plus \$6,000 USD per year for maintenance. Consequently, Bill Endow's team chose Confluence Wiki, by Atlassian, and implemented it on Oracle 10g RAC, running on Red Hat Enterprise Linux on HP servers. Specifically, the team set up two servers to run the wiki platform - one for software to display the wiki pages, the other an oracle database server to deal with structure and content, as well as user info and history. In addition, they built a small storage unit to act as a file system, holding all attachments and non-text documents.

### ***Low Initial User Acceptance***

By 2007 the wiki was finally in place but receiving minimal traffic. Only Bill Endow's team of 10 - 15 was using the wiki due to two major problems. The first issue was integration of Confluence Wiki into NBC's existing network software. In order to verify whether the content contributor is a legitimate NBC employee, Confluence Wiki must check the contributor's identity by forcing him or her to log into the NBC network with an employee ID and password. This verification phase was slow and often failed, preventing even legitimate users from accessing, contributing, and modifying content on the wiki. Second, the version of Confluence Wiki software purchased was still in an early stage and had several lingering glitches which caused annoying delays in accessing and updating content. The collaborative effort of Bill Endow's team and Confluence resulted in a resolution of these problems, ensuring seamless user verification processes and increasing performance and speed of the wiki application.

### ***Support from Top Management***

By late 2007 the wiki was still receiving minimal traffic - but that was about to change through an unexpected event. In December 2007 NBC's IT department was reorganized to "Plan, Build, Run, Govern" and business-liaison teams were created so that the IT department could be aligned with NBC's business units (i.e. TV Systems, Film, Home Entertainment, etc.) to provide more customized services for business units. A group of approximately 300 staffers and 500 contractors would be affected. During an offsite, Bill Endow demonstrated the wiki for the new management team. The new leadership of the IT department decided that the wiki - this little known tool used only within Bill Endow's group - would be the nerve center for all information related to the reorganization. All department heads would be required to create a page with their organizational structure and relevant information. In

January 2008 the IT department rolled out the new and improved wiki. The recognition from the top IT management team increased the wiki's usage by 10 times overnight.

Because the wiki was used for the reorganization, the existence and potential of the wiki started to be recognized across NBC. For instance, the Nightly News graphics department and a division of IT called Dot.Media began using it to track workflow. As the number of users grew, the wiki started to generate buzz around the company.

With the wiki growing fast and attracting more traffic, Bill Endow recognized the need to expand its capacity. Data center utilization grew dramatically starting in 2005, leading to an investment of tens of millions of dollars over the next several years to expand capacity. This expansion indicated that the wiki had reached the next level of maturity where it required careful scalability and capacity planning to ensure continuous availability of services. Bill Endow's team needed careful planning and foresight to keep the wiki running smoothly, simultaneously taking cost pressures into account. To achieve this goal, Bill Endow moved the wiki to a virtual server. Using a virtual server allowed the initial investment to be maximized quickly and efficiently, and facilitated the wiki's expansion as its usage grew. By 2009 the wiki had been upgraded to the latest version of Confluence Wiki (version 3.1), lived on a virtual server and was ready for company-wide utilization.

### ***The Peacock Predicament***

Around that time Peacock Productions, a division of NBC News, was in dire need of a knowledge management tool. Peacock Productions produces a variety of programming and provides content for channels both internally and externally. Specifically, Peacock produces long-form documentaries, live specials and events and reality/docu-soap series for several cable networks. Examples are: *American Character Along Highway 50 with Tom Brokaw (USA)*, *The McVeigh Tapes: Confessions of an American Terrorists (MSNBC)*, *Intervention In-Depth (A&E)*, *Disappeared (Discovery ID)*, *Storm Stories (The Weather Channel)*, *Secrets of the Secret Service (Discovery Channel)*, and *Criminal Mindscape (MSNBC)*.

Peacock Productions has a core staff of roughly 40 employees but constantly expands and contracts as workload fluctuates unforeseeably depending on the season, schedules, and changes in viewership. Due to the variability inherent in any production division, Peacock uses a number of freelancers to supplement their full-time staff and could have more than 100 people working for them at any given moment. This fluid organizational structure and the nature of the work – i.e., producing TV programming and content – keeps many employees on the road frequently, and consequently knowledge sharing and communication is always a challenge. Peacock Productions was in desperate need of an information management solution. Nonetheless, the department lacked a centralized database, or information repository, that employees, regardless of their employment status (full-time, or freelance), could access to gather information necessary for their jobs. In fact, they were using a number of fragmented, isolated, antiquated legacy systems for information storage and retrieval. Fragmented databases coupled with poor governance (there was no structure as to who could enter information) led to data redundancy and data inconsistency. The fragmented data management systems also lacked flexibility and user friendliness that prevented employees from effectively finding relevant information in a timely manner. Consequently, countless hours of manpower were wasted. What's the number for IT? Where do I submit my expenses? How do I fill out my time card? These were just some of the most frequent questions that Peacock employees had but were never answered properly and promptly due to the lack of a proper information repository.

“Before the wiki, information sharing at Peacock Productions was extremely ad hoc and completely disorganized,” said Danielle Bibbo, Coordinating Producer in the Management Team of Peacock Productions. Danielle Bibbo proposed a deployment of a central information repository to enhance communication and knowledge transfer within the division. Danielle Bibbo had been working for Peacock for more than seven years and thus had the knowledge as to where to find information, who to contact, and what forms needed to be filled in. Newer employees and freelancers who did not possess such knowledge flocked to her office and inundated her with endless phone calls and emails with routine and repetitive questions. As the unit expanded and more people joined the department, the demand for such information grew drastically. This prevented Danielle Bibbo and other experienced staff members of Peacock from focusing on their core tasks, costing the company significant, skilled manpower.

Danielle Bibbo suggested that the division establish a central information repository where such tacit knowledge could become explicit, documented, and readily accessible by any Peacock employee. The repository would allow experienced staff members to focus on their tasks instead of answering others' routine questions. Danielle Bibbo launched a team of five people from the division to brainstorm possible alternatives for such a repository. Their

requirements were simple: First, the application had to be easy to use. NBC staffers are not technology savvy (due to the nature of their job, in which technology is used infrequently), and thus would not use any application that is complicated or takes significant time to learn. Also, Peacock has many freelancers and daily contractors that are constantly joining and leaving the division and as such could not be trained on a complicated system. They needed an application that they could log onto and immediately know how to use. Second, Peacock needed an application that could be modified and updated instantly without requiring extensive maintenance and support from the IT department. Lastly, the application needed to be cost-effective because NBC, like many other companies in 2009, was undergoing the worst recession after the great depression.

### ***Success of the Wiki in Peacock***

Danielle Bibbo was informed of the existence of a wiki which Bill Endow developed in 2005. The wiki started getting traffic around NBC by this time. More importantly, it was free to use because Bill Endow's team had already made the initial investment. Peacock began to use the wiki as an easy platform for communication. The platform for sharing information was ready; now, Danielle Bibbo's team needed to gather 'information' and create the content which would be shared on the wiki. Ironically, the solution for the information repository was attained instantly, while the content – the information requirements to be shared on the platform – was a bigger challenge.

It took over 10 months for Danielle Bibbo's team to assemble the information requirements for Peacock. They first carefully analyzed every business process and workflow that occurs within Peacock – whether they were carried out explicitly or rather implicitly through personal connections. The information requirements also included company policy and legal matters which needed involvement of other departments, such as legal, finance and human resources, as "guest contributors." Moreover, it included 'insiders information' or tacit knowledge, which is critical for producing successful TV programs. For instance, a user shares his or her review of filming equipment (e.g., "this camera is good for filming in daylight situations while not strong in low light conditions); then another user quickly adds his or her personal experience with the equipment.

In February of 2010 the Peacock wiki was finally launched as the central information repository to transfer not only explicit and procedural information but also tacit knowledge which had only been shared on personal levels. The wiki was a comprehensive warehouse of information consisting of 145 pages covering 240 topics<sup>7</sup>. It is the most complete "guide to the unit" that anyone had ever created and it all lives on a wiki. Within days the wiki was gaining incredible momentum and after just a few months of use, the site had already collected over 1,300 visits and more than 5,000 clicks. Today, employees at Peacock Productions are using the wiki to brainstorm ideas, make suggestions and, of course, to find information. The Peacock wiki has eliminated countless meetings, multiple conference calls, numerous mass emails and frequent unnecessary questions – and that means things are getting done faster and more efficiently. "The wiki has dramatically increased the efficiency of our unit and enabled Peacock Productions to run more smoothly. Since implementing the wiki, people are able to easily find the information they need without wasting valuable time," said Danielle Bibbo.

Among the many benefits Wiki has brought to Peacock, it provided an opportunity to create new sources of information by leveraging small contributions from a broad community of motivated, self-selecting contributors. In addition, it helped the organization achieve lower operational costs while enhancing the quality and level of service. Many leading companies will have made or saved millions of dollars due to this networked collective intelligence. On average, users at Peacock Productions spent 3-5 minutes searching for information, whereas the wikis helped to reduce that search time to 39 seconds. As a result, the implementation of wikis will provide Peacock Productions a projected annual savings of approximately \$100,000 for 2010. Table 6 presents projected yearly savings.

Furthermore, mobile subscribers are projected to grow 35% in 4 years to 5.8 billion worldwide by 2013 largely driven by the Asia-Pacific Market<sup>8</sup>. As the workforce becomes more mobile, the one-stop-shop for policy, procedures and processes can be easily downloaded to a user's blackberry or smart phone for use in the field. Peacock Productions leveraged this trend by enabling a downloadable version of the wiki for blackberries and have also discussed the possibility of creating a wiki iPhone application. Second, the firm's services provide improved customer satisfaction by being able to address questions from employees who are able to access the content found on the wikis. This in turn helped to reduce the costs associated with various unanswered questions and missing

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<sup>7</sup> See Figures 2 and 3 for screenshots of the Peacock Productions wiki.

<sup>8</sup> <http://www.portioresearch.com/Market%20Notes%20Mobile%20Music%20In%20India.pdf>



information. In addition to the significant cost-savings, the wiki enabled Peacock to improve information flow and resource-sharing with other divisions and departments, such as payroll, finance and accounting. Further, the wiki fostered a culture where employees feel safe in contributing and expressing their ideas and opinions freely.

### ***The Future of Wikis at NBC***

Impressed by the success of the wiki at Peacock Productions, NBC Universal is currently planning to expand wikis throughout the organization. Steve Capus, President of NBC News, and Kevin Lord, Executive Vice President of Human Resources, suggested use of wikis throughout the News Division and also as a tool to guide employees through the future Comcast/NBC Universal joint venture. The NBC wiki currently has 900 users with 300 active users. The next phase is to grow the user base by marketing the wiki throughout the organization and by raising company awareness through education and training.

By the time wiki use spreads to all the employees of NBC Universal (approximately 17,000 employees as opposed to 900 current users), Bill Endow's NBC IT team must find a more scalable way of supporting the wiki to accommodate a sudden increase in traffic. Also, NBC Universal needs to create an attractive platform for users to contribute and to use the resources available on the website with ease. NBC Universal can take advantage of contributions of linking, clicking and searching by looking for implicit patterns and information in the data. NBC Universal also needs to make sure a wiki integrates well with other business tools and applications such as Microsoft Office. This is important because as usage of the wikis grows, they need to present a familiar interface to people who are not highly tech-savvy and to package pages together in useful views that could feel like a document or table. In addition, they need to watch for advances in ease of use, such as 'one-click' usability, that remove current barriers and promote widespread adoption. "The wiki helps us capture knowledge at its source, with the individual knowledge worker, in real time, as ideas occur to them," said Bill Endow.

## **Conclusion**

In this case study, we describe how a wiki was developed by NBC's IT team, and how the wiki enhanced knowledge sharing within Peacock Productions. This case shows that benefits of Wiki can be greater for a fluid organization in which sharing of implicit and tacit knowledge is critical for its success.

Throughout the world, businesses constantly strive to improve efficiency and effectiveness in order to attain increased profitability and greater success (Laudon et al. 2006). As technology continually changes, "adaptation" is essential to any business model. Achieving operational excellence is vital for any firm's success not to mention survival. Employee collaboration brings a company one step closer to operational excellence. Wikis enable companies to cultivate the culture of collaboration upon which they can be more productive and provide greater value to their customers. By connecting employees through Wiki, they can work together in spite of geographic location - through time zones and across continents. While the key function of a wiki is easy creation, it's collaboration that gives a wiki its value: Individually you can be good but collectively you can be great.

While wiki users are changing, so are wikis. Currently heavily text based, the future trend is for wikis to become graphic based (like standard websites) to enable applications and plug-ins. Cloud computing will either rely on wikis, or change the landscape of what a wiki is. Drupal, open source software with Wiki capabilities, is currently used as a back end system for larger websites with Wiki functionality. Ning, a newly established company, provides an online platform for users to create their own social network. Drupal and Ning are just two examples of new companies that have begun taking advantage of wikis and using them to enhance their core business.

These new forms of Wiki will enable business organizations to foster the culture of collaboration which encourages knowledge workers to voluntarily and willingly share their expertise. By encouraging sharing of tacit knowledge, firms will be able to achieve operational excellence, improve employee performance and customer satisfaction, and ultimately achieve competitive advantage.

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## Tables and Figures

<b>Table 1. Advantages of Conversational Knowledge Management Tools (Excerpted from Wagner 2004, page 266)</b>	
	<ul style="list-style-type: none"> <li>• It can be economical and technology undemanding. Many on-line communities are built on little more than a listserv or a (freely available) web- based discussion forum.</li> <li>• Conversational knowledge creation is fast, taking potentially only as long as required for one person to post a question and others to post or e-mail a response. Speed makes conversational technologies particularly useful for environments where ad-hoc knowledge creation is required.</li> <li>• Conversational knowledge creation is suitable for environments where the knowledge is not centralized, but resides with multiple owners who may be located far apart.</li> </ul>

<b>Table 2. Advantages and Disadvantages of Wiki-based Applications</b>	
Advantages	<ul style="list-style-type: none"> <li>• Can be edited by anyone, anywhere, and at any time.</li> <li>• Inexpensive.</li> <li>• Saves history of changes.</li> <li>• Simple and easy to use/edit (no technical expertise required).</li> <li>• Eliminates data redundancy.</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>• Can be ineffective when there is a lack of consensus.</li> <li>• Lack of supervision and support if problems occur.</li> <li>• Potential security issues.</li> <li>• May evolve chaotically.</li> </ul>

<b>Table 3. Alternative Information Sharing Tools</b>	
Blogs	<ul style="list-style-type: none"> <li>• Typically limited to one author.</li> <li>• Provide knowledge and viewpoints on array of issues.</li> <li>• Often convey bias perspectives.</li> <li>• Feedback is limited to a comments section, which is often controlled by the author to reflect his or her own opinions and can digress from the topic.</li> </ul>
Forums	<ul style="list-style-type: none"> <li>• More flexible and impartial than blogs.</li> <li>• Information sharing is conversational and very informal.</li> <li>• Various users edit and comment on an array of topics.</li> <li>• Inaccurate posts can't be edited by other users.</li> <li>• Forum posts are often difficult to locate, as they are frequently archived.</li> </ul>
Intranets/Extranets	<ul style="list-style-type: none"> <li>• Content managers dictate the information.</li> <li>• Many organizations are seeking a competitive advantage on readily available information for employees.</li> </ul>

**Table 4. A Timeline of Events for the Wiki Implementations**

Time	Development Phases	Scope and Reach
2005	<ul style="list-style-type: none"> <li>• Bill Endow, then the head of Software Engineering and Delivery Team at NBC, initiated a development project of a wiki.</li> <li>• Confluence was chosen as the wiki application.</li> </ul>	<ul style="list-style-type: none"> <li>• Developed for intra-divisional communications within the Software Engineering and Delivery Team whose employees worked at geographically dispersed locations.</li> </ul>
2007	<ul style="list-style-type: none"> <li>• Confluence wiki was launched.</li> <li>• Soon, problems integrating the wiki with NBC's existing network software and several lingering glitches were found.</li> </ul>	<ul style="list-style-type: none"> <li>• Minimal traffic was received even from the Software Engineering and Delivery Team due to the problems.</li> </ul>
December 2007	<ul style="list-style-type: none"> <li>• NBC's IT department was reorganized to be aligned with NBC's business units.</li> <li>• Wiki was selected as the nerve center for all information related to the re-organization of NBC IT department.</li> </ul>	<ul style="list-style-type: none"> <li>• All department heads were required to create a page in the wiki with their organizational structure and relevant information.</li> <li>• The wiki started gathering traffic from other departments outside IT.</li> </ul>
January 2008	<ul style="list-style-type: none"> <li>• The new wiki improved and redesigned to be the nerve center for the reorganization was launched.</li> </ul>	<ul style="list-style-type: none"> <li>• The wiki's usage was increased by 10 times overnight.</li> </ul>
2008-2009	<ul style="list-style-type: none"> <li>• The wiki reached the next level of maturity where it required careful scalability and capacity planning to ensure continuous availability of services.</li> <li>• As a part of capacity planning, a decision to run the wiki on a virtual server was made.</li> <li>• The updated application, Confluence Wiki (version 3.1), was adopted for company-wide utilization.</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>
2009	<ul style="list-style-type: none"> <li>• Peacock Productions, a division of NBC News, was in dire need of a knowledge management tool.</li> <li>• Danielle Bibbo, Coordinating Producer in the Management Team of Peacock Productions, suggested that the division establish a central information repository.</li> <li>• The wiki, developed by Bill Endow, was suggested as a solution.</li> <li>• For the next 10 months, information to be shared in the wiki was gathered and the content was created.</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>
February of 2010	<ul style="list-style-type: none"> <li>• The Peacock wiki was finally launched as the central information repository.</li> </ul>	<ul style="list-style-type: none"> <li>• Peacock Productions employees were the main users of the Peacock wiki.</li> </ul>
Future	<ul style="list-style-type: none"> <li>• NBC IT team must find a more scalable way of supporting the wiki to accommodate a sudden increase in traffic.</li> <li>• NBC Universal needs to create an attractive platform for users to contribute and to use the resources available on the website with ease.</li> <li>• A downloadable version of the wiki for blackberries and a wiki iPhone application are being discussed.</li> </ul>	<ul style="list-style-type: none"> <li>• The next phase is to grow the user base by marketing the wiki throughout the organization and by raising company awareness through education and training.</li> <li>• Mobile users will be included.</li> </ul>

<b>Table 5. Knowledge Sharing Objectives for the Wiki Project</b>	
Department-wide Communication	<ul style="list-style-type: none"> <li>• Provide transparency into organization, goals and charter of IT department.</li> <li>• Share best practices and documentation of all types with all audiences.</li> <li>• Share information in an accessible and useful form.</li> <li>• Help employees and contractors share specific technical knowledge vital to successfully executing projects.</li> </ul>
Quality Assurance	<ul style="list-style-type: none"> <li>• Provide a searchable real-time reference manual for QA engineers to help reduce the long window currently required to onboard a new resource, and to help advertise and maintain standards by making them transparent and accessible.</li> <li>• Share functional QA process overview to educate people on test planning and to ensure entry criteria (use cases, functional specifications, etc.) meet quality standards for test preparation.</li> </ul>
Processes and Tools	<ul style="list-style-type: none"> <li>• Share tool overviews, links to tutorials, and best practices gathered by tool users.</li> <li>• Share templates and example documents for the various deliverables. Help answer questions such as, “What is included in a good Vision Statement?”</li> </ul>
Resource Allocation	<ul style="list-style-type: none"> <li>• Share resource allocation process overview to educate people on the steps that must be taken to engage with Resource Allocation group.</li> <li>• Provide an entry point to the Resource Allocation process – a guide to specific next steps.</li> </ul>
Software Architecture	<ul style="list-style-type: none"> <li>• Share software architectural design process overview with design engineers, software architects, software engineers, etc. to help teams successfully design their applications.</li> <li>• Share templates and example documents for the various software architecture deliverables.</li> <li>• Share architecture tool overviews, links to tutorials, and best practices gathered by tool users.</li> </ul>
Software Engineering	<ul style="list-style-type: none"> <li>• Share various best practices pertaining to all of the above processes and areas of the department.</li> </ul>

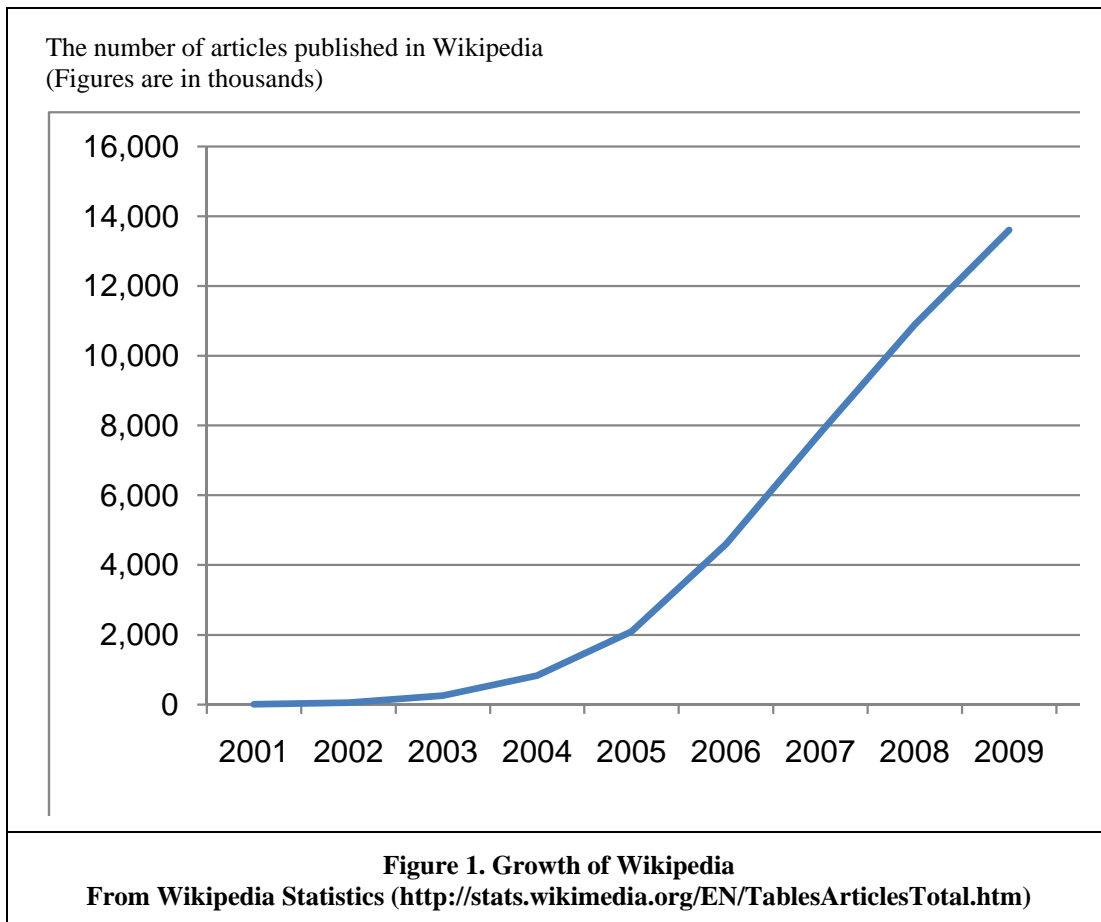
<b>Table 6. Cost-Saving by the Use of Wiki (from February 8 to March 20, 2010)</b>	
Page clicks	4,052 page clicks on the site
Average time spent on a page	39 seconds (per page)
Average cost per second per employee <sup>9</sup>	\$0.02
Average time spent to acquire information BEFORE the wiki <sup>10</sup>	On average, people spent 4 minutes searching for or asking about the information.
Average time spent to acquire information AFTER the wiki <sup>11</sup>	On average, the same information can be found in 39 seconds.
2010 Projected Yearly Savings (estimate <sup>12</sup> )	<p>4 minutes of time before Wiki (240 seconds) compared to 40 seconds of time after Wiki</p> <p>Time Saved = 200 seconds</p> <p>X 200 seconds = \$4</p> <p>For each visit to the wiki we save \$4</p> <p>\$4 x 4,052 clicks = \$16,208 saved in 2 months (Feb 8 - March 30)</p> <p><b>Projected Yearly Savings Estimate = \$97,248</b></p>

<sup>9</sup> 'Cost' refers to labor costs in the form of salaries and wages paid to long-term staff and short-term freelance employees of Peacock Productions. The average cost per second per employee was calculated as follows: 1) A weekly salary (based on blended salary rates determined by the budgeting department) was assigned to each of eight (8) positions in the unit – Senior Management, Production Management, Producer, Associate Producer, Assistant Producer, Production Assistant, Support Staff, and Other (secretarial, etc.). 2) The weekly salary of each position was then multiplied by the number of people who occupied that position. 3) The weekly subtotals for each position were then added to derive a weekly total for the unit as whole. 4) A per second rate per employee was then calculated for the entire unit based on a forty (40) hour work week.

<sup>10</sup> Time saved varied depending on topics of interest.

<sup>11</sup> The statistics are obtained from the Peacock workforce survey administered in March of 2010.

<sup>12</sup> This is a conservative estimate based on the assumption that the number of users will remain constant after 2 months.



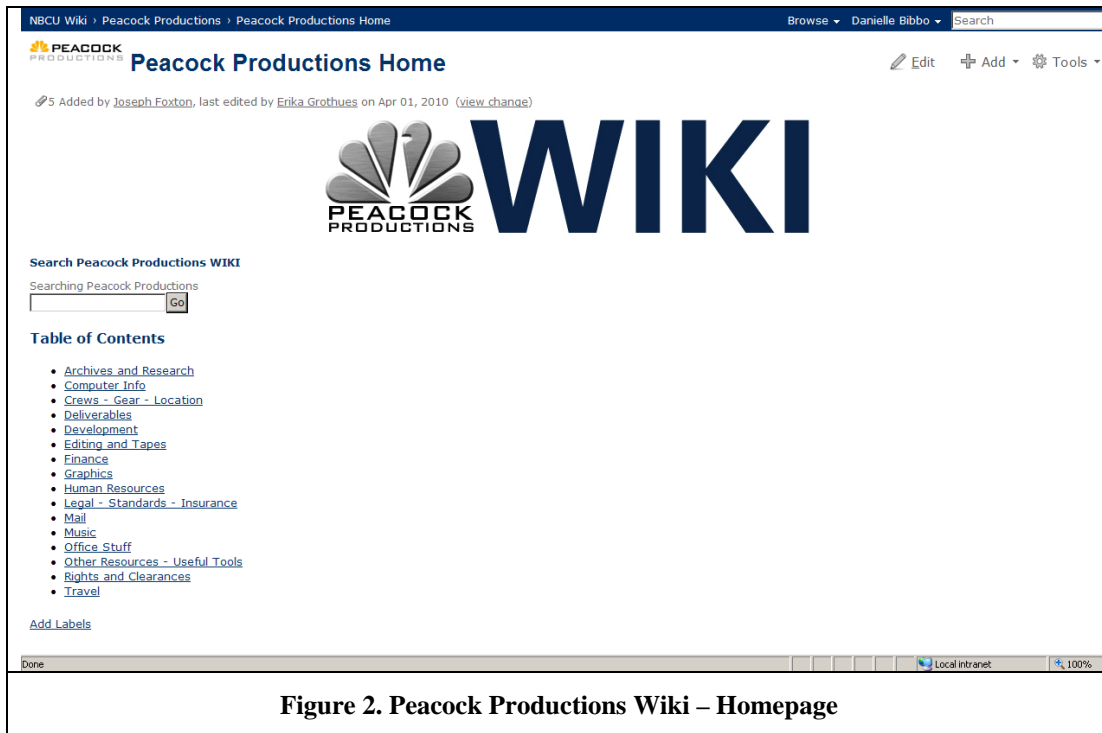


Figure 2. Peacock Productions Wiki – Homepage

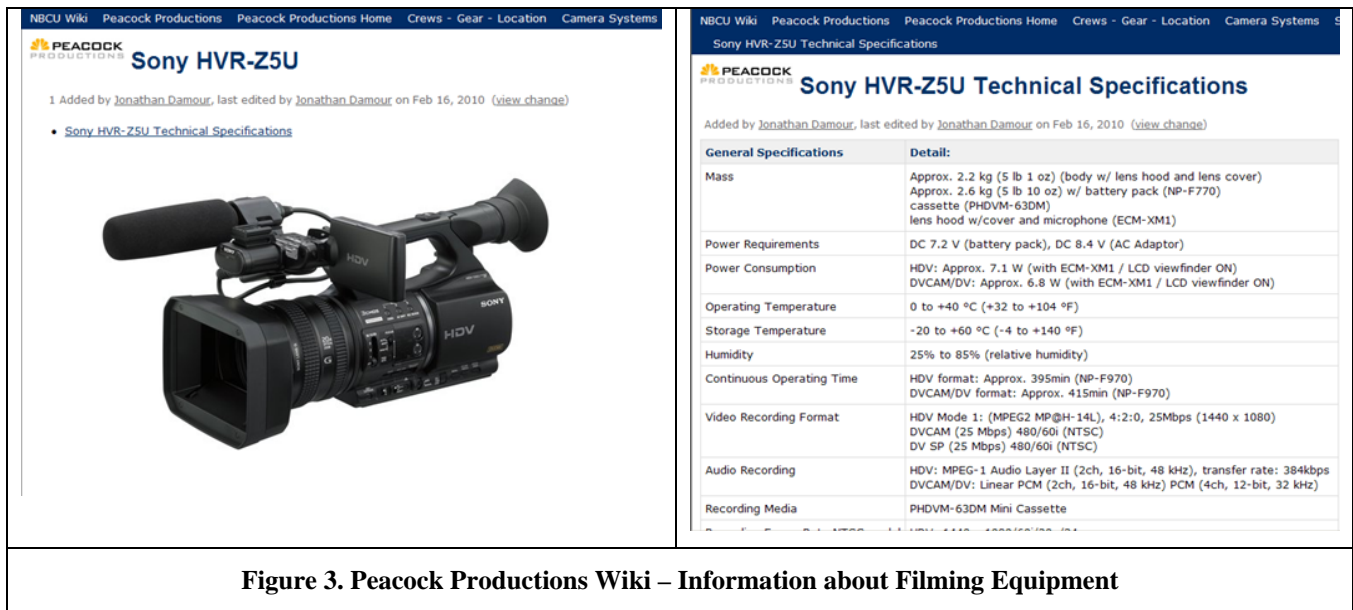


Figure 3. Peacock Productions Wiki – Information about Filming Equipment