

Peeking Over Cubicles: An Ethnographic Approach to Knowledge Management

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Introduction

For the new knowledge manager, the prospect of putting knowledge management theories into practice can be daunting. Different knowledge management schools of thought include various lenses through which knowledge work can be viewed and explained, and there is no unifying paradigm for the design and implementation of knowledge management strategies. The new knowledge manager faces the task of sifting through numerous case studies, models, and frameworks in an attempt answer the question, Where do I begin?

An underrepresented and, some would argue, underappreciated starting point is the knowledge audit. Knowledge audits are the first and most critical step of any knowledge management initiative. This paper outlines the successful ethnographic approach used by an intern from the School of Information and Library Science (SILS) at the University of North Carolina at Chapel Hill to conduct a knowledge audit for a Fortune 500 company, and proposes that this approach can successfully launch knowledge management practices in any organization.

In the literature, surveys and interviews are the standard method for conducting knowledge audits. Moving away from the traditional, this paper argues the effectiveness of a holistic ethnography, specifically participant observation. The case study presented in this paper demonstrates how participant observation was employed to conduct a successful knowledge audit at Company X and shows how the findings were used to develop a more thorough understanding of the individual, departmental, and organizational practices of the company. Finally, the paper discusses the employer benefits of hiring a Library and Information Science (LIS) student to conduct the audit, and provides a basis for further research on the use of LIS interns in the corporate setting.

Literature Review

INTERNSHIPS

Collaborative educational programs between academic institutions and businesses vary widely in their requirements and structure. Many terms are used to describe these programs, such as internships, field experiences, service learning, cooperative education, and experiential

learning. The term “internship” is used as an all-inclusive term in this paper, referring to any relationship between academic institutions and businesses designed to provide learning opportunities for students in an organizational setting.

There is a significant amount of literature on the topic of internships, and most research papers and anecdotal articles tend to include one (or more) of three specific themes: internship program design and implementation, improving the effectiveness of internship programs, and the benefits of internships to stakeholders. Literature on the design and implementation of internship programs typically draws conclusions through one of two methods. One method is to survey current practice within similar departments at other universities. For example, Hindmoor examines internship programs in 20 political science departments, draws comparisons, and makes recommendations based on the findings (2010). Other researchers make recommendations for design and implementation based on surveys given to organizational hosts and interns. Their resulting tips and strategies address issues such as identifying host sites for internships, recruitment of students, organizational host and student obligations, faculty supervision, and evaluation of outcomes (Shoenfelt et al. 2012; Thiel and Hartley 1997). However, few studies focus solely on design and implementation. Much of the discussion on this theme is an outcome of research that focuses on student perception of internship effectiveness.

The effectiveness of internship programs is almost always viewed through the lens of student perception. Student perception is usually obtained via questionnaire, either before and after an internship experience or simply post-internship. The foremost goal of these studies is to identify areas of improvement for one’s own program and share the findings with similar institutions (Renganathan et al. 2011; Jaarsma et al. 2009). However, in order to contribute something new to existing literature, each study addresses a different aspect of student perception. Peters et al. find that internship programs are perceived as more multi-cultural than academic programs (2011), while Green et al. demonstrate the values that students place on specific hiring traits and how these values change after an internship (2011). Other studies compare student perceptions and expectations with those of the site supervisor in an attempt to improve the effectiveness of an internship experience (Daugherty 2011; Rothman 2007). While there is plenty of research on internship design and effectiveness, the bulk of the literature focuses on the benefits of an internship program.

The literature shows that there are three groups that benefit from internships: universities, students, and employers (Gault et al. 2000). There is less literature on the benefits gained by universities than the other two groups, and the little research there is tends to be anecdotal. Weible addresses this gap in the research and finds that while universities with internship programs gain a stronger connection with the community and improved reputation, only a small percentage are receiving the full potential benefit that participation in these programs can offer (2009). Unlike the lack of attention the universities receive, the amount of research on the benefit of internships to students is exhaustive. The most commonly cited value is that internships provide an opportunity for the practical application of theory obtained in the classroom. A sampling of other student benefits includes:

- Improved analytical and/or interpersonal skills (Coco 2000; Randolph 2008; Shoenfelt et al. 2013)
- Higher starting salaries (Coco 2000; Gault et al. 2000, 2010)

- More job offers (Coco 2000; Gault et al. 2010)
- Less time to obtain first job (Gault et al. 2000; Thiel and Hartley 1997)
- Greater overall job satisfaction (Gault et al. 2000)
- Improved entrepreneurial skills (Varghese et al. 2012)
- Better preparation for occupational subcultures (Shoenfelt et al. 2013; Stanton et al. 2006)
- Increased marketability/employability (Gault et al. 2010; Shoenfelt et al. 2013)
- Developing cross-cultural collaboration management skills (Randolph 2008; Saviz et al. 2012)

If the benefits of internship programs to students and universities are on opposite ends of the research spectrum, one being supported by case studies and in-depth research and the other being mostly anecdotal, the discussion of the benefit to the employer falls somewhere in the middle. In the anecdotal articles, employers report the advantages they have gained by hosting interns such as cost-effective labor, reduction of workload, the ability to pre-screen potential employees and attract top students, etc. The few research articles on this topic report the same findings; however, these findings are not the primary aim of the research. Knemeyer and Murphy survey students and employers on the perceived benefits of internships as a way to highlight the differences between the two groups and argue for implementing a formal expectations process between prospective employers and interns (2002). The fact that employer's perceptions of internships have been underestimated was the basis for research that shows that regularly collecting feedback from employers can increase program effectiveness and improve collaboration with educational institutions (Virolainen et al. 2011). It is clear from a review of the literature that further research is needed on the employer benefits of participating in internship programs.

The themes of design, effectiveness, and benefits are visible throughout the literature on internships, regardless of academic discipline. The research outlined above covers internship programs in departments such as political science, business, psychology, engineering, and veterinary medicine. However, when one targets research in a specific discipline, the studies become unique—reflecting the values, needs, and structure of that particular profession. This is especially true for literature on internships in the field of library and information science.

In a study of over 50 LIS schools, Howden finds that there is little standardization in the design and implementation of internship programs (1992). Based on these findings, the researcher recommends that internships become a requirement in LIS curriculum, as field experience is an important formative element in the process of entering a profession with so many specialties (Howden 1992). Albertson and Whitaker also follow this design theme by creating a framework for developing technology literacy projects, as a way to provide practical experience to LIS students while benefitting community members (2011). Like other disciplines, the bulk of the literature on LIS internships focuses on the stakeholder benefits of participating in internship programs. While the fundamental benefits remain the same, improving skills and increasing experience, there are more nuanced advantages depending on the setting. Internships in universities allow students to team up with academic librarians, a collaboration that benefits both parties. Students gain valuable research experience for their curriculum vitae, while the librarian receives motivation for completing the research project in a timely manner (Berg et al.

2009). In addition, academic library internships provide students with experience working on subject-based teams and help reduce the librarian's workload (Sargent et al. 2011). Research has also been conducted on internships in public libraries. In addition to previously discussed benefits, students working in public libraries have an opportunity to work with diverse populations and give back to the community. (Bell 2007; Brzozowski et al. 2012). By focusing on specific library settings, the gaps in the LIS literature become more apparent, such as the lack of research on LIS internships in the corporate setting.

One major purpose of this paper is to address these gaps in the literature. This research focuses on LIS internships in the corporate setting and the benefits to the host organization. In addition to examining general employer benefits, this research will also highlight the specific advantages of hiring LIS students to conduct knowledge audits.

THE KNOWLEDGE AUDIT

There is no standard definition for a knowledge audit. Every new case study or reference in the literature puts a new spin on the meaning or objectives of a knowledge audit. In addition, the knowledge audit can be easily confused with the information audit. "Knowledge audit" is the preferred phrase in LIS literature, but due to a lack of distinction in both LIS and business literature, the words 'knowledge' and 'information' can be used interchangeably without effecting the meaning, as both information and knowledge audits seek to describe and track resources that have the potential to add value to an organization. Griffiths notes the intersection of these two words when he writes:

Certainly, a knowledge audit would record tacit resources such as know-how and experience among the organization's staff, but it would also encompass printed resources purchased externally that would be counted as information assets in an information audit (2010, 221)

The only point of agreement in the literature is that knowledge audits are the first and most critical step of any knowledge management initiative (Debenham and Clark 1994; Levy et al. 2010; Liebowitz et al. 2000; Perez-Soltero et al. 2009; Wang and Xiao 2009). This paper uses the broad definition of knowledge audit outlined by Mertins et al., which states that the purpose of a knowledge audit is to investigate business processes in an organization aiming at the following objectives:

- Uncovering strengths and weaknesses within the actual management of corporate knowledge;
- analyzing circumstances, barriers, and enablers for knowledge management;
- increasing awareness for knowledge management within the company;
- designing a roadmap for future knowledge management efforts;
- and collecting measurable data for the controlling of knowledge management (2003, 46-47).

After meeting these objectives, the findings are typically presented to appropriate stakeholders in the organization. Visualization of the results in the form of knowledge maps, charts, and

diagrams often accompany this report (Burnett et al. 2004; Debenham and Clark 1994; Moulton 2008).

The methods for conducting a knowledge audit are as varied as the definitions. Some methods are comprehensive, whereas others emphasize where knowledge is stored or focus on the effective flow and use of knowledge within the organization. There is no universal approach, so the practitioner is faced with sifting through the numerous tools, techniques, frameworks, and models offered in the literature. Buchanan and Gibb highlight this issue when they write:

While it can be debated as to whether or not a standard approach is required, the lack of an agreed methodological approach does make methodology selection a little haphazard, particularly given that there is also limited empirical evidence regarding usability of existing methods (2007, 161).

The most common approach in the literature is the framework. The framework consists of a series of phases or steps required to meet the objectives of a knowledge audit (Burnett et al. 2004; Levy et al. 2010; Liebowitz et al. 2000; Moulton 2008). Other researchers have surveyed existing frameworks, identifying commonalities and forming best practices, in order to create a meta-framework (Mertins et al. 2003; Wang and Xiao 2009). Less common approaches employ technology to conduct the knowledge audit. For example, Perez-Soltero et al. implement an ontology through a computer prototype (PROTO-KA) to facilitate the knowledge audit process (2009). Despite having a unique emphasis and approach to the knowledge audit, every framework and tool takes the same basic method of data collection: surveys and interviews.

In this paper, the term 'survey' is used synonymously with 'questionnaire,' and the word 'interview' is all-inclusive, regardless of whether it was conducted on an individual or group basis or whether it was standardized or informal. Depending on the particular approach, the format and sampling preference of these surveys and interviews will vary, but in current literature on information and knowledge audits, data is typically collected using both tools. The rationale for using both surveys and interviews is that these two research methods provide a quantitative and qualitative comparison, respectively, when analyzing the results, thus increasing validity and reliability (Blomberg 2003; Mertins et al. 2003). It is interesting to note that observation is not a research method associated with information and knowledge audits. Speculation on the reasons for this decision by audit practitioners and the effects of incorporating observation into the data collection process will be discussed in the following section.

In addition to researching the employer benefits of hiring LIS students to conduct knowledge audits, the other purpose of this paper is to demonstrate the advantage of employing a comprehensive ethnography throughout the knowledge audit process.

Why Observation?

In knowledge audit literature, the conventional method for data collection is surveys. This is not surprising as survey research is a frequently used mode of observation in the social sciences. There are several cited reasons for this reliance on surveys, including the ability to

describe a population too large to observe directly, the potential for standardization is good for measurement, and careful probability sampling provides a group of respondents whose characteristics may be taken to reflect those of the larger population (Babbie 2010).

Interviews are the other established data collection method for knowledge audits. Pairing interviews with surveys allows auditors to triangulate their data through a comparison of the results acquired from both quantitative and qualitative methods. In addition, with the fast-paced nature of the corporate environment, the interview and survey methodological approach offers an efficient and rapid way of assessing an organization. However, while this approach increases reliability, it does so at the cost of validity (Babbie 2010). This paper argues that in order to increase the effectiveness of a knowledge audit, the organization must employ a holistic ethnography, specifically utilizing participant observation.

The method of participant observation is when “the researcher takes part in the daily activities, rituals, interactions, and events of a group of people as one of the means of learning the explicit and tacit aspects of their life and their culture” (Gluesing 2013, 24). This involves spending time with employees in their work setting, observing them as they do their work, analyzing artifacts they use, and interviewing them throughout the observation. Interviews during observation can extend and deepen the researcher’s understanding of what has been observed (Blomberg et al. 2003). The advantages of employing participant observation in a knowledge audit are as follows:

- **Effective for studying subtle nuances in attitudes, behaviors, and social processes:** One reason that managing knowledge is difficult is because it relies so heavily on people, and understanding their complex social relationships. Participant observation allows auditors to immerse themselves in the participant’s work life and capture a snapshot of an extremely dynamic and complex environment, as “people are not often aware of their actual behavior because it’s so habitual. Such tacit knowledge is often not easily accessible through interview” (Blomberg et al. 2003, 969).
- **Provides maximum flexibility:** “One of the greatest strengths of ethnography is its flexible research design. The study takes shape as the work proceeds” (Nardi 1997, 361). This flexibility is especially important in the knowledge audit, as it allows the auditor to adapt his research as he discovers potential areas for knowledge innovation.
- **Eliminates discrepancy between verbal report and behavior:** “Anthropologists and other social scientists have long recognized that what people say and what people do can vary significantly, making reliance on surveys, focus groups, and interviews insufficient for the task at hand” (Blomberg et al. 2003, 965). Surveys and interviews are susceptible to the limitations of human memory, and to participants who are concerned with their image or who may attempt to please the researcher by responding in a certain way. Participant observation allows auditors to view of activities as they occur in their everyday setting from the point of view of study participants.
- **Relatively inexpensive:** All participant observation requires is a pencil and notepad.

The remaining sections of this paper describe a case study where the method of participant observation was used in conducting a knowledge audit in a Fortune 500 company. This study will not only demonstrate the advantages listed above, but also numerous others discovered during the course of the audit.

Case Study

BACKGROUND

In fall 2011, a Fortune 500 American manufacturing company (Company X) requested help from the School of Information and Library Science at the University of North Carolina at Chapel Hill to implement a large-scale knowledge management program.

Founded over 150 years ago, Company X is a global leader in several major business sectors. Given the unique nature of each business sector, the company naturally organized itself into subdivisions for each sector. However, over time, these divisions of the company drifted apart, both geographically and administratively. Disconnected, each of these divisions has developed their own methods for organizing and sharing information and knowledge.

The envoys from Company X were a team of departmental managers from the most customer-facing division in the company. Like the rest of the company, this division has a strong research and design component, but the nature of its particular product line requires providing external customers with general and technical call center support. Given the amount of information and knowledge flowing through these call centers, the departmental managers recognized they had a problem managing information and knowledge. Some of the issues they noted included knowledge duplication (“reinventing the wheel”), having little awareness of the knowledge available in the organization, and not knowing where to locate appropriate information and knowledge when responding to customers.

Seeking help from SILS was not Company X’s first attempt to address these problems; the departmental managers had employed professional knowledge management consultants in the past with little success. According to the management team, the consultants had only conducted a brief surface-level analysis of the organization before recommending an expensive knowledge management solution. The managers were skeptical of these costly recommendations, so they decided to collaborate with the local experts at SILS. After deliberation, both parties decided that the best solution was for Company X to hire a second-year graduate student for a twelve-week internship, in which this new knowledge manager would be tasked with designing a five-year knowledge management strategy.

The management team from Company X was led by an individual who had been with the company for decades and who had a personal passion for knowledge management. This individual was chosen to be the site supervisor of the SILS intern. During the hiring process, the site supervisor elaborated on the desire for a formal knowledge management strategy, stating that the division was seeking an evaluation of knowledge practices, recommendations for improvement, and justification for the purchase of a major knowledge management solution (e.g. eGain or InQuira).

RESEARCH DESIGN

The first step of the research design process was to carry out a comprehensive literature review of relevant material in order to develop an understanding of best practices. After sifting through numerous textbooks, articles, and case studies, the intern (henceforth referred to as the auditor) realized that what Company X required was a knowledge audit. Once this approach was established, the site supervisor and intern created a knowledge audit plan. The scope of the audit was the entire host division over a period of 12 weeks. The departments within the host division include Customer Care, Applications Engineering, Technical Support Line/Field Engineering, Project Engineering, Outside Plant Engineering, Product Line Management, and Technology. Due to the dynamic and exploratory nature of knowledge audits, no standard level of granularity was established.

The objectives of the knowledge audit were also intentionally broad, allowing the auditor the flexibility to adjust with each new discovery. The objectives of the knowledge audit at Company X were as follows:

- Locate and assess the use of both tacit and explicit knowledge
- Identify and evaluate knowledge culture, assets, infrastructure, processes/flows, barriers, and enablers
- Increase awareness of knowledge work
- Create a five-year knowledge management strategy that includes recommended improvements and strategic initiatives

The one specific goal of the knowledge audit was to determine how to improve the rate of first-call resolution in the division call centers. The Customer Care and Technical Support Line departments are two massive call centers dedicated to providing customer support. “First-call resolution” is the rate by which a call center employee can resolve a customer’s issue on their first call. This rate had plateaued and the site supervisor suspected the reason was knowledge management-related.

DATA COLLECTION

The auditor collected data between July and September 2012, primarily through ethnographic observation of, and informal interviews with, staff at work. The auditor observed 10 Customer Care employees, 4 Technical Support Line staff/Field Engineers, 6 Application Engineers, 3 System Specialists, 9 Product Line Managers, 4 members of the web team, 1 Technology staff member, and 1 retiring Engineering Manager. Most of participants were chosen through a combination of purposive and snowball sampling. For example, in larger departments, such as Customer Care and Technical Support Line/Field Engineering, the auditor chose staff members that would provide the most accurate and precise representation of the population. This was accomplished by observing staff members with varying lengths of employment and levels of responsibility. The auditor also asked each person observed to recommend additional participants. In the smaller departments, such as Application Engineering where each employee has a specialization, the auditor observed everyone in the group.

When collecting data, the auditor observed people in their private workspaces. This made the participants more comfortable, allowed them to reference artifacts that were integral to their

work, and provided cues to help jog their memory because of the familiarity of the workspace. The method used by the auditor was a balance of silent observation (“shadowing”) and participant observation. When shadowing, the auditor asked employees to go about their daily tasks as if the auditor was not there. This was not a problem for the staff, as the demands of their work kept them busy. For example, while observing employees in the call centers, the auditor used a supplemental headset to listen in on every call. When a particular action was completed, the auditor would ask the participants to retrace the process and provide further clarification through a series of probing questions. Casual conversation was also used to collect data in this process. The auditor sought to establish and maintain good rapport with participants, not only for the insightful information that comes when social barriers are lowered, but also to increase awareness of knowledge work within the company. When he was with participants, the auditor sought every opportunity to demonstrate the value of knowledge work and gain ground-level support for knowledge initiatives.

During observation, the auditor made detailed notes of participant interactions with people, technologies, processes, and artifacts. In addition to taking extensive notes, the auditor also requested copies of knowledge artifacts for later analysis. For example, when concluding an observation, the auditor typically compiled a combination of screenshots, e-mails, Post-its, and documents. The auditor also made note of any reference material used, such as product catalogs and specification sheets. When observation with a participant ended, the auditor would immediately return to his private workstation in order to assemble the various types of data collected, transcribe his notes, and record any relevant contextual information. Observation of a participant ended when the auditor yielded few new insights. On average, the auditor spent 8 hours with each staff member. However, establishing good rapport with participants allowed the auditor to revisit participants in order to address new findings, clear up misconceptions, or invite them to participate in knowledge initiatives. It was also common for participants to approach the auditor with any additional information they felt was relevant.

DATA ANALYSIS AND VISUALIZATION

The analysis process brought together all the data gathered throughout the audit, including observation notes, interview transcripts, and artifacts for each individual. Collecting such a variety of data enabled the auditor to weave actions, dialogue, and documents into narratives. The auditor then compared the narratives of individuals within the same department, spotting trends and repeating evidence in order to make generalizations and draw useful conclusions about employee knowledge activities. Once the auditor developed an in-depth understanding of knowledge activities within a single department, he then repeated this process, examining knowledge activities between departments and across the division. This process allowed the auditor to build a comprehensive picture of the knowledge environment and culture at Company X.

The data identified where tacit and explicit knowledge was located in the division, where it was needed, and how it was used. Rather than trying to convey the knowledge flow in text, the auditor took every opportunity to visualize the data. Based on the auditor’s experience and the site supervisor’s preference, the auditor created Unified Modeling Language (UML)

activity diagrams to illustrate knowledge sources, flows, and bottlenecks within the division. Activity diagrams “show the conditional logic for the sequence of system activities needed to accomplish a business process” (Hoffer et al. 2002, 696). While demonstrating workflows of stepwise actions and activities, the activity diagram uses columns, also called swim lanes, to represent the organizational unit responsible for certain activities. These diagrams were useful for demonstrating the movement of knowledge throughout the division, showing how knowledge is used within business processes, and what technology, artifacts, or people are involved in each action.

The auditor created 18 activity diagrams. In deciding which workflows to visualize, the auditor chose core business processes, actions that affected the rate of first-call resolution, and activities that highlighted the trends identified in the initial analysis. When each diagram was completed, the auditor verified the workflow with the relevant participants. Not only did this validate the findings, but it kept the lines of communication open with participants and strengthened their investment in knowledge work at Company X. Although creation of the activity diagrams was time-consuming, they were extremely useful in identifying areas of improvement and for delivering the audit results to management.

FINDINGS

The department managers from Company X approached SILS because they had a problem managing information and knowledge. Every employee could identify a few specific issues, but management needed someone to provide the big picture view. The first two objectives of the knowledge audit were designed to meet this need. As a reminder, those objectives were:

- Locate and assess the use of both tacit and explicit knowledge
- Identify and evaluate knowledge culture, assets, infrastructure, processes/flows, barriers, and enablers

The findings listed below demonstrate the success of the knowledge audit in meeting these first two objectives. Due to the large number of findings and the need to preserve the anonymity of Company X, this paper only provides a general overview of the results.

1. Tribal knowledge at every level

The department managers at Company X knew that corporate knowledge was isolated, and assumed that this “tribal knowledge” was a reflection of the geographic and administrative separation of the many divisions within the company. While the managers were correct in their assumption, they did not realize the full extent of this tribalism. On an enterprise level, Company X works in different business sectors. The divisions that support these business sectors function well on their own, but are dysfunctional as contributors to the overall performance of the organization. The knowledge audit revealed that this fracturing increases within each division.

In the host division, the auditor found that tribal knowledge is situated around product lines. Using the Engineering Department as an example, engineers specializing in Product Y have different tribal knowledge than those who support Product Z. The host division also sells

their products in two different markets, further complicating knowledge sharing efforts. As a result, even if two engineers support Product Y, one could work within Market A and the other in Market B. These tribes, while not ineffective on their own, increase the potential for duplicating the efforts of other tribes, or “reinventing the wheel.”

2. Two native languages

Since the host division supports two markets, it developed two different names for each product. This means that within the same physical room, staff members often have difficulty communicating with each other. In addition, customers frequently use a competitor’s term for the same type of product. During data collection, the auditor observed this barrier to knowledge sharing with almost every employee.

“Sometimes people call in with these names I’ve never heard of and it takes forever to try and find out what they mean.” - Customer Care Representative

3. Inefficient use of content solutions

The auditor identified over 17 different content repositories in use within this one division, such as Salesforce.com, SharePoint, Oracle databases, Lotus Notes, SAP, PTC Wind Chill, etc. Very few of these repositories are integrated, and each has its own uniquely inefficient filing system--no naming structures, metadata, or governance. This makes locating information and knowledge incredibly time-consuming and difficult for the staff. For example, the auditor observed an Application Engineer spend 45 minutes resolving a customer issue only to discover that he had resolved the exact same issue two years prior. He found an e-mail in Lotus Notes where he had written the exact same explanation, but he had filed it in a location and under a name he could not remember. In addition, the auditor frequently found different versions of the same document located in different repositories, and discovered that some old repositories were being used solely because employees did not want to learn how to use new technologies.

“I don’t use the E-Catalog. I don’t understand how to search through it so it ends up being a waste of time. The documents may not be as current, but I am more familiar with searching in Lotus Notes.” - Application Engineer

When originally implemented, the content management systems at Company X were viewed as a panacea. This technology-centered approach to information and knowledge management was one of the most damaging discoveries made during the audit. Company X and the host division too often consider information technology infrastructure to be the management system, rather than merely the enabler. New technology is easy to buy, install, justify (investment), and demonstrate, but without proper governance and processes, these technologies fall into misuse. The auditor observed this lack of governance in action with the enterprise-wide implementation of Microsoft SharePoint. The specifics of this example will be shared in the “Improvements and Initiatives” section of this paper.

4. Inability to locate expertise

Another common issue observed by the auditor is the division's inability to connect those with experience and know-how with those who need it. For security reasons, Company X balks at the creation of organization charts and employee profiles, but has offered no alternative to locate expertise. All of the employees feel like they spend a great deal of their day looking for the information and knowledge they need to do their job. Like the previous example, this problem directly affects the rate of first-call resolution. Employees in the call centers often have to end a call and respond to customers later because they do not know the answer to a question and are unable to find someone who does.

"If I don't know what the part number is, I will look in SAP and the product catalogs, otherwise I have no idea who to send it to. I'll just make a guess and send it to someone. If I'm wrong, then hopefully they direct me to the right person. Keeping up with the constantly changing organization structure is a pain. I wish there was a better way" - Technical Support Line

5. Failure to capture critical knowledge

The knowledge audit was most valuable in identifying and prioritizing critical knowledge within the host division. Critical knowledge is knowledge that is valuable and durable enough to offer a sustainable, competitive advantage and justify the costs of retaining, transferring, and storing it (O'Dell and Hubert 2011, 19). While Company X excelled in creating critical knowledge, it often failed to capture it. Part of the issue was identification. It is easy for a major research and development company to identify a patent as a knowledge asset, but what is more difficult to recognize is the value of the processes, people, and relationships critical to obtaining the patent. However, even if Company X was successful in identifying all of its critical knowledge, it had no procedures in place to capture it. For example, Product Line Managers (PLM) in the host division are responsible for production forecasting. The knowledge of how to set production forecasts was identified by the auditor as critical tacit knowledge. Unfortunately, no procedures, best practices, or lessons learned are recorded or transferred. With each PLM supporting different products in different markets, the auditor found that no two forecasting methods were the same and that PLMs often duplicated efforts despite being in the same physical space. In addition, most of the staff observed stated that there is so much movement within the company that by the time someone develops the experience and instincts for forecasting they leave the position and take their knowledge with them.

"Why are there 3 different forecasting efforts taking place? Now, I'm curious to know what other PLMs are doing for their 30/70 forecast." - Product Line Manager

6. Knowledge is walking out the door

During the knowledge audit, the auditor discovered that an engineering manager who had been with Company X for decades was retiring. This discovery prompted further inquiries that revealed that Company X has no knowledge retention strategy or exit interviews of any type for retiring employees. Other engineers realized the potential loss and had created a list of knowledge they needed to capture before the employee left, but the list was amateur and did not differentiate between common and critical knowledge. When the auditor read the list, he adjusted

the audit schedule so that he could observe the retiring employee at work. After two days, the auditor revised the original list, identifying and prioritizing critical tacit and explicit knowledge. For example, at highest risk to the company is the loss of the employee's informal network, the people he seeks out for answers and the strong relationships he builds with customers. The initiative and recommendations for improvement proposed by the auditor to address this issue are discussed in the "Improvements and Initiatives" section of this paper.

7. In-house enablers

The knowledge audit uncovered a few individuals within the host division who had not only recognized the organization's inability to properly manage information and knowledge, but had attempted to provide a solution. One example was the engineer who created a list of knowledge that needed to be captured before his co-worker retired. Another employee was so frustrated by the misuse of software and the lack of content system integration that he built solutions in his off hours. Although these solutions offered improvements on existing systems, he received push-back from the IT department and could not gain buy-in from management. Finally, a manager from the Technology department had been collecting Post-Launch Reviews and lessons learned from innovation projects for two years, but he wasn't sure what to do with this highly critical knowledge, so he simply stored it on his laptop. This was a frightening discovery, as this corporate memory was not being shared and was at risk of being lost forever (should something happen to his laptop). In addition to these individuals, the auditor also identified a few emerging communities of practice. The members of these cross-departmental communities informally met during lunch to share best practices, exchange ideas, and learn from one another. Their existence and potential importance could not be ignored in the knowledge audit because these groups harbor some of the best collective expertise and collaborative work of organizations.

8. Cultural barriers

The previous findings touched on some of the barriers to cultivating a knowledge-sharing culture in the host division. In addition to those discussed above, the auditor observed that most employees feel that their promotion depends upon the expertise they have, and not on the extent to which they help others and share their knowledge. Other barriers observed are that most people do not realize what aspects of their knowledge ought to be shared, or they do not view knowledge creation and sharing as an inherent part of their work. A commonly cited reason for employees' lack of engagement in knowledge work is that they do not have time.

The major reason for these barriers is that executives at Company X have not bought into knowledge work. The disconnected relationship between corporate headquarters and its divisions was obvious to the auditor very early in the knowledge audit process, both in the lack of common infrastructure and miscommunication between these groups. In order to ensure the success of any knowledge management program, it is critical that the host division obtains senior management support. Gaining the attention of senior executives sends a message to the organization that knowledge management is critical to the organization's success. This support not only cultivates a knowledge-oriented culture, but is often accompanied by the funding and resources necessary to ensure knowledge management success.

9. Using outdated resources

One trend in the findings of the knowledge audit is the use of outdated explicit knowledge and information resources. Ninety percent of the Customer Care participants were observed using old print catalogs to answer customer questions, even though updated information was located in the electronic catalog. These print catalogs were familiar resources, often dog-eared and highlighted, so employees were resistant to using new tools. This reliance on outdated print resources put the organization at risk and affected other departments. The website team had difficulty getting the employee feedback they needed to improve usability of the electronic catalog. The website team even tried promotions, where staff would be entered to win an iPad for every 10 synonyms and search terms they provided. Despite a massive marketing campaign, the team reported only one entry after a three-month period.

The auditor also observed employees using outdated explicit knowledge. In one case, an application engineer used a printed product specification sheet to build a list of part numbers for a sales team member. When asked why he preferred the print copy, the engineer retrieved the electronic version to demonstrate why the print was better. During his explanation, the engineer discovered a discrepancy between the print and e-version, indicating that the copy he had been using was outdated.

INITIATIVES AND IMPROVEMENTS

The final two objectives of the knowledge audit were to increase awareness of knowledge work in Company X, and to create a five-year knowledge management strategy that included recommended improvements and strategic initiatives. The auditor increased awareness of knowledge management through conversations with participants during observation, and by including these participants in knowledge initiatives. The strategic initiatives were selected from the list of recommendations that would be included in the final report to management and were chosen based on strategic impact. Additionally, the initiatives were constrained by what the auditor could accomplish before the end of the internship program. This section will describe the knowledge audit reporting, list some of the recommendations made to the host division, and briefly detail two initiatives.

The auditor reported the findings of the knowledge audit three times. First, the auditor met with each participant to validate the findings and recruit participants for initiatives. Next, the auditor compiled results, activity diagrams, and recommendations for each department. With the site supervisor, the auditor gave a presentation to each department manager. On the final day of the internship program, the auditor and site supervisor presented the complete findings and strategy to both department and division management. This final report was designed by the auditor and site supervisor to provide a roadmap and business case for implementing knowledge management over the next 3-5 years.

The report demonstrated value and understanding of Company X's knowledge needs and provided tactical guidance for the effective management of organizational knowledge. The strategy was based on the three elements of knowledge management -- people, process, and technology -- and how effective management of each component would contribute to the mission of Company X. The business case clarified scope, key stakeholders, risks and barriers, where the program funding should come from, which knowledge to focus on, existing tools and technology that can be leveraged, milestones and potential timeline, etc. More importantly, the report gave recommendations for improvements and detailed the initiatives that would kickstart the effort.

The most valuable part of the knowledge audit report for Company X was the recommendations for improvement. Swash writes, "The prime benefit of an audit, however, is not the report or information map itself, but the recommendations for rationalization and improvement that arise out of the analysis of the results" (1997, 314). Due to the weight applied to this portion of the report, the recommendations were validated and supported with evidence to avoid the risk that they would be seen as biased, incomplete, or unfocused. In addition, the site supervisor took the lead on the presentation of these recommendations, as he was an employee with a long tenure and strong reputation. This was advantageous because the site supervisor's opinion is trusted among his peers and it was critical to communicate the need for change in a positive way, as well as in a way that guaranteed senior management support. The following list provides a simplified version of the knowledge audit's recommendations for improvement in order to protect proprietary information and preserve the anonymity of Company X.

- Company X needs to break down knowledge silos. They can do this by fostering the communities of practice identified in the audit. This informal practice connects employees across organizational boundaries and leads to knowledge sharing and transfer that cannot be achieved by technology.
- Capture lessons learned from all projects. Follow the lead of the Technology Manager and capture lessons, experiences, and practices throughout the course of a project. Implement this practice within core business processes and establish effective storage and retrieval of these lessons.
- The 3 Ts: Thesaurus, Taxonomy, and Tagging. Implementing the 3 Ts into existing content repositories will vastly improve the organization and retrieval of information and knowledge.
- Establish consequences for using outdated resources. Within the document revision process, embed a procedure for flagging or removing previous versions. Begin phasing-out resources known to contain outdated information, such as the print catalogs.
- Consolidate content repositories. Begin with repositories, such as the Lotus Notes database, that contain outdated resources and that inhibit the use of more effective tools.
- Company X does not need to buy a new expensive knowledge management tool. The company already has a tool that can meet their needs. With proper governance and by maximizing features, Microsoft SharePoint is a capable knowledge management solution.
- Implement an expertise locator. In addition to tagging capabilities, there are social networking add-ons for both Microsoft SharePoint and Salesforce.com that can improve locating experts within the company.

- In order to stop knowledge from disappearing, elicit knowledge from staff members on a more active basis. In addition, develop a formal retention program with Human Resources that will identify and capture critical knowledge from retiring employees
- Develop a knowledge-sharing culture. Encourage departmental managers to participate in knowledge work, lead the change by example, and incentivize their employees to engage in knowledge activities.
- Hire librarians. Specifically, hire a knowledge manager to lead knowledge activities within the host division, and eventually enterprise-wide. Provide this knowledge manager with a team. Ideally, someone from IT who can traverse IT boundaries, as well as the in-house enablers identified during the audit.
- Conduct a pilot initiative. Choose a small initiative that you can measure for success, such as improving the rate of first-call resolution in the call centers.

The flexibility of the knowledge audit approach used at Company X allowed the auditor to adjust to new findings and start knowledge management projects while conducting the audit. The following are two example projects led by the auditor.

1. Knowledge Retention

When the auditor was informed of the retiring engineering manager, he adjusted the audit schedule to accommodate observation of this employee. The auditor observed the engineer at work for two days, identifying expertise, assessing risk of losing critical knowledge, and noting behavior characteristics. After observation, the auditor spent a day compiling data. This data was presented to the site supervisor and together they agreed that, with the engineer’s impending retirement, action needed to be taken. Since the auditor had little experience designing knowledge retention programs, he consulted the literature and created a guiding template (see Figure 1).

Figure 1

| Program Design |
|--|
| <ol style="list-style-type: none"> 1. Identify experts in which knowledge retention is to take place. Assess risk of losing critical knowledge and skills. 2. Prepare a list of what is to be retained and what will be discarded. <ol style="list-style-type: none"> a. Prioritize the knowledge to be transferred and define a specific scope. b. For each knowledge subject marked for retention, a description should be added regarding the reason this knowledge is important. The reason should take into consideration alternatives for the knowledge (does it exist somewhere else in the dept. /organization? Can it easily be re-developed or purchased?). c. Focus on knowledge relating to business-critical areas of proficiency, business critical relationships and networks, lessons learned, best practices, tips and recommendations, etc. 3. Create a customized methodology to harvest or transfer critical operational knowledge. <ol style="list-style-type: none"> a. This refers to explicit and tacit knowledge that is only possessed by the retiring employee |

- i. Gather and organize explicit knowledge and store it in a shared location.
 - ii. Document unwritten/tacit knowledge. There are many methods for capturing this knowledge: Job shadowing, communities of practice, process documentation, critical incident interviews or questionnaires, expert systems, job aids, storyboards, mentoring programs, education and training, storytelling, after action reviews (more for capturing knowledge of the present, rather than events or processes in the past), information exchanges, best practice studies, meetings, wikis, blogs, video-taped interviews, do's and don'ts tutorials (webcasts), knowledge fairs, etc.
 - iii. Retain future access to the employee. This is a short-term intervention. Expert will quickly begin to lose access to up-to-date knowledge, and his knowledge will go out of date.
4. Integrate knowledge into current processes of work and into existing repository.
 5. Assess the program.

The retiring engineer's co-workers accomplished the first step for the auditor. They had also created a list of knowledge they wished to capture before the engineer left. As stated in the "Findings" section of this paper, with the data collected from observation, the auditor revised the original list, identifying and prioritizing critical tacit and explicit knowledge. For example, a high-value asset was the employee's informal network, the people he sought out for answers and the strong relationships he built with customers. In order to capture this knowledge, the retiring engineer would take his replacement with him during field work and when he attended conferences and met with customers in order to transfer his contacts and reputation.

Other critical knowledge identified was the engineer's lessons learned on specific projects in the field. In order to capture this tacit knowledge, the auditor had to consider the engineer's behavior. The engineer was fast-paced, a natural trainer/instructor, engaging, straight to the point, and fueled by face-to-face interaction. He was not the type to sit down and document his lessons in a blog or wiki. Taking this behavior into consideration, the auditor and site supervisor decided to make a series of videos in the style of TED Talks and host them on the company intranet site. Using the list of critical knowledge previously created, the auditor chose high priority topics and had a close co-worker of the engineer write down some detailed questions they wanted answered. The idea was to interview him in a room with a whiteboard and products, and videotape it. Each video would be 5-10 minutes maximum and the site supervisor would film a new video every 1-2 weeks. After distributing the videos on the intranet site, they would be tagged and stored in SharePoint. When the auditor left the internship program, the first Company X Talk was scheduled for filming and everyone in the engineering department was excited.

2. Thesaurus, Taxonomy, and Tagging.

The most valuable recommendation made in the knowledge report was to conduct a pilot initiative. The host division at Company X needed a small success they could measure that would justify future knowledge efforts. In addition, the initiative needed to be aligned with Company X's goals and values. Davenport and Prusak note, "In knowledge management, it's important to start small, actually accomplish something, and then trumpet what's been achieved" (1998, 164). For these reasons, the auditor and site supervisor decided to improve the rate of first-call resolution in the call centers by implementing Managed Metadata in Microsoft SharePoint. Managed Metadata is an add-on that allows administrators to create controlled vocabularies, define synonyms, and build taxonomies. The major benefit of this tool is the improved organization and retrieval of content. Additional benefits include: exporting vocabularies to create a corporate thesaurus, enhanced site navigation, and the ability to leverage analytics. By continuously improving search results, with the help of analytics, staff in the call centers would be able to locate knowledge more quickly and efficiently. The use of a thesaurus would also save on the time spent trying to translate different tribal languages. These improvements would increase the rate of first-call resolution and demonstrate cost-savings to senior management.

Six months prior to the auditor's arrival at Company X, Microsoft SharePoint was implemented across the company. The IT department stripped the tool to its basic functions and released it to employees throughout the company. Early in the knowledge audit, the auditor discovered that different departments throughout the organization were creating custom sites with no consistency in design, structure, or use. The site supervisor addressed this lack of governance by pushing for the formation of a team within the division that would reverse the damage done and prevent further silos of information and knowledge. When the decision was made to implement Managed Metadata, the site supervisor contacted the IT department for access. The IT department informed the site supervisor that, although they had already purchased this add-on, they required \$6,000 and a business case to allow access. While the site supervisor worked on acquiring funds, the auditor began the process of building the taxonomy.

While the auditor had the skillset to build the taxonomy, he needed the expertise and experience of Company X employees. At this point in the audit, most of the observation was completed, so the auditor revisited participants and invited them to join the project. The final team consisted of employees from every department, product line, and market. The first step in the creation of the taxonomy was to educate the staff on the purpose and benefits of Managed Metadata. This was accomplished by teaching an hour-long class titled, "What Is Managed Metadata and Why Should I Care?" After the staff felt comfortable with the subject matter, the auditor began hosting small "brain-dump" sessions where team members would help construct the hierarchy and define synonyms. Having observed the web team's difficulty in obtaining synonyms for the website, the auditor invited members of the web team to sit in on these sessions and collaborate. When the internship ended, the auditor had created most of the taxonomy,

funding was secured, and Managed Metadata was scheduled to be activated. The final step was to train the site supervisor in how to finish the taxonomy and upload it to SharePoint.

Discussion

ETHNOGRAPHIC APPROACH TO THE KNOWLEDGE AUDIT

This paper argues that in order to increase the effectiveness of a knowledge audit, an organization should employ a holistic ethnography, specifically participant observation. The knowledge audit is the beginning of a larger ongoing process, so it is vital for an organization to have a comprehensive and in-depth understanding of its knowledge assets and activity, prior to program implementation. The strength of ethnography, as compared to traditional methods of data collection, lies in its validity. Unlike surveys and interviews, participant observation eliminates the potential discrepancy between what a participant tells the auditor and what they actually do. The auditor was not only able to validate what he observed with what he was told, but often made discoveries that would not have been uncovered in a survey or interview. For example, the auditor observed engineers using physical products to help solve customer problems. When the auditor reported these products as a source of knowledge, and recommended increasing the amount of physical products available to Technical Support Line staff, the engineers admitted that they never would have thought of their products as a knowledge tool. These tacit habits and behaviors provided valuable context and information on knowledge activities at Company X, and was especially important considering that the implementation of knowledge management requires changes in both organizational and personal behavior.

Another major benefit of ethnography is its flexibility. Nardi notes this benefit when she writes, "A researcher may study a focused area of interest as set forth in the original study design but, unlike an experiment, interesting material can and should be explored when it is encountered" (1997, 362). Nowhere is this flexibility more appropriate than in knowledge work. The audit process at Company X was as dynamic as the individuals and corporation audited, and due to this flexibility, the auditor was not only able to adjust to new discoveries, but act on them as well. From readjusting the audit schedule to observe a retiring engineer, to initiating a pilot program in the call centers, this flexibility allowed the auditor to maximize the time he spent at Company X. The auditor's work on the pilot initiative also demonstrates the usefulness of ethnography in designing knowledge management solutions.

The research of Bonnie Nardi and Jeanette Blomberg has shown the value of ethnographic work on the design and evaluation of technologies. The ethnographer can ensure that products are easy to use, meet user needs, and provide the user's perspective throughout the design process (Blomberg et al. 2003; Nardi 1997). During the initiative to implement Managed Metadata in Microsoft SharePoint, the auditor and site supervisor used the narratives created from audit observations to make sure that the functionality of the software aligned with user needs and behavior. The audit findings were also used to improve the usability of other tools critical to knowledge retrieval, such as the intranet. By tailoring these knowledge solutions to the needs of call center staff, the auditor was able to improve the effectiveness of information and knowledge retrieval and increase the rate of first-call resolution.

In addition to providing increased validity and flexibility, contextual and behavioral information, and the user perspective in the design of knowledge solutions, ethnography is a universal approach. Although different organizations hold different types of knowledge and carry out different types of processes, this paper provides a knowledge audit method that can be used in any organization. The ethnographic approach frees the new knowledge manager from the burden of finding a suitable framework or model within the massive library of knowledge management literature. Additionally, participant observation is a relatively inexpensive approach. The cost of conducting the successful knowledge audit at Company X included the auditor's time and the time of other personnel supporting the process. For the price of hosting an LIS intern, the return on investment was high.

LIS INTERNSHIPS IN CORPORATIONS

Although the primary focus of this paper is arguing the effectiveness of the ethnographic approach in knowledge audits, Company X also benefitted from hiring an LIS intern to conduct the audit. As noted earlier in the paper, prior to collaborating with SILS, the host division initially hired professional consultants to perform a knowledge audit. These consultants only conducted a brief survey of knowledge activities in the division before recommending the purchase of an expensive knowledge management solution. Due to the expenses incurred in hiring the professional consultant, the decision to employ an intern from SILS was both cost-efficient and practical, as Company X has an established summer internship program.

Upon completion of the internship program, every manager who worked with an intern is required to submit a performance evaluation that includes questions about what benefits, if any, were gained by hiring the student, and the effect of the student's subject expertise on business. The results of this evaluation are then shared with the student in a meeting with their site supervisor. Since the SILS intern conducted a division-wide audit and interacted with managers of every department, the evaluation results provide valuable insight into the employer benefits of hiring LIS interns.

When asked how Company X benefitted from hiring the intern, the most common answers were "cost-effective" and "helps reduce workload." One manager wrote, "Interns like [the auditor] are a bargain when compared to paying a full salary. The [Company X] internship program is extremely helpful; we often tackle projects we might not get to otherwise." This is not a surprising response as Company X was experiencing a hiring freeze at the time the knowledge audit was performed. Also noted in the evaluation was that the internship program provides managers with a way to recruit top students, and screen potential new hires. The intern was told that, were it not for the hiring freeze, the managers would have taken his recommendation and hired him in a knowledge management role. The reasons they gave included the success of the knowledge audit, the intern's ability to adopt the corporate culture, and that because of the audit, the intern now had the best understanding of division operations. A final comment worth mentioning was that hiring the intern was a "way to develop and maintain relations with SILS and the University of North Carolina at Chapel Hill." Even though Company X was unable to hire the intern, they expressed interest in continuing their collaboration with

SILS and asked the intern to help facilitate the process of hiring a new student the following year.

In the next section of the evaluation, the departmental managers addressed the advantages of hiring a LIS student at Company X. Many of the responses focused on the unique skills of library and information professionals. Examples include:

“Library students have the expertise to develop best practices around the management of information and knowledge.”

“The intern possesses a highly sought after skill set in industry right now. Organizations, like ours, are struggling to manage the ever-increasing deluge of information we create and receive.”

“[The auditor] has practical and theoretical training in a variety of areas such as systems-analysis, data visualization, instruction, and connecting people with information and technology. Each of these disciplines is valued by [Company X].”

Other responses focused on the knowledge audit, specifically comparing the difference between the professional consultant and the intern. For example, one manager wrote, “We needed an external auditor; someone who could provide an objective view, and didn’t know the people or politics involved. Both the intern and the consultant were external, but the consultant had knowledge that he kept closer to himself (for fear that we wouldn’t need him), whereas the intern really wanted to help and more readily integrated into the team atmosphere.” It is clear from this response, and the others outlined above, that the departmental managers at Company X recognize the value of hiring LIS students as interns.

While these evaluation responses are contextual and cannot be generalized, they demonstrate the increasing realization in major organizations around the globe that the unique skill set of library and information professionals is more relevant than ever before. However, in difficult economic times, hiring a librarian or consultant is not always an option. The findings presented in this paper show that hiring an LIS intern is an economical way to assess the knowledge environment of an organization, implement knowledge initiatives, and develop a strategy for future knowledge efforts. The bottom line? The next time you have information or knowledge management needs, contact your local library school.

LIMITATIONS

Like all research methods, ethnography has its limitations. The obvious limitation is the potential for bias. In observation, bias can occur within the participant and the ethnographer. Factors that influence participants include their background, whether or not they worked in other organizations or other departments of Company X, their role within the department, as well as the length of time employed. The auditor tried to overcome this limitation by selecting participants with varying lengths of employment and levels of responsibility, or observing all staff members within a department when possible. Throughout the audit process, the auditor also

remained aware of his own potential biases and mitigated effects of these biases whenever possible. When the auditor observed and interviewed staff, he tried to remain as objective as possible. It also helped that he was unfamiliar with the people, history, and politics of the subjects.

Another limitation of ethnography is reliability. Although the researcher maintains that the ethnographic approach to the knowledge audit outlined in the paper can be successfully employed in any organization, there are many factors that can impede an audit. For example, the level of staff and leadership cooperation, the abilities of the auditor, and time spent in the field. Two audits conducted in the same organization have the potential to yield slightly different results. Coding the data collected or introducing additional inquiry using survey research would help triangulate the data and increase reliability. Nardi notes,

In many corporate settings, it is useful to follow an ethnographic study with a quantitative study focusing on particular questions for which statistically sound predictions can be made. The qualitative research brings to life crucial areas of interest that should be pursued, avoiding the expensive (and futile!) 'fishing expedition' approach of large unfocused quantitative studies. A good qualitative study provides 'ecological validity' to a quantitative study, giving wider latitude for interpreting numerical data" (1997, 362).

Since the knowledge audit was constrained by the timeline of the internship program, the auditor did not have time to conduct a supplemental quantitative study. Nevertheless, this provides a basis for future research.

The internship evaluation results prompt another area for future research. There is a gap in internship literature for exploring the benefits of LIS interns in the corporate setting. Although contextual and not generalizable, the benefits described in this paper can be used in the creation of a larger study, one that surveys corporations who hire interns from one particular library program, or across multiple library schools.

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