

# **Information and Communication Technology Literacy: What Do Businesses Expect and What Do Business Schools Teach?**

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**Information and Communication Technology Literacy:  
What Do Businesses Expect and What Do Business Schools Teach?**

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## **Abstract**

Today's information and communications technology (ICT) provides unprecedented amounts of information to organizations and their employees. This overabundance challenges workers, placing an increasing premium on skills of sifting through information of sometimes dubious quality, integrating information critically, and producing well-reasoned conclusions. This paper explores the hypothesis that employers want new hires skilled in ICT literacy, which includes navigating information effectively and using technology efficiently. Based on an ICT literacy framework for higher education, two surveys were created to assess the opinions of human resources (HR) consultants and business school faculty. HR consultants endorsed practically all elements of the framework as being important or essential for new hires. Especially valued were skills associated with information security, confidentiality, and ethical behavior. However, business school faculty did not report a corresponding focus on ICT literacy generally, or ethical/legal issues in particular, in their instruction. The results suggest that while ICT literacy does indeed appear to be among the key skills for today's workforce, much work must still be done to integrate these skills throughout the business school undergraduate curriculum.

Key words: information literacy, higher education, schools of business, information and communication technology (ICT) literacy, human resources

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Advances in computer technology, starting in the 1980s, have generated new affordances of information access, evaluation, use, and production of new knowledge. Because of computer and communication technologies, such as the internet, there is an intense focus on information use and knowledge generation in the workplace (Avdjieva et al., 2004) and a correspondingly increasing demand for information-literate and information and communication technology (ICT)-literate new hires: workers who can skillfully handle information in the context of technology. Accordingly, more is expected from a college graduate with respect to decision-making and problem-solving in an information-centric environment (Braun, 2004; Feast, 2003). The workplace's demands have colleges and universities examining their programs and designing their curricula (Feast, 2003; Lambrecht, 1999) to provide the best workplace preparedness for their graduates.

Preparing college graduates to earn, retain, and advance in their professional careers is an important goal of higher education (Association of College and Research Libraries [ACRL], 2000), including business schools. Business schools are criticized for not preparing their students for the workplace (Pfeffer & Fong, 2002; Sadri, 2002), especially because the 21st century workplace demands more from the business curriculum (McCoy, 2001). Advances in technology, and the emergence of an information-based economy, make it necessary to investigate the modernity of the business school's curriculum and how it addresses the needs of its students for ICT literacy. Because the content of the business education curriculum must stay parallel to the needs of society (McCoy, 1996), integrating ICT literacy into the business school's curriculum becomes essential to provide the business school's graduates with an education fit for the emerging information-centric workplace.

### **Skills Needed by Today's Workers**

Several national efforts suggest the importance of an ICT-literate workforce, and the need for business school curricula to incorporate these skills.

A consortium of four organizations (The Conference Board, Corporate Voices for Working Families, The Partnership for 21st Century Skills, and the Society for Human Resource Management) surveyed 400 employers around the United States about required labor skills (Workforce Readiness Project, 2006). The study aimed to assess the employers' perspective on new employees' (recent college or high school graduates) readiness for the

workplace. This research inquired whether the current skill levels of the new employees were described as *excellent*, *adequate*, or *deficient*; what the new workplace entrants' knowledge of academic subject were considered *very important*, *important*, or *not important*; how the importance of these skills may change over the next 5 years; what emerging content areas were critical over the next 5 years; and what are the nature and costs of remedial training or initiatives. The four skills found to be important to these employers were professionalism/work ethic, oral and written communication, teamwork/collaboration, and critical thinking/problem solving.

The Boyer Commission Report (1998), *Reinventing Undergraduate Education*, was a result of a 3-year study sponsored by the Carnegie Foundation for the Advancement of Teaching and Learning. The ACRL's (2000) information literacy competency standards were based, in part, on the conclusions of this report. The commission presented a curricular framework for information literacy in higher education and emphasized the importance of designing the curriculum in a way that provided a learner with an environment where questioning, decision-making, and high-level thinking are the norm. The report recommended that higher education institutions implement a research-based learning experience starting in the freshman year that would build a solid ground for a life of inquisitive learning. Since publication of the Boyer Commission report, a number of business education groups have incorporated information literacy into their standards.

The National Business Education Association (NBEA) publishes national standards for business education (2001). The NBEA standards serve as the basis for business education as they form "a forward-looking synthesis of what students should know and be able to do in business" (§ 1). The NBEA standards stress the importance of producing knowledgeable and ethical citizens from business school graduates. The NBEA standards acknowledge that, eventually, all business students will participate in information distribution and management because "technology has accelerated the pace and frequency of change not only in business but also in life" (§ 1). The NBEA standards describe information technology as the collecting and organizing of information to serve as a tool in solving problems in various contexts, and emphasized the importance of a business student using available technology to "analyze, synthesize, and evaluate situations at home, school,

or work, and then apply technology to solve problems and complete tasks efficiently and effectively.” (§ 3)

The Association to Advance Collegiate Schools of Business (AACSB) standards (2003) include a set of learning assurances that help chart an effective business curriculum. These learning assurances acknowledge the importance of using information technology to help solve organizational problems. These assurances also emphasize analytic and thinking skills as well as knowledge of social responsibility. The AACSB standards lay a general framework for a business curriculum and incorporate several aspects of information literacy and ICT literacy, such as the management and use of information.

Despite this growing awareness of ICT literacy nationally, adoption by business school curricula has been slow. Most reported studies focus on limited activities within particular business schools.

Avdjjeva et al. (2004) shared their experience of embedding information literacy in the curriculum of an introductory business course. Their study was a collaborative work among librarians, business faculty, and students. The experiment involved an innovative teaching model, which provided opportunities for the students to take ownership of their lifelong learning. The researchers embedded five information literacy modules that emphasized research and thinking skills, academic honesty, proper use of information, and the use of internet resources. These information literacy modules were crucial to the completion of the course’s assignments. Students were surveyed and data were collected for four semesters. Some of the findings included the students’ recognition of their limited knowledge of information resources, particularly library resources; collaborating librarians and business faculty recognized the importance and benefits of students’ information literacy skills in supporting the students’ preparation for capstone courses. The researchers concluded that embedding information literacy in the business school’s curriculum represented a needed curricular innovation.

Feast’s (2003) study used content analysis and interviews to evaluate the effect of integrating information literacy practices into eight first-year core business courses. The rationale behind the study was that acquiring information literacy skills is imperative for college and university students because it is a “key to prosperity” (p. 81). The researcher investigated relevant course booklets for direct and indirect references to information

literacy; the researcher also interviewed course coordinators to explore their use of information literacy practices. Feast (2003) found that many factors affected the integration of information literacy into teaching and learning practices, such as the subject matter of the business school course and the ability of the faculty member to accommodate the teaching of information literacy. She concluded that there was a need for more integration of information literacy.

Conducting a study that measured business faculty members' knowledge of Internet privacy, Bozman and Pettit-O'Malley (2002) found that faculty members' knowledge and time spent on learning emerging internet-relevant subjects were limited. Internet privacy is an important issue because of the legal and ethical weight it carries. The researchers concluded that business curriculum and faculty should emphasize gaining internet-relevant knowledge and discussions, especially those of legal and ethical implications such as privacy.

Fiegen et al. (2002) investigated a curriculum model at a regional university's college of business administration. The curriculum model was developed in accordance with AACSB's standards. Fiegen et al. wanted to assess learning outcomes in that university's business curriculum; their goal was to generate an assessment tool for faculty. The tool would identify information competencies to be integrated into business courses. Four upper-level courses were chosen as the experimental context. The professors of these courses were asked to bring their courses' syllabi and complete an assessment planning matrix; the syllabi and matrices were used to generate pretest and posttest student surveys. The students completed the pretest survey on the first day of class, and the posttest survey at the conclusion of a research project they had been assigned. The surveys were used to measure learning outcomes. The study found that professors found it challenging to incorporate information literacy outcomes into their courses. The study noted a lack of consistency in business courses because different courses addressed and stressed different information competencies. Having a consistent approach, with clearly defined learning goals, fosters a culture of information literacy and speeds adoption across the curriculum (Johnson, 2000).

## **ICT Literacy Framework**

In 2001, ETS convened an 18-member international panel to investigate the influence of current and emerging information and communication technologies on student and worker literacy. The panel included representatives from Australia, Brazil, Canada, France, and the United States having affiliations with government agencies, nongovernmental organizations, and educational institutions. The panel met five times, including two meetings outside the United States (Paris, France and Rio de Janeiro, Brazil). Through its deliberations, the panel concluded that critical skills for current and future workers center on the confluence of technology literacy and information literacy, focusing on the concept of *ICT literacy*—the skillful use of information within digital environments (International ICT Literacy Panel, 2002). ICT literacy bridges the definitions of information literacy and technology literacy. By focusing on information skills in the context of technology, ICT literacy addresses the key challenges of information access, information overload, and information quality faced by students and workers alike.

Subsequent work (Katz et al., 2004; Katz, 2007) done in collaboration with higher education institutions across the United States expanded the definition of ICT literacy to include seven key performance areas: defining a need for information, accessing information via technology, evaluating online information, managing digital information, integrating information from varied digital sources, creating information, and communicating information through technology. Each of the seven elements was further defined through specifying concrete behaviors that would warrant the extent to which someone is ICT literate.

Table 1 summarizes this framework; the full framework contains detailed performance indicators, which were the basis of the questionnaires used in the two studies.

**Table 1**

***Summary of ICT Literacy Framework***

<p><b>Define:</b> Understand and articulate the scope of an information problem in order to facilitate the electronic search for information. Tasks include</p> <ul style="list-style-type: none"><li>• Distinguishing a clear, concise, and topical research question from poorly framed questions, such as ones that are overly broad or do not otherwise fulfill the information need.</li><li>• Asking questions of a professor that help disambiguate a vague research assignment.</li><li>• Conducting effective preliminary information searches to help frame a research statement.</li></ul>
<p><b>Access:</b> Collect and/or retrieve information in digital environments. Information sources might be web pages, databases, discussion groups, e-mail, or on-line descriptions of print media. Tasks include</p> <ul style="list-style-type: none"><li>• Generating and combining search terms (key words) to satisfy the requirements of a particular research task.</li><li>• Efficiently browsing one or more resources to locate pertinent information.</li><li>• Deciding what types of resources might yield the most useful information for a particular need.</li></ul>
<p><b>Evaluate:</b> Judge whether information satisfies an information problem by determining authority, bias, timeliness, relevance, and other aspects of materials. Tasks include</p> <ul style="list-style-type: none"><li>• Judging the relative usefulness of provided web pages and on-line journal articles.</li><li>• Evaluating whether a database contains appropriately current and pertinent information.</li><li>• Deciding the extent to which a collection of resources sufficiently covers a research area.</li></ul>
<p><b>Manage:</b> Organize information to help you or others find it later. Tasks include</p> <ul style="list-style-type: none"><li>• Categorizing e-mails into appropriate folders based on a critical view of the e-mails' contents.</li><li>• Arranging personnel information into an organizational chart.</li><li>• Sorting files, e-mails, or database returns to clarify clusters of related information.</li></ul>
<p><b>Integrate:</b> Interpret and represent information, by using digital tools to synthesize, summarize, compare, and contrast information from multiple sources while</p> <ul style="list-style-type: none"><li>• Comparing advertisements, e-mails, or web sites from competing vendors by summarizing information into a table.</li><li>• Summarizing and synthesizing information from a variety of types of sources according to specific criteria in order to compare information and make a decision.</li><li>• Rerepresenting results from an academic or sports tournament into a spreadsheet to clarify standings and decide the need for playoffs.</li></ul>
<p><b>Create:</b> Adapt, apply, design, or construct information in digital environments. Tasks include</p> <ul style="list-style-type: none"><li>• Editing and formatting a document according to a set of editorial specifications.</li><li>• Creating a presentation slide to support a position on a controversial topic.</li><li>• Creating a data display to clarify the relationship between academic and economic variables.</li></ul>
<p><b>Communicate:</b> Disseminate information tailored to a particular audience in an effective digital format, such as by</p> <ul style="list-style-type: none"><li>• Formatting a document to make it more useful to a particular group.</li><li>• Transforming an e-mail into a succinct presentation to meet an audience's needs.</li><li>• Selecting and organizing slides for distinct presentations to different audiences.</li><li>• Designing a flyer to advertise to a distinct group of users.</li></ul>

This paper reports on two studies of the extent to which the ICT literacy framework describes skills both valued by employers and taught by business faculty. Through two web-based surveys— sent to human resources (HR) consultants and faculty at top business schools—

respondents rated the relative importance (HR consultants) and frequency of teaching (business faculty) of each element of the ICT literacy framework.

### **Study 1: HR Consultants**

Do employers believe that ICT literacy skills are important qualities for new hires? This study explored the hypothesis that employers value the skillful use of information via technology. Similar to what is done in a job analysis, we converted the elements of the ICT literacy framework into a survey, asking HR consultants to rate how essential these skills are for incoming workers.

#### **Method**

**Participants.** Invitation e-mails were sent to all 1,691 U.S.-based members of the Society for Human Resource Management (SHRM) who identified themselves as HR consultants. SHRM is an international, 200,000 member organization whose mission is to advance the HR profession. Given the central role played by HR consultants in the hiring practices of many types of organizations, this group was thought to provide a gauge of the business community's values regarding expectations for new hires.

If the HR consultant accepted the invitation, we sent them the URL for a web-based survey and a password, via a follow-up e-mail, along with the deadline for completing the survey. One week later, a reminder e-mail encouraged participation by those who did not respond to the initial e-mail invitation. Overall, of the 1691 e-mails invitations sent, 151 came back as undeliverable and 180 HR consultants accepted the invitation to complete the survey. Of the latter, 159 (88%) provided a fully completed survey.

**Instrument.** The survey sent to HR consultants consisted of an introduction that defined *new hire* as a recent college graduate, followed by 44 items: Three gathered identifying information (date, last name, e-mail address) and 41 items elicited HR consultants' judgments of the ICT literacy framework. The 41 items were organized into seven sections that began with a definition of one portion of the framework (as in Figure 1, **Define, Access, etc.**) and included the corresponding framework elements. Each element was posed as a statement about new hires, such as "A new hire is able to refine a vague research question or statement into one that is appropriately specific" and "A new hire is able to identify and select resources that are relevant

and accurate.” Responses were on a 4-point scale: *Not Important*, *Somewhat Important*, *Important*, and *Essential*. There was also a *No Opinion* option.

The image shows a survey interface. At the top, there is a dark red header with the text "Human Resources Survey" on the left and "Exit this survey >>" on the right. Below the header is a section titled "DEFINE" in bold. The text in this section reads: "Define Proficiency: The ability to use information and communication technology (ICT) tools to identify and appropriately represent an information need. Please rank the importance of the following ICT competencies in recruiting a new hire for your organization." Below this text is a question: "4. A new hire is to generate and justify research questions or statements of information needs." Underneath the question is a list of five radio button options: "Not important", "Somewhat important", "Important", "Essential", and "No opinion".

Figure 1. Sample section heading and question.

## Results and Discussion

Human resources consultants strongly endorsed all elements of the ICT literacy framework, with more than 50% of respondents rating all the elements as either *Important* or *Essential*. In addition, 39 of the 41 elements were rated as *Important* or *Essential* by more than 60% of respondents. These results are consistent with the idea that ICT literacy is important for new hires.

The findings are consistent with others’ studies that similarly demonstrate the importance of ICT literacy skills for today’s workers. As noted earlier, surveys of business leaders (e.g., Workforce Readiness Project, 2006) illustrate increased attention on information literacy and ICT literacy in today’s workforce. Widely cited anecdotal reports give further credence to the idea that ICT literacy skills are of strategic importance to businesses (e.g., Cheuk, 2002; Feldman, 2004). In addition, researchers have demonstrated more direct evidence of information

literacy in the workplace through observational studies of workers (Kirk, 2004; Kuhlthau & Tama, 2001).

Table 2 shows the elements that received the highest ratings, being judged *Essential* by more than 75% of respondents. These most essential portions of ICT literacy all relate to ethical and legal issues surrounding information use. Appropriately using electronic information, especially from the internet, can be challenging for students; although available for free, much electronic information may not be used for free, and certainly must be appropriately cited to avoid plagiarism (Association of College and Research Libraries, 2000). Similarly, new hires might have access to sensitive and/or confidential information, and HR consultants appear particularly concerned that new hires know the limits of such information use. Thus, while it is important for new hires to be able to think about, problem solve, navigate, and communicate effectively, issues of legal use of information are of paramount concern for our HR consultant respondents.

**Table 2**  
*Most Frequently Rated as Essential*

Statement Percent	<i>Essential</i> Rating
A new hire is able to recognize and respect authorship, copyright, trademark, and confidential information.	81%
A new hire is able to recognize and treat confidential or sensitive information appropriately.	93%
A new hire is able to recognize and follow security procedures.	80%
A new hire is able to recognize and respect legal and ethical considerations regarding information use.	77%
A new hire is able to assure appropriate care of confidential information.	90%
A new hire is able to refrain from using insensitive language with respect to culture, race, ethnicity, or gender while communicating information to an audience.	95%

## Study 2: Business School Faculty

The findings of the previous study suggest that some HR consultants strongly endorse the ICT literacy framework. Our next question was whether business school faculty members recognize and teach these skills. We used the same framework to develop a survey asking faculty about their teaching strategies with respect to ICT literacy.

### Method

**Participants.** The sampling frame consisted of all 3,780 business school faculty at the top 25 undergraduate business programs in the United States as ranked by the *U. S. News and World Report's* annual Best Colleges edition (ranking based on peer reviews). We selected these U.S.-based public and private schools as representative of reputable business programs. Just as in Study 1, the business school faculty were contacted via e-mail and interested faculty members were sent the URL of the survey. Overall, of the 3,780 e-mails invitations sent, 69 came back as undeliverable and 195 faculty members responded to express interest in completing the survey. Of the latter, 144 (74%) provided a fully completed survey.

**Instrument.** The survey for business faculty was constructed similarly to the survey for HR consultants: It was divided into seven sections, with each item in a section reflecting an element of the ICT literacy framework. However, because some items did not apply to business faculty, only 30 of the full 41 elements were used in this survey. This survey was designed to explore the extent to which ICT literacy appears in business school curricula. As such, rather than asking about the importance of each element, the survey asked faculty to report the frequency with which they taught ICT literacy skills. Example statements include “My teaching strategies include plans to teach the student how to choose appropriate information resources” and “My teaching strategies include plans to teach the student how to establish criteria for judging the appropriateness of information with respect to an information need.” Responses were on a 4-point scale: *Always*, *Frequently*, *Moderately*, and *Never*. There was also a *Not applicable* response option for each statement (Figure 2).

## 7. Information and Communication Technology (ICT) Integration

This section is used to inquire about how often and how your teaching and class activities deal with the information and communication technology (ICT) competencies. ICT competencies include defining, accessing, managing, integrating, evaluating, creating, and communicating information.

Please rank the frequency in which you integrate the ICT competencies in

**28. My teaching strategies include plans to teach the student how to generate and justify questions regarding a specific information need.**

- Always
- Frequently
- Moderately
- Never
- Not applicable to my teaching

**Figure 2. ICT literacy section heading and sample question**

### Results and Discussion

In contrast to the results for HR consultants, business faculty reported less attention to ICT literacy. Only nine of the 28 elements of the ICT literacy framework were rated as being included in the faculty member's teaching *Always* or *Frequently* by more than 50% of respondents. The elements reported as *Always* or *Frequently* taught by most faculty members included skills associated with drawing reasonable conclusions from information: "My teaching strategies include plans to teach the student how to support conclusions with all necessary relevant information" (74% of respondents), "My teaching strategies include plans to teach the student how to draw feasible conclusions targeting problem solving"(63%), and "My teaching strategies include plans to teach the student how to discern a highly appropriate information need from an existing problem" (62%). The remaining elements were highly rated by less than 60% of responding faculty.

Interestingly, few faculty members rated the elements associated with the ethical use of information as *Always* being part of their course plans. Table 3 shows the faculty results for the same ICT literacy elements that were highly rated by most HR consultants in Table 2. At most, about one-third of faculty reported always including these elements in their instruction. In addition, these elements were rated as *Not applicable* or *Never* by between 21–62% of faculty. Although these faculty do not ignore the ethical and legal use of information—perhaps these topics are integrated as appropriate throughout a course or covered primarily in distinct courses—these results suggest that responding faculty members do not teach these elements with a frequency that might be expected given the value HR consultants place on legal and ethical topics associated with information use.

Overall, the moderate-to-low integration of ICT literacy skills into business faculties' teaching coincides with other researchers' surveys of business school curricula (e.g., Hawes, 1994).

**Table 3**

***Ratings of Ethical Elements of the ICT Literacy Framework***

Statement Percent	<i>Always</i> Rating	Percent <i>Not applicable</i> or <i>Never</i> Rating
My teaching strategies include plans to teach the student how to recognize and respect authorship, copyright, trademark, and confidential information.	30%	21%
My teaching strategies include plans to teach the student how to recognize and treat confidential or sensitive information appropriately.	20%	38%
My teaching strategies include plans to teach the student how to recognize and follow security procedures.	7%	62%
My teaching strategies include plans to teach the student how to recognize and respect legal and ethical considerations regarding information use.	21%	30%
A new hire is able to assure appropriate care of confidential information.	Not asked	Not asked
My teaching strategies include plans to teach the student how to refrain from using insensitive language with respect to culture, race, ethnicity, or gender while communicating information to an audience.	28%	34%

## **General Discussion**

Using two web-based surveys, this research explored the value HR consultants place on ICT literacy skills and the extent to which these skills are taught by business faculty. The first study suggested that HR professionals value ICT literacy and expect their new hires to possess these skills. The second study suggested that although business faculty at the 25 top-ranked business schools taught some ICT literacy concepts, the level of integration was not as great as might be hoped given the HR consultants' ratings. The consistency of our results with those of the research literature leads us to tentatively conclude:

1. Human resources professionals are interested in ICT literacy in general and that employers require ICT-literate college graduates.
2. ICT literacy integration is limited in the current business school curriculum.

The present work represents a call for a change in the business curriculum: If business schools seek to educate tomorrow's workforce leaders, then business school curricula should reflect the ICT literacy skills valued by employers. Yet ICT literacy skills are not necessarily isolated skills, taught in a single course. As with writing, their value comes through integrating the skills throughout the curriculum, such as by embedding ICT literacy assignments into existing courses (Rockman & Associates, 2004). Such an integration of ICT literacy into the business curriculum requires an implementation strategy that recognizes the university stakeholders who might support curricular change. Stakeholders include human resources, higher education administration, business faculty, librarians, and business students.

### **The Role of Human Resources**

Principal partners in curriculum change are the HR units in hiring organizations. This group of stakeholders wants to hire qualified ICT-literate workforce, and therefore this group may benefit from partnering with colleges and universities to communicate the needs of the business community. For such a partnership to succeed, both sides—higher education and the business community— should have a common vocabulary for discussing the knowledge and skills needed by graduates. Detailed frameworks, such as the ICT literacy framework used in this report, can foster collaboration between business schools and businesses, helping to guide needed curricular changes.

The process of implementing curricular change may prompt addressing two sets of challenges: administrative and faculty issues and also it addresses the role of the library in the integration process.

### **The Role of Higher Education Administration**

Colleges and universities face many challenges in many of their functions such as curricula revision and implementation. These challenges vary in their difficulty levels but mostly are affected by drivers such as accreditation, commitment, and infrastructure.

Accreditation bodies such as the Association to Advance Collegiate Schools of Business (AACSB) conduct assessments of business schools to ensure that these schools are adapting to current and emerging socio-economical issues. AACSB (2003) states in its Standards Report:

Curricular contents must assure that program graduates are prepared to assume business and management careers as appropriate to the learning goals of the program. Contents of the learning experiences provided by programs should be both current and relevant to needs of business and management positions...Another example of present-day relevance and currency is the need for graduates to be competent in the uses of technology and information systems in modern organizational operations. The school must determine the specific ways globalization and information systems are included in the curriculum, and the particular pedagogies used. Curricula without these two areas of learning would not normally be considered current and relevant. (p. 71)

Miles, Hazeldine, and Munila (2004) describe accreditation as “a hallmark of quality and [it] provides students and other business-school stakeholders with an objective, third-party assurance that the business school is conforming to sound academic management practices and a somewhat accepted curriculum” (p. 30).

Because technological advances such as ICT have become daily functions for society and business, it is pertinent for business schools to adapt to these social changes by making ICT-related proficiencies—including ICT literacy—vital components of their curricula. Information literacy is important to lifelong learning (Johnston & Webber, 2004). Hence, the organizational culture of the business schools has to recognize and to commit to allow ICT literacy to be part of its daily processes and functions in seeking accreditation.

Administrative commitment to change is the key factor in driving change toward implementation, and this commitment can be illustrated by providing an appropriate infrastructure that allows for ICT literacy integration. Making the various higher education stakeholders interact cooperatively can be facilitated by having a curriculum integration plan. This plan should provide a vision of the final outcome—an ICT-literacy-rich business curriculum. Critical to success is a qualified and motivated faculty who will drive the ICT literacy integration.

### **The Role of Faculty**

Faculty are critical stakeholders for implementation of ICT literacy curricular changes. The plan for ICT literacy integration must include opportunities for ICT literacy-centered development of undergraduate business faculty. Faculty's beliefs about their capabilities are crucial to the success of any faculty-initiated undertaking, such as ICT literacy integration (Colbeck, Cabrera, & Marine, 2002; Johnston & Webber, 2004). Preparing business faculty with ICT literacy skills can be arranged through development seminars as well as by providing references and resources such as peer mentors and tutorials, sometimes provided by library staff.

Faculty's involvement in ICT literacy development seminars and their subsequent performance in acquiring ICT literacy skills depends on faculty's motivation. Johnston and Webber (2004) explain the impact of information literacy on academia, "When academic staff becomes information literate it can influence their pedagogic thinking and the way they conceive of their own discipline and its knowledge base" (p. 13). Faculty's motivation to undertake any professional development opportunities depends on many factors, such as tenure implications, workload compensations, and monetary incentives. Other faculty motivation factors may include the use of technology, professional recognition, and resistance to change. College and university administrations should consider these motivating factors to attain a successful integration of ICT literacy into their business curricula. Compared to the responsibility that befalls higher education administrations, the stakeholder group with the biggest responsibility to integrate ICT literacy is the business faculty.

The business faculty leadership of the integration effort can be strengthened by professional collaboration with the institutional library and its staff. This collaboration carries with it the benefit of exposure to cross-disciplinary pedagogy; Fiegen et al. (2002) suggest that

librarians use their information literacy standards and their search strategies techniques in collaboration with the business faculty to prepare the business students with ICT proficiencies.

### **The Role of the Library**

The Association of College and Research Libraries (ACRL), as an authority on information literacy, developed information literacy competency standards to help produce lifelong learners in colleges and universities (ACRL, 2000). ACRL's standards were the basis for the ICT literacy framework (2004) used in the current report. Campbell and Wesley (2006) wrote, "There are indicators that the academic community views the library as its intellectual heart on some level. There are specific indications that the university views the library in a central role for all academic affairs" (p. 93).

The business faculty and the library staff may collaborate to initiate and promote an ICT literacy plan. The ICT literacy plan needs to start with addressing the training needs of business faculty's ICT literacy before implementing the plan in the classroom. The library may offer ICT literacy training for current business faculty and then provide ICT literacy orientation for incoming faculty. Furthermore, the library will continuously promote its services and expertise by updating its materials and announcing these updates to the institutional community.

Consequently, the business faculty and the library can collaborate to

- identify the ICT literacy needs of the business students;
- identify the ICT literacy needs for each discipline;
- identify all core courses that need ICT literacy instruction (Fiegen et al., 2002);
- develop measurable ICT literacy outcomes for these courses and students; and
- implement the plan incrementally to provide opportunities for all students to achieve the competencies outlined by the program.

### **The Role of Business Students**

Business students benefit from the collaboration of business faculty and librarians. Students are information users and must carry some responsibilities in the ICT literacy process. Avdjieva et al. (2004) explained, "By developing the students' ability to identify their needs and legitimating and encouraging students to voice their learning needs, teachers can better facilitate lifelong learning" (p. 7); Johnston and Webber (2004) added that students contribute back to

their institutions through their responsibility for using information properly and by further synthesizing information into knowledge.

### **Conclusions**

The results of these studies suggest differing expectations for students' ICT literacy skills between the employers who hire students and the business schools that train the students. Employers seek ICT-literate workers, yet business schools might not be teaching these skills.

How might these expectations be aligned? A first step is communication between business schools and their business communities. Each should work towards a common framework for ICT literacy, which would underlie integration of ICT literacy skills across the business curricula. Business school faculty involvement is critical to any initiative for curricular change because faculty hold a key position as a link among the various stakeholders: school administrators, employers, and students. Faculty should work closely with library staff, who traditionally have been the primary instructors of information literacy and ICT literacy skills, to develop course activities and assignments that provide critical ICT literacy training.

## References

- Association of College and Research Libraries (2000, January). *Information literacy competency standards for higher education*. Retrieved from <http://www.ala.org/ala/mgrps/divs/acrl/standards/informationliteracycompetency.cfm>
- Association to Advance Collegiate Schools of Business (2003). *Standards for business accreditation*. Retrieved from [http://www.aacsb.edu/accreditation/process/documents/AACSB\\_STANDARDS\\_Revised\\_Jan08.pdf](http://www.aacsb.edu/accreditation/process/documents/AACSB_STANDARDS_Revised_Jan08.pdf).
- Avdjieva, M., Callagher, L., Knight, C., & Mitchell, L. (2004, September). Infolit: A “home grown” information literacy initiative in a flexible e-learning environment. Paper presented at the Library & Information Association of New Zealand Aotearoa (LIANZA) Conference, Auckland, New Zealand.
- Boyer Commission on Educating Undergraduates in the Research University (1998). *Reinventing undergraduate education: A blueprint for America’s research universities*. Washington, DC: Author.
- Bozman, C. S., & Pettit-O'Malley, K. L. (2002). The need for continuing education on rapidly changing business issues: Internet privacy as a telling example. *Journal of Education for Business*, 77(4), 219–225.
- Braun, N. M. (2004). Critical thinking in the business curriculum. *Journal of Education for Business*, 79(4), 232–236.
- Campbell, N. F., & Wesley, T. L. (2006). Collaborative dialogue: Repositioning the academic library. *Libraries and the Academy*, 6.1, 93–98.
- Cheuk, B. (2002, July). *Information Literacy in the Workplace Context: Issues, Best Practices and Challenges*. White paper prepared for UNESCO, the U.S. National Commission on Libraries and Information Science, and the National Forum on Information Literacy, for use at the Information Literacy Meeting of Experts, Prague, The Czech Republic. Unpublished manuscript.
- Colbeck, C. L., Cabrera, A. F., & Marine, R. J. (2002). *Faculty motivation to use alternative teaching methods*. Paper presented at the meeting of the American Educational Research Association, New Orleans, LA.

- Feast, V. (2003). Integration of information literacy skills in business courses. *Reference Services Review*, 31(1), 81–95.
- Feldman, S. (2004). The high cost of not finding information. *KM World*, 13(3), 8–10. Retrieved from <http://www.kmworld.com/Articles/ReadArticle.aspx?ArticleID=9534>.
- Fiegen, A. M., Cherry, B., & Watson, K. (2002). Reflections on collaboration: Learning outcomes and information literacy assessment in the business curriculum. *Reference Services Review*, 30(4), 307–318.
- Hawes, D. K. (1994). Information literacy and the business schools. *Journal of Education for Business*, 70(1), 54–61.
- International ICT Literacy Panel (2002). *Digital transformation: A framework for ICT literacy*. Princeton, NJ: ETS. Retrieved from <http://www.ets.org/Media/Research/pdf/ICTREPORT.pdf>
- Johnson, D. (2000). Information power: Building standards that are useful. *Teacher Librarian*, 28(2), 19–20.
- Johnston, B., & Webber, S. (2004). The role of LIS faculty in the information literate university: Taking over the academy? *New Library World*, 105(1196/1197), 12–20.
- Katz, I.R. (2007). Testing information literacy in digital environments: ETS's iSkills Assessment. *Information Technology and Libraries*, 26(3), 3–12.
- Katz, I.R., Williamson, D.M., Nadelman, H.L., Kirsch, I., Almond, R.G., Cooper, P.L., Redman, M.L., & Zapata-Rivera, D. (2004, June). *Assessing information and communications technology literacy for higher education*. Paper presented at the Annual Meeting of the International Association for Educational Assessment, Philadelphia, PA.
- Kirk, J. (2004, September). *Information and work: Extending the roles of information professionals*. Paper presented at the ALIA 2004 Biennial Conference, Gold Coast, Queensland, Australia.
- Kuhlthau, C. C., & Tama, S. L. (2001). Information search process of lawyers: A call for 'just for me' information services. *Journal of Documentation*, 57(1), 25–43.
- Lambrecht, J. J. (1999). Teaching technology-related skills. *Journal of Education for Business*, 74(3), 144–151.
- McCoy, R. W. (1996). *Computer competencies needed in business education for the 21st Century*. Unpublished doctoral dissertation, University of Georgia, Athens.

- McCoy, R. W. (2001). Computer competencies for the 21st century. *Information Technology, Learning, and Performance Journal*, 19(2), 21–35.
- Miles, M. P., Hazeldine, M. F., & Munila, L. S. (2004). The 2003 AACSB accreditation standards and implications for business faculty: A short note. *Journal of Education for Business*, 80(1), 29–34.
- National Business Education Association (2001). *National standards for business education*. Reston, VA: Author. Retrieved from <http://www.nbea.org/newsite/curriculum/standards/index.html>.
- Pfeffer, J., & Fong, C. (2002). The end of business schools? Less success than meets the eye. *Academy of Management, Learning and Education*, 1(1), 78–95.
- Rockman, I. F. and Associates (2004). *Integrating information literacy into the higher education curriculum: Practical models for transformation*. San Francisco, CA: Jossey-Bass.
- Sadri, G. (2002). Identifying core business school competencies. *The Online Journal of Teaching and Learning*. Retrieved from [http://www.exchangesjournal.org/research/1044\\_Business\\_1.html](http://www.exchangesjournal.org/research/1044_Business_1.html).
- U.S. News & World Report (2005) *America's best colleges 2005*. Washington, DC: Author.
- Workforce Readiness Project. (2006). *Are they really ready to work? Employers' perspectives on the basic knowledge and applied skills of new entrants to the 21st century U.S. workforce*. Retrieved from [http://www.21stcenturyskills.org/documents/FINAL\\_REPORT\\_PDF9-29-06.pdf](http://www.21stcenturyskills.org/documents/FINAL_REPORT_PDF9-29-06.pdf).