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Information Literacy in the Workplace: A Cross-cultural Perspective

職場的資訊素養：跨文化觀點

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【Abstract】

This cross-cultural study has two main purposes: to investigate how information literacy is perceived in the workplace and to discover how employees obtain information to carry out their jobs in an effective and timely fashion. This project applies a mix of research methods, including site visits, interviews, and a survey. More than 120 participants from forty companies were involved in this study. They were from a wide variety of industries in Taiwan and Silicon Valley, in Northern California, where many companies base offices or operations from around the world. Major obstacles in conducting cross-continent research are cost, time demands, scheduling, and adaptation to local culture. In this global economy, cross-cultural and cross-border research will help educators, such as librarians, understand the complexity of skills expected in the workplace. Much has been written on information literacy, yet very few can relate how information literacy is applied in the workplace. This primary study sheds some light to help academic librarians reposition themselves as researchers-educators integral to student success.

【摘要】

本論文為一跨文化性的研究，具有兩個主要目的：一是探討在職場中對於資訊素養的認知；二是探討員工如何及時有效的獲取和應用資訊來執行自己的任務。本研究採用混合式研究方法，包括實地考察、訪談和問卷調查。研究對象來自北加州矽谷和臺灣 40 家企業的 120 多名員工，他們分別從事不同行業。其中許多世界級的跨國企業選擇矽谷或臺灣作為公司總部或世界營運樞紐。進行跨洲研究的主要阻礙包括經費、時間、行程安排與適應當地的文化。跨文化和跨國界的研究將有助於教育工作者，如圖書館員，了解職場上所需技能的複雜性。目前已出版許多關於資訊素養的文獻，僅少涉及職場上資訊素養的應用。由於學

術圖書館員在學生的學習過程中扮演不可或缺的角色，此初步研究，可幫助學術圖書館員重新為自己定位。

Introduction

Do you know the cost of not finding the right information at the right time? This cross-cultural study aims to find out how information literacy is perceived and to discover how employees obtain information in order to carry out their jobs effectively and in a timely fashion. More than 120 participants from 42 companies or organizations were involved in this research. They were from a wide variety of industries in Taiwan and Silicon Valley, in Northern California, where many companies base offices or operations from around the world. Thirty managers or line workers were interviewed in-person on their views of information literacy and its impact.

According to the American Association of College and Research Libraries (ALA, 2001), an information-literate person should know when information is needed, where and how to access the needed information, how to evaluate the information, and how to use the information legally and ethically. This sets the foundation for this research because information literacy forms the base for lifelong learning.

The findings revealed the universal need for information literacy in the workplace. Although training may be available, there is no handholding on the job; therefore lifelong learning skills are essential. While the concept of using information legally and ethically may be perceived differently in Western and Eastern cultures, most respondents ranked high on the importance of citing the original source. The majority of the respondents believed information retrieved from the Internet is reliable. Email is not just the most used means of communication, but also the most effective way to disseminate information. Most of the respondents had experience working with a librarian in college and continued to use libraries for their information needs.

Why Is Information Literacy Chosen? What are the Economic Factors/Impacts, and Values of Information Literacy?

In the last decade of the 20th century, information technologies evolved exponentially, forever changing the way we do business. This trend continues to explode in the first part of the 21st century, as Internet changes the way we live, work, and communicate. In a highly competitive global environment, the ability to find the most relevant information to support a worker's daily job functions becomes critical. Much research has focused on the economic impact of not finding the right information at the right time. An International Data Corporation (IDC) article released in 2001 revealed that this delay could cost a Fortune 500 company $5.3 million a year in the United States (Feldman & Sherman, 2001). Another study showed that small- and medium-sized businesses in the United Kingdom wasted over £3.7 billion because of inefficient use of the Internet as a research tool (Saulles, 2007).

In order to excel in this highly competitive world, college students need not just study effectively in their disciplinary area, but also learn and polish the skills that will help them obtain the right information at the right time. These skills are known as information literacy. Librarians have been working with professors to help teach students in this regard for decades. This partnership has been documented or studied by both librarians and professors. Many of those partnerships have proven to be successful, demonstrating that librarians provide added value to students' academic success.

This study will investigate how information literacy is perceived and how workers incorporate information literacy into their work lives to help perform their daily tasks in a timely fashion. The results will help academic librarians better focus information literacy instruction for college students. It will also uncover insights into how employees obtain information in order to carry

out their jobs effectively. Because of the economic implications, it is critical for employees who need information to execute their duties effectively, as illustrated in IDC's and Saulles' studies.

In this fast-paced global era, information is created at the speed of light around the world, around the clock. In many countries, children learn to use a computer or an electronic device, such as a smartphone, to access the World Wide Web (WWW) before they start formal schooling. Studies (Herring, 2001; Dewald, 2005) show that even teaching professionals equate the ability to access the WWW with the competency to find the right information. They also believe that students should already know how to use the library effectively by the time they reach college (Thomas, 1994). Hence, it is crucial for librarians as educators to ensure students are taught adequately so they will be able to evaluate and use the right information to complete their schoolwork. They need to become lifelong learners in order to meet the challenges in their workplaces in an increasingly competitive world. It is also essential that all educators, including librarians, K-12 teachers, and college professors, collaborate to advocate and teach the importance of information literacy.

Although this study may be influenced by the author's background as a business librarian in an academic library, the methodology is easy to duplicate for other disciplines.

Literature Review

In a UNESCO white paper, Rosenberg (Correia, 2002) concluded that in the new economy "information literacy … must be part of the skill sets of almost every employee who works with information in a small business" (PP.7).

Information literacy was strongly endorsed by UNESCO in 2003, at its meeting in Prague: "Towards an Information Literate Society." In a report based on this meeting, Stern exclaimed that information literacy "is simply a strategy for knowledge building, communication, and problem solving" that can be taught without technologies

(Thompson, 2003, pp.7). Abell and Oxbrow stated that "the recognition of knowledge as a primary competitive advantage focuses attention on both people and information" (Abell & Oxbrow, 2001, pp.12) since information is the foundation of knowledge.

Declaration by U.S. Department of Labor - Information Literacy in the Workplace Context

Almost two decades ago, the U.S. Department of Labor identified five competencies necessary to meet the challenges of today's (i.e., 1992) workforce. To succeed, workers must be able to manage resources; work amicably and productively with others; acquire and use information; possess the ability to master complex systems; and work with a variety of technologies (Copple et al., 1992, pp. 3-4, 22-23). Among those competencies, managing resources and acquiring and using information are two major elements of information literacy. These skills are even more critical in the information age of the 21st century.

Mikulecky and Kirkley envisioned that information literacy skills should be integrated into job function in the workplace so workers would be able to access accurate information in a timely fashion (1998, pp.298). Furthermore, in the *Library Advocate's Guide to Building Information Literate Communities* (ALA, 2001) the message to the business community says, "Good decisions depend on good information" because "information literacy is vital for a competitive workforce."

Rosenberg (Correia, 2002) declared that "information literacy is becoming the lifeblood of the business… and must be part of the skill set of almost every employee who works with information in a small business" (pp.6, 7) because those small enterprises need the information "to conduct and grow the business." They certainly will need "increasingly sophisticated, information-literate employees" to thrive and prosper.

This concept of information literacy has been expanded in a global context by Bruce and Candy(2000) and Virkus

(2003). These researchers documented the information literacy movement around the world. Bundy (2002) stated that information literacy "is a profound whole-of-society and global educational issue ... in a 21st century where information will be the pervasive commodity" (2002, pp.126).

Bruce (1999) and Bundy (1998; 2002) conducted extensive studies on information literacy in the workplace in Australia. Boekhorst (2003) reported how stakeholders were working on policies to make citizens of the Netherlands become information literate. Karisiddappa and Rajgoli (2007) described how information literacy was blooming in India.

Braunstein (1981) investigated information as a commodity from a macro-economic standpoint in 1976 and suspected information could be an attribute to the economic failure during that period. Glazer (1993) claimed that an information-intensive organization "takes seriously that information has replaced matter and energy as the primary social and economic resources" (pp.108). The results of this study suggested that the business community collectively "comes to understand and can thus anticipate the information-based changes … resulting [in behaviors that] are necessary for successful competition …" (pp.107). As mentioned earlier, tangible financial consequences in the business world have been proved by IDC (Feldman & Sherman, 2001) and Saulles (2007) in their studies that quantify the cost of not finding the right information at the right time.

In 2005 the Australia Library and Information Association issued the *Statement of Information Literacy for all Australians* and stated that "information literacy is a prerequisite for: participative citizenship, social inclusion, the creation of new knowledge, personal empowerment, and learning for life." More recently, Henke (2007) listed information literacy as a key element of 21st century learning in a digital world.

Information Literacy in Higher Education

In the academic world, librarians have long been partnering with professors "to impart [information literacy] skills and knowledge that enrich and empower students in their learning and research engagement" (Owusu-Ansah, 2004, pp.12). Many studies prove that students can accomplish better research results after a library presentation by a librarian with a focus on information literacy skills (Roldan & Wu, 2004; Wu & Kendall, 2006; Fiegen, Cherry, & Watson, 2002).

Cooney and Hiris (2003) successfully collaborated with a business professor to integrate information literacy into a graduate finance course and assessed the results with a checklist under the ACRL IL framework. It concluded that "the collaborative framework provides an effective way to continuously improve instruction methods" (pp.224). Although this result provided great guidance for business librarians to better focus on information literacy instruction, it did not further the effort to monitor how this kind of collaboration will benefit students in the workplace. Therefore, "there is a need to review whether the ability to use information effectively that students are taught in school is applicable in the workplace" (Cheuk, 1998a).

In a case study with eight engineers, Cheuk(1998a) divided the information-seeking and information-using process into seven situations. These engineers "applied loose criteria to judge information relevance" in the initial situation. They "chose information formats based on the purpose and context in which the information was to be presented" (pp.10). Cheuk concluded that the information-seeking process "appeared to be chaotic" so information professionals [such as librarians] need to provide services which "can better satisfy information users' needs" (pp.13). Cheuk (2000) further argued that "there is a need to take information literacy to a higher level." This implies the critical thinking element of information literacy skills.

These studies cover only one segment, either by geographical location or a single workplace. None of these studies ties information literacy in the workplace across multiple sectors of the industry or geographical locations.

The author fills this gap by interweaving information literacy in the workplace across multiple industries in two geographical locations. The intent is to investigate how information literacy is incorporated into the workflow in order to carry out daily tasks effectively and how to better focus information literacy instruction from an academic librarian's perspective.

Background: Why Silicon Valley and Taiwan?

In this research, Silicon Valley is defined as the geographical area from the San Francisco International Airport in the north to the San Jose International Airport in the south. It includes Santa Clara County, part of San Mateo County, and Alameda County.

Silicon Valley is known to be the capital of innovation. Many of the world's largest corporations chose Silicon Valley to be their headquarters: Adobe, Apple Inc., Cisco Systems, eBay, Facebook, Genetech, Google, Hewlett-Packard, Intel, Netflix, Oracle, SunPower, Symantec, Tesla, Yahoo, etc. Microsoft, the world's largest software company, with its headquarters in Bellevue, Washington, has a campus in Silicon Valley.

According to an internal report from a Fortune 500 company in Silicon Valley, 40% of IT staff are Asians. In the 2010 U.S. Census survey, the population in Santa Clara County was 1,781, 642. Approximately 36% of the population in Santa Clara County was born outside of the United States. This explains why 70% of the respondents in Silicon Valley speak another language in addition to English (see Appendix A).

Taiwan is about 6,500 miles (10,000 kilometers) away from Silicon Valley. Lured by the great potential of business opportunities to help evolve the Internet

and the e-commerce that technologies have generated, many engineers and high tech professionals from Taiwan have decided to return to their homeland. In the 1980's, in order to help those intellectuals and professionals transfer their knowledge and valuable business skills, the Taiwanese government built a Science-Based Industrial Park in Hsin-chu City, which is 85 miles south of Taipei, the capital (Eckhouse, 1986; Johnston, 1988; Mathews, 1997).

The author has close personal and professional connections to many companies and institutions both in Silicon Valley and Taiwan and therefore chose these two places to make the most out of this research.

Many of the Silicon Valley companies visited by the author are the largest of their kind; therefore, company intelligence is highly guarded. Out of those surveyed, 52% had more than 1,000 employees. For security reasons, the author was requested to sign agreements with most of those companies for non-disclosure of company identity. Many companies utilize the latest technologies to better support daily operations and to cut costs. For example, several companies have virtual reception desks where visitors speak into a microphone. A virtual receptionist appears on a TV or computer screen. Following the directions to sign in, visitors are then escorted by the person with whom the visitor has an appointment or by a security guard. Conversely, those companies in Taiwan are much more relaxed in security measures. All companies in this study have an in-person reception desk. People in Taiwan are very hospitable. The author was invited by several interviewees to have a tea/coffee break or even a lunch while interviewing. While in Silicon Valley, the visit or interview was conducted as a business engagement.

Methodology

This research project involved human subjects; hence it has gone through an Institutional Review Board approval at San Jose State University.

In the pilot study, eight samples were sent to three librarians and five working adults outside of the library profession to test the wording and timing of the survey. The survey has thirty questions covering the following categories: library/resource center, training needs, resources most used, elements of information literacy, most effective means of disseminating the information within the organization, and demographics.

To make sure the research derived as much information as possible from participants, the methodology included an interview (in person or by telephone), a site visit, and a survey (either online or in paper format). The survey was distributed via listservs, known email addresses, and hardcopy mail. It started with the author's networking, and then snowballed with referrals from personal and professional contacts.

To minimize redundancy, no more than three participants were chosen in one company, and only one from each department or function. More than 120 people from 40 companies completed the survey, either online or on paper. Thirty managers or line workers were interviewed from those companies. The participants included the vice president of research & development, company controller, marketing director, president/owner of a software development start-up, web master, customer service representative, Internet evangelist, human resource director, talent recruiting specialist, visiting scholar from Switzerland, general manager of banking services, stock/financial/wealth manager, account executive of marketing research, general manager of high speed railroad consultation, director of government-funded information and business intelligent institute, importer/exporter, and engineer. Although the list seems to be random, it provides a very broad spectrum. To accommodate the language preferences, the paper questionnaire was available in English and Chinese, but the online version was available only in English (it is included in Appendix B).

Data Analysis

To compare how workers in Taiwan and Silicon Valley view information literacy, the author compared 50 of the most completely answered questionnaires from each group. The results are as follows:

The results show that 52% of those surveyed have a library/information resource center and 22% rely solely on the Internet and free sources for information needs. Among those surveyed, 35% have a librarian or information professional staffing at the center and 48% of the respondents are on their own. For those expected to work on their own, 50% have no training available, 21% provide online training on their company's intranet, and 24% provide in-person sessions as needed. See Table 1.

In Taiwan, 70% of the respondents speak a language in addition to their native language. The majority of them speak English. Therefore, they use materials in Chinese, English, and other languages. In Silicon Valley, 62% of those surveyed speak a language other than English. In Santa Clara County, California, 36% of the population are foreign born, and 49.6% speak a language other than English at home. This reflects the globalized demands and the demographic characteristics as shown in the U.S. Census data.

As for information literacy concepts, the participants were asked the following questions: the importance of citing the original source, and factors used to evaluate the accuracy of the retrieved information. Following are the results:

Overall, 70% believed the information that was retrieved from the WWW is reliable. When asked what other criteria were used to evaluate the accuracy of the retrieved information, most of them (54%) believed content, author's affiliation, and date of publication are all important elements. Among those three factors, content (31%) was more important than date (10%) and author (5%). More respondents in Silicon Valley (36% as opposed to 26% in Taiwan) believed that content is more important than

the other two elements. Surprisingly, the currency (date) of the information ranked very low in Silicon Valley (2%) and low in Taiwan (18%). Using an author as a criterion also ranked low both in Silicon Valley (4%) and Taiwan (6%). With the widespread use of social media when information is freely shared and disseminated, how librarians teach students to evaluate/investigate the authoritativeness and credibility of authors remains a big challenge.

Table 1　*Background*　*N*=100

Does your company have a library/resource center?	yes	no	contract out	
Silicon Valley	48% (24)	50% (25)	2% (1)	
Taiwan	56% (28)	30% (15)	14% (7)	

Is a librarian or professional staff in charge of the center?	yes	employee in his /her own	don't know or didn't answer	
Silicon Valley	34% (17)	50% (25)	16% (8)	
Taiwan	38% (19)	46% (23)	16% (8)	

Does your company provide training programs?	no	yes, online	yes, in-person	
Silicon Valley	58% (29)	20% (10)	18% (9)	
Taiwan	38% (19)	26% (13)	30% (15)	

What resources do you use the most?	free www	prof. asso.	subscribed d/b	gov websites
Silicon Valley	80% (40)	36% (18)	36% (18)	34% (17)
Taiwan	76% (38)	28% (14)	24% (12)	46% (23)

As for the importance of giving credit to the original source, overall 55% ranked as extremely or very important. The breakdown is 54% in Taiwan and 56% in Silicon Valley; yet only 32% of the respondents in Silicon Valley and 36% in Taiwan cited sources all the time. More details are analyzed in Table 2.

Since most of the respondents worked in highly competitive industries, keeping current in their field is crucial. Most respondents ranked attending a conference and reading professional /trade magazines high at 49%. Asking a colleague came close at 46%; attending staff meetings or having news/email alerts tied at 37%. The breakdowns are very similar both in Silicon Valley and Taiwan. One thing worth mentioning is "asks a friend" ranked high at 28%. Based on the communication means, it looks like respondents valued human contact other than email as illustrated in Table 3 since face-to-face meeting and asking a colleague or friend for updates rank relatively high.

The next two questions uncovered respondents' experiences in using libraries and seeking assistance from librarians while in college. Asked if they have worked with a librarian, 40% of all respondents said they sought help for their school term papers and 36% still use public libraries for their information needs. In Silicon Valley, 38% have asked a librarian for help for a school project and 42% still use the public library. In Taiwan, 46% have worked with a librarian and 30% still use the public library for their information needs.

When asked what they have learned from a librarian, using a database remained high at 43% of all respondents

(34% in Silicon Valley and 52% in Taiwan). Other areas, such as evaluating content, finding scholarly works, citing the source or building a search query, remained very low at less than 10%. This is an area worth further investigation. Instead of pointing out the needed sources, is it equally important to teach library users other elements of information literacy skills, such as those mentioned above?

In terms of the means of disseminating information, participants had multiple choices: cell phone, email, land-line phone, free voice over IP (VoIP, such as Skype, Yahoo talk, etc.), online chat, fee-based VoIP, webcast, online video (such as You Tube), texting, blog, wiki, ShareSpace or web 2.0-based tools, face-to-face meeting, printed/photocopied materials. Here are the data distributions:

It seems to be universal that email remains the most popular means of communication. Surprisingly, Silicon Valley respondents rank cell phone use very low at 18% while it is the second most used in Taiwan with 54%. According to statistics from the International Telecommunication Union (2011), mobile cellular subscriptions per 100 inhabitants in 2002 were 109.55 in Taiwan and 49.16 in the United States. At the time of this survey, it was 119.91 in Taiwan versus 89.86 in the United States. Accordingly cellular usage is more mature in Taiwan, and that may explain why the percentage is so high in this small island state.

In June 2006, the capital Taipei became the first city in the world to roll out a city-wide Wi-Fi network, boasting over 4,000 hotspots, covering around 90.0% of the city's 2.6 million people. Wi-Fi in Taiwan is widely available and often free of charge, in public places such as airports, train stations, hotels, and coffee shops. These hotspots provide better coverage and clearer reception, thereby encouraging more usage (Euromonitor, 2010a; 2010b).

In terms of effectiveness, respondents ranked email communication to be the highest and ranked face-to-face meetings as effective as well. This is why these two types of communication remained the most popular means of communication as illustrated in Table 3. In Taiwan, cell phone and online chat ranked as high as the face-to-face meeting.

Significance to the Profession and Challenges for Future Research

Many datasets can be used to help academic librarians more effectively design and deliver information literacy education for college students. If email is a popular and effective means of communication, perhaps we need to develop a tool that can help librarians easily "push" an answer to students via email. Human interaction remains high as an important factor of communication even for people who work in the high-tech industries that developed those tools. Hence, "live" in-person instruction is a relevant approach to reaching our students. Many studies have been advocating the importance of using technology-enabled tools to reach our students; we may need to re-evaluate these approaches when implementing those tools or a hybrid strategy maybe the answer. It's true that technologies help us better perform our daily tasks, such as word processing, preparing statistical reports, visual presentation, etc. However, technology cannot replace human beings yet. We need to incorporate pedagogies that best suit different learning styles.

Table 2 *Concept of and/or Experience with Information Literacy*

If you rely on www, do you think the information is reliable?	yes, most of the time	yes, all the time	not always, but this is all we have	
Silicon Valley	76% (38)	10% (5)	8% (4)	
Taiwan	62% (31)	6% (3)	30% (15)	

<div align="right">(continued)</div>

Table 2   *(continued)*

What criteria do you use to evaluate the accuracy of retrieved information?	all of above (content, date, author)	content	author	date
Silicon Valley	60 % (30)	34% (17)	4% (2)	2% (1)
Taiwan	50% (25)	26% (13)	6% (3)	18% (9)

Which are trustworthy sites by domain name?	.gov	.org	.edu	.com
Silicon Valley	66 % (33)	64% (34)	60% (30)	60% (30)
Taiwan	60% (30)	58% (29)	46% (23)	56% (28)

Do you cite the source?	sometimes	all the time	not at all
Silicon Valley	52% (26)	32% (16)	12% (6)
Taiwan	48% (24)	36% (18)	16% (8)

How important to give credit when citing a source?	extremely	important	very
Silicon Valley	32% (16)	28% (14)	24% (12)
Taiwan	16% (8)	28% (14)	38% (19)

When you were in college, did you ask a librarian for assistance?	for school term papers	used pub library	learn on my own
Silicon Valley	46% (23)	52% (26)	40% (20)
Taiwan	36 %(18)	24% (12)	40% (20)

What did you learn from a librarian?	using databases	search query	all	evaluate info	other
Silicon Valley	40% (20)	12% (6)	10% (5)		
Taiwan	56% (28)			20% (10)	18% (9)

Table 3   *Communication and Continuing Education*

Please list top 3 commonly used communication means	email	face-to-face meeting	land phone	cell	online chat
Silicon Valley	94% (47)	58% (29)	38% (19)		
Taiwan	94% (47)			54% (27)	50% (25)

Please list the most effective means of communication	email	Face-to-face meeting	land phone	online chat	cell
Silicon Valley	90% (45)	50% (25)	24% (12)	24% (12)	
Taiwan	86% (43)	42% (21)		42% (21)	48% (24)

How do you keep up with the profession?	attending conference	news/email alert	trade mag-online	ask colleagues	trade mag-hard c.
Silicon Valley	72% (36)	70% (35)	62% (31)	60% (30)	
Taiwan	44% (22)		42% (21)	44% (22)	44% (22)

It is encouraging that many respondents have sought out assistance from a librarian in college to learn how to use a database and continue to use and view the library as a valuable place when seeking information. We need to continue our efforts in reaching out to our students to advocate the information literacy tools and resources that cost taxpayers millions of dollars.

The legal and ethical aspects in using information remain troublesome as illustrated in the data analysis and Table 2.

How librarians as educators re-enforce or teach these elements of information literacy provides opportunities for further investigation. One of these approaches could be using legal cases to demonstrate the consequences of not citing sources (plagiarism) or copyright/patent infringement. There are many reports and lawsuits involving plagiarism that either caused students to be suspended from school or lose jobs or book contracts. Copyright or patent infringement lawsuits are very common in the corporate world. Students need to be educated and explore the complications of these legal and ethical issues not just to become better citizens but be better workers once entering the workforce.

The complexity of this research reveals many challenges librarian researchers might face. One crucial question is whether academic librarians have received adequate training from library school in order to conduct in-depth research, such as the scale of this project. This is a fast growing area due to globalization. Becker (2006) proclaimed that "the traditional roles of librarians are shifting from the parochial to the global" (pp.84). What continuing education is needed and what is available to help librarians become lifelong learners as we are preaching to our students? Librarians are portrayed as professional workers. In many institutions, academic librarians have faculty status. As faculty, it is mandatory to create/generate knowledge to share with other professionals. In other words, doing research and writing are part of a librarian faculty's responsibility. Does our library and information science education offer adequate training to prepare future academic librarians to conduct in-depth or large

scale research? The author experienced great difficulty in designing this survey and some challenges in data analysis. Another question is, should it be necessary to obtain and renew a license like teachers and medical doctors to maintain a librarian's professional status? What continuing education should be mandatory?

Another area worth investigating is the effectiveness of job performance for workers who have adequate training by an information professional compared to those who are expected to be on their own. In order to remain competitive, all workers who need to use information must realize the urgency of obtaining the right information at the right time. Because "rapidly accessing accurate information -- has now become [an integral part] of many jobs." Workers at all levels are expected to "gather information from multiple sources … to solve problems" (Mikulecky & Kirkley, 1998, pp.292, 298). Furthermore, "Information literacy skills exist at different levels of organizations. …Organizations which access a wide range of information of high quality … will make the best informed decisions" (Crawford & Irving, 2009, pp.36).

We have been living in an information age since the launch of the Internet in the 20th century. Information is the base of knowledge. All employees, regardless of their work or the nature of their job functions, are required to make judgments based on the best knowledge they have obtained. "The knowledge-based environment is formed and nurtured by people in all parts of the organization: … it is their journey that will make the difference" (Abell & Oxbrow, 2001, pp.42). The current workforce consists of people of all ages with various experiences with and training in information literacy. About 80% of the participants in this survey are between the ages of 25 and 39. People who were born after 1980, those called "digital natives" (Prensky, 2001), have entered the workforce and are gradually becoming a strong influence in their organizations. People such as Mark Zuckerberg are not just employees but are founders of their own companies. The 27-year-old Zuckerberg claims on his Facebook page that he is " trying to make

the world a more open place by helping people connect and share." He was chosen as Person of the Year in 2010 by *Time* magazine for "creating a new system of exchanging information that has become both indispensable and sometimes a little scary." With more than 550 million registered users worldwide, it is not just scary but also challenging to make sure they use information ethically and legally.

There are digital natives shaping the workplace culture. They are the ones who grow up with computers. They live in a virtual social-networked world where information is freely disseminated. What is their concept of a user's or author's rights? Can we educate people who are computer savvy to become information literate? Can librarians educate digital natives (Bennette, Maton, & Kervin, 2008) to think critically when they exchange and share information?

Lorenzo & Dziuban were concerned over whether digital natives can transfer their net savvy skills to become information literate and asked two essential questions: "How can students become skilled at finding, evaluating, creating, and effectively using information from the rapidly expanding resources available to them?" and "How can these skills transfer to the workplace and personal lives of students once they leave campus?" (2006, pp.2)

As the world becomes increasingly connected with social networks, how librarians can use these powerful tools to reach and influence their users is a huge area to investigate and research.

Academic librarians play a vital role in helping and training college students become information literate. "In today's organization, you have to take the responsibility for information because it is your main tool. But most don't know how to use it. Few are information literate" (Harris, 1993, pp.7). Librarians must seize every teachable moment when they interact with students, whether at reference service points, in-person or in virtual information literacy lectures or research consultations. Better yet,

academic librarians need to work with other stakeholders to advocate the urgent need of incorporating information literacy into college curricula. This is another area worth investigating.

Conclusion

The findings reveal that the need for information literacy in the workplace is universal. All employees are expected to find the right information in a timely fashion in order to carry out their work effectively. They are expected to be lifelong learners. While the concept of using information legally and ethically may be perceived differently in Western and Eastern cultures, most respondents agreed on the importance of citing the original source. This may be a result of higher education, because 96% of all respondents had a college degree at the time of this survey. However, this may not be the case in other workplaces. This study involved a wide range of workers across many sectors of work functions and industries. Their views of information literacy are almost identical. The most alarming finding is the lack of knowledge about the legal and ethical aspects of using information.

Kirton documents extensively how information literacy should be perceived or applied in the workplace. She concluded that "while much has been written on the topic of information literacy, very little has been published about its place and importance in the workplace" (2005, pp.372). This opens up many opportunities for academic librarians to step out of the academic ivory tower and reach out to the workplace to prove that the information literacy skills taught in college indeed are essential in the real world.

There can be major obstacles to conducting cross-continent research: cost, time demands, scheduling, language skills, and adaptation to local culture. In the Internet age, however, it is very easy to find a partner who is interested in the same research topics and has the skills needed to conduct this kind of research. With

careful planning, the experience can be positive and rewarding. In this global economy, cross-cultural and cross-border research will help educators, such as librarians, understand the complexity of skills expected in the workplace. Librarians play an integral role in students' success, and their success helps create productive workers who can compete and succeed in this global environment.

Acknowledgements

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Appendix A

Demographics				
What is the nature of your job function/ responsibility	marketing	customer support	engr	R&D
Silicon Valley	16% (8)	12% (6)	12% (6)	12% (6)
Taiwan	20% (10)	14% (7)	22% (11)	
What is the number of employees in your company	1000+	<100	200-499	
Silicon Valley	56% (28)	26% (13)	8% (4)	
Taiwan	40% (20)	22% (11)	14% (7)	
Is your company public or privately held?	pub	private	Gov't	
Silicon Valley	58% (29)	34% (17)	8% (4)	
Taiwan	16% (8)	62% (31)	22% (11)	
What is your highest education?	ba/bs	ma/ms	phd	hi school
Silicon Valley	34% (17)	58% (29)	6% (3)	2% (1)
Taiwan	54% (27)	18% (9)	4% (2)	4% (2)
Where did you receive your education?	USA	more than one country	Asia	
Silicon Valley	52% (26)	30% (15)	18% (9)	
Taiwan	6% (3)	40% (20)	54% (27)	
Do you speak more than one language?	yes	no		
Silicon Valley	70% (35)	30% (15)		
Taiwan	76% (38)	24% (12)		
What is your age group?	25-30	31-39	40-49	50-59
Silicon Valley	16% (8)	22% (11)	32% (16)	26% (13)
Taiwan	38% (19)	42% (21)	8% (4)	8% (4)

Appendix B

QUESTIONNAIRE

Title of the project: Information Literacy in the Workplace: a Cross-Cultural Perspective

Institution: San Jose State University, California, USA

I. How do you obtain and evaluate information to support your job?

1. Does your company have a special department or unit, such as library or resource center?

    1.a ☐ yes   If you answer "yes," please skip questions #2

    1.b ☐ no

2. If your library doesn't have a special department or unit, such as library or resource center but contract out, how does this service work? These services can be from any of the following vendors: Dialog, Yankee Group, Gartner Group, Thompson Financial Services, Bloomberg, etc.

    2.a ☐ pay a fixed fee annually

    2.b ☐ pay per service/project

    2.c. ☐ please specify your service provider _____

3. Who is in charge of this unit, please only check one

    3.a ☐ a trained professional, such as librarian or someone with a college degree in the field, please specify _____

    3.b ☐ the individual who needs the information will do the search him/herself

4. If individuals are expected to perform the search/research, does your organization have a training program in place?

    4.a ☐ yes, in-person session by a trained professional

    4.b ☐ yes, training materials are available online via my company's intranet

    4.c ☐ no, employees are expected to work on their own

5. Where is this unit located?

    5.a ☐ in the main office/headquarters

    5.b ☐ a remote site

    5.c ☐ on-line via a portal

    5.d ☐ other, please specify _____

6. Which of the following resources do you use the most? Please check no more than 3.

    6.a ☐ subscribed/proprietary database, such as Lexis/Nexis, Factiva,
          please specify _____ _____

    6.b ☐ resources provided by various government agencies

    6.c ☐ trade organization, please specify _____

    6.d ☐ professional association, please specify _____

    6.e ☐ free resources via the world wide web (WWW), use   search engine, such as Google or Yahoo

7. If you rely on the WWW, is the information reliable to you?

    7.a ☐ yes, all the time

    7.b ☐ yes, most of the time

    7.b. ☐ .com   7.b.2 ☐ .gov   7.b.3 ☐ .edu   7.b.4 ☐ .org   7.b.5 ☐ .net

    7.c ☐ not always, but this is all we have

8. How do you evaluate the accuracy or reliability of the free information that was retrieved from the WWW? Please only check one.

    8.a ☐ by the author's credibility

    8.b ☐ by domain name, please only check one

    8.c ☐ by the date it was last updated

    8.d ☐ by the content

    8.e ☐ all of the above

9. Even though most of the information obtained from the WWW could be free, do you cite or give credit to the source?

    9.a ☐ Always   9.b ☐ Sometimes   9.c ☐ Not at all

II. How is the information shared and disseminated among stakeholders and other employees?

10. Please check top 3 choices with "1" being the most commonly used

    10.a   ☐ cell phone

    10.b   ☐ email

    10.c   ☐ land-line phone

    10.d   ☐ iPhone or Blackberry or other type of smartphone

    10.e   ☐ online chat, instant message (IM)

    10.f   ☐ free Voice over IP, such as Skype

    10.g   ☐ Voice over IP with subscription

    10.h   ☐ Webcast

    10.i   ☐ Online video, such as YouTube

10.j ☐ fax

10.k ☐ blog

10.l ☐ wiki or wikipedia

10.m ☐ ShareSpace or a networked space

10.n ☐ Web 2.0-based tools, such as Second Life, or, please specify

10.o ☐ face to face meeting

10.p ☐ other, please specify _____

10.q ☐ please list the top 3 you chose above _____

11. Please check top 3 choices with "1" being the most effective

11.a ☐ cell phone

11.b ☐ email

11.c ☐ land-line phone

11.d ☐ iPhone or Blackberry

11.e ☐ online chat, instant message (IM)

11.f ☐ free Voice over IP, such as Skype

11.g ☐ Voice over IP with subscription

11.h ☐ Webcast

11.i ☐ Online video, such as YouTube

11.j ☐ fax

11.k ☐ blog

11.l ☐ wiki or wikipedia

11.m ☐ ShareSpace or a networked space

11.n ☐ Web 2.0-based tools, such as Second Life, or, please specify ___

11.o ☐ face to face meeting

11.p ☐ other, please specify _____

11.q ☐ please list the top 3 you chose above _____

III. Professional development

12. How do you keep up with the latest development in technology and your field? Check top 3 in the order of effectiveness, with "1" being the most effective.

12.a ☐ ask colleagues

12.b ☐ ask friends

12c ☐ use RSS feed

12.d ☐ use news or email alert

12.e ☐ through virtual network

12.f   ☐   attend staff meeting

12.g   ☐   go to conference

12.h   ☐   read trade magazine/newspaper – hard copy

12.i   ☐   read trade magazine/newspaper online

12.j   ☐   take a class or workshop, etc.

12.k   ☐   other, please specify _____

12.l   ☐   please list the top 3 you chose above _____

13. Have you worked with or asked a librarian for assistance?

13.a   ☐   yes, in school for my school projects

13.b   ☐   yes, in a public library

13.c   ☐   no, I am on my own

14. What did you learn from a librarian? Please check all that apply.

14.a   ☐   how to search databases

14.b   ☐   how to use Google scholar

14.c   ☐   how to evaluate the information

14.d   ☐   how to cite the information properly

14.e   ☐   how to build a good search query, including how to use Boolean operators

14.f   ☐   all of the above

IV. Demographic information

15   What lines of industry does your company fall under?

15.a   ☐   computer software

15.b   ☐   computer hardware

15.c   ☐   financial planning/management

15.d   ☐   banking

15.e   ☐   manufacturer, including OEM

15.f   ☐   import/export

15.g   ☐   information technology or service provider

15.h   ☐   retail, conventional

15.i   ☐   online retail

15.j   ☐   government or non-profit agency, including educational institution

15.k   ☐   insurance

15.l   ☐   health care

15.m   ☐   other, please specify _____

16. What is the nature of your job responsibility?

 16.a ☐ marketing

 16.b ☐ technical support

 16.c ☐ customer support

 16.d ☐ end user/customer education

 16.e ☐ training

 16.f ☐ engineering

 16.g ☐ research and development (R&D)

 16.h ☐ sales

 16.i ☐ knowledge management, such as maintaining intranet/internet portal

 16.j ☐ other, please specify _____

17. How many employees are there in your entire company?

 17.a ☐ less than 100

 17.b ☐ 100-199

 17.c ☐ 200-499

 17.d ☐ 500-999

 17.e ☐ 1000 or more

18. Is your company public or privately held?

 18.a ☐ public

 18.b ☐ private

 18.c ☐ no for profit, including educational institution or government agency

19. My work location is

 19.a ☐ the headquarters

 19.b ☐ a branch office or subsidiary

 19.c ☐ this is the sole location

20. My work location is

 20.a ☐ in the USA headquarters

 20.b ☐ in the USA as a branch office or subsidiary

 20.c ☐ in the USA as sole location

 20.d ☐ in Asia as the headquarters

 20.e ☐ in Asia as a branch office or subsidiary

 20.f ☐ in Asia as the sole location

21. What is the highest formal education you've received and where?

21.a ☐ high school, where?_____

21.b ☐ undergraduate from _____University, major in _____

21.c ☐ master degree from _____University, major in _____

21.d ☐ doctoral degree from _____University, major in _____

22. What is your age group?

22.a ☐ under 25

22.b ☐ 25-30

22.c ☐ 31-39

22.d ☐ 40-49

22.e ☐ 50-59

22.f ☐ 60 or over

23. May I include your organization's name in my research report/papers?

23.a ☐ yes   please list your company name here _____

23.b ☐ no,   thanks

24. Please provide your email address if you'd like to receive a copy of the report, _____

Thank you for your participation!

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