Student Learning and Workplace IL: A Case Study

Barbara D'Angelo

Abstract

This article reports on a case study that analyzed portfolios composed by technical communication undergraduate majors at a research university in the United States. Results showed that students, who are also practicing professionals in their field, exhibited information literacy (IL) outcomes more typical of the workplace than academia. The categories of research engaged in by students to complete course work included academic, applied, and experiential. These categories grounded the students' research in rhetorical and contextually situated practices. They indicate that it may be important to broaden the way that information literacy is articulated, taught, and learned to bridge the gap between academia and the workplace.

Information Literacy: Academic or Workplace Skill?

The 1983 publication *A Nation at Risk* exemplified ongoing and heightened concern related to achievement in schools and universities in the United States. In the late twentieth and early twenty-first centuries, attention and concern about the performance of the nation's schools is attributed, in part, to the evolution of information and communication technologies and the perception that economic and workplace transformations require the teaching and learning of different or higher levels of skills than schools and colleges are delivering. The development of information literacy (IL) standards for higher education internationally can be seen in this context as an attempt to address the need for these higher-level skills. In the United States (Association of College and Research Libraries, 2000), the United Kingdom (Society of College, National and University Libraries, 2004), Australia, and elsewhere, standards and outcomes state-

ments related to IL have been created to delineate the skills and abilities students should learn related to research and information use.

Beginning with the Middle States Commission on Higher Education, accrediting agencies in the United States increasingly recognized IL and recommended the assessment of it as a learning outcome (Gratch-Lindauer, 2002). IL also is recognized internationally as a core competency. Following the 2003 Prague Conference of Information Literacy Experts, an Alliance for Information Literacy was created with membership from regional and national organizations from around the world to facilitate the sharing of information and expertise on IL "to facilitate people's participating effectively in the Information Society, as part of the basic human right of life long learning" (National Forum on Information Literacy, 2003). The United Nations Educational, Scientific, and Cultural Organization (UNESCO) recognizes IL as a key skill and devotes resources to ensure awareness of it in all levels of education globally. UNESCO's strategy is linked to the belief that IL is a prerequisite for individuals to use information and communications technology effectively to access and use information and knowledge (United Nations Educational, Scientific, and Cultural Organization, 2007).

In 1994, management guru Peter Drucker declared that "Executives need to make themselves and their businesses information literate. . . . and look on information as a tool for a specific job." Drucker's statement reflects the contextual nature of information gathering, analysis, and use in the business world. Frequently, however, the term "information literacy" is associated with academics while in the workplace the same concepts are referred to using other terminology such as information management, knowledge management, computer skills, or data mining (O'Sullivan, 2002). Often the focus becomes related to the need for skills to use information technology.

Yet, there has been recognition for the need for a more complex set of skills that are reflected in IL statements and documents produced by library associations. Indeed, in 1996 the Office of Economic Cooperation and Development published a report describing the demand for highly skilled workers within the context of the knowledge-based economy but did not explicitly use the term, "information literacy" (1996). On the other hand, the 2007 Horizon Report did explicitly name IL as one of six key trends likely to have a significant impact on education over the next five years (New Media Consortium, 2007). A year later, the Partnership for 21st Century Skills published its resource and policy guide on public education in the United States calling for more attention to be devoted to educational policy in which twenty-first century skills are the focus. Among these are the ability "to assess the credibility, accuracy, and value of information, analyze and evaluate information, make reasoned decisions…" and "making innovative uses of knowledge, information and op-

portunities to create new services, processes and products" (2008, p. 10).

These statements and reports serve as reminders that IL does have a place in business and industry. In their conceptual framework paper *Towards Information Literacy Indicators*, Catts and Lau (2008) remind us that the Alexandria Proclamation must be considered beyond education and in the context of work, civil society, health, and well-being. The authors distinguish between the type of ICT skills focused on by policy makers in which individuals use technology to access and transmit information and the fuller range of IL skills and abilities needed to interpret and use information effectively. For workplace practices, the distinction lies in the difference between routine distribution of information and the use of information to innovate and to create new products and processes. Cheuk (2008), for example, describes the adaptation of Christine Bruce's seven faces of IL (Bruce, 1997) to integrate IL as a component of a knowledge management program to address information overload within an environmental consulting firm. Employees' ability to use information more effectively as a result of the program created value for the firm.

More recently, Toledano O'Farrell proposed a conceptual framework to explore the relationship between IL and knowledge management in which distinctions are made between information use and the ability to interpret and act upon information. He argues for a social constructivist perspective of learning to view IL as one aspect of *literacies* rather than as an independent concept. Doing so may lead to a better understanding of situated practices in organizational settings (Toledano O'Farrell, 2008). This view of IL as contextualized and situated within practice builds on the work of others who have argued for a broader understanding of IL to move beyond tool-based and prescriptive approaches typical of many current training paradigms (Johnston & Webber, 2003; Lupton, 2004). More recently, Crawford and Irving stated that "It is essential to recognize the key role of human relationships in the development of information literacy in the workplace. . . . An understanding of what constitutes information literacy is widespread in the workplace; however, but is often implicit rather than explicit and is based on qualifications, experience and networking activities" (2009, p. 36). Not only do these perspectives broaden our understanding of IL in relation to workplace practice, they are consistent with rhetorical and process-oriented approaches to writing instruction in the United States. In process-oriented approaches, writing and communication is situated in the environment in which it takes place. Writing and communication of information are components of IL, whether viewed as a stage in the process or as a literacy that intersects with IL. It is useful, therefore, to understand IL in a rhetorical context that is situated in practice.

Student Learning and Workplace IL: A Case Study

In higher education in the United States, the focus of IL education has been primarily on the teaching and learning of academic research skills, most notably in general studies courses. The linkage between the search for, retrieval, and use of information with its presentation and communication can be the basis for a natural alliance between IL and writing instruction, particularly in first-year composition (FYC) courses (Elmborg, 2005; Norgaard, 2003; Norgaard, 2004). However, the role of FYC is to help students to learn the types of academic research and writing skills that are required in disciplinary coursework. While this type of instruction may help students to become successful academics to finish courses and graduate, it is less clear whether the focus on academic research and writing enables students to transfer skills to workplace needs and practices.

Technical Communication Portfolio Analysis

Technical communication is traditionally associated with the presentation of technical information, in the form of reports, manuals, and other instructional materials and business and professional communication. As it has grown as a discipline, technical communication has evolved to incorporate other applied communication environments such as medical/health communication, instructional design, and Web development and design. As an applied academic discipline, degree programs in technical communication emphasize both disciplinary academic knowledge as well as workplace practice.

The study reported on here investigated how students in an undergraduate degree program in technical communication experienced IL by analyzing narrative statements and artifacts from graduating seniors' capstone portfolios. This article reports on the results of research to show how learning outcomes related to IL were manifested in portfolios of student work. Analysis of student portfolios resulted in categories of research based upon the rhetorical constructs of audience and purpose. Thus, the research contributes to and builds upon studies that have begun to identify IL as situated- and context-oriented.

Portfolios are collections of artifacts—assignments or other documents selected by students to demonstrate their learning. A reflective statement or letter ties the contents (artifacts) together using metacognition to demonstrate reflective self-analysis and learning. Portfolios are effective tools in a constructivist approach to education in which the learner connects thought, reflection, experience, and action over time to construct new knowledge. Reflection enables students to understand and be aware of the processes that they engage in when they learn. Reflection is particularly key to portfolio assessment because students demonstrate not only their own learning processes but also demonstrate how performance meets goals or outcomes for learning (Yancey & Smith, 2000). Portfolios are a

common assessment tool used in writing instruction and has been used in the assessment of IL (D'Angelo & Maid, 2009; Samson, 2010; Scharf et al., 2006).

Methods

The Multimedia Writing and Technical Communication (MWTC) Program at Arizona State University (ASU) began offering a bachelor of science (BS) degree in technical communication in 2000. For curricular development and assessment purposes, the program chair designed the MWTC Program around nationally recognized outcomes for writing programs modified to fit the context of an undergraduate technical communication program. Faculty then integrated IL into the MWTC Program's outcomes to reflect more fully the program's mission and goals as a technical communication program grounded in teaching and learning of the management, use, and design of information (D'Angelo & Maid, 2004). Students compose a portfolio in their final semester as their culminating project in the degree program. They compose a narrative statement to argue that they have achieved programmatic learning outcomes. Students select assignments, documents from internships or their workplace, to include as evidence that they have, in fact, achieved outcomes and applied their learning. Portfolios are evaluated by faculty using Phase 2 scoring by reading the narrative statement and referring to the artifacts as evidence (White, 2005).

For this case study, the author studied ten electronic portfolios from the MWTC Program from the fall 2006, spring 2007, and fall 2007 semesters using grounded theory to analyze how the construct of IL was manifested in student work. Six of the ten portfolios were submitted by males, four by females. Eight of the ten students worked part or full time while enrolled in the MWTC Program, one of whom owned his own business. Content of each portfolio was loaded into Atlas.ti, a content analysis software program, to facilitate analysis using grounded theory.

Using grounded theory methods, the researcher uses a coding structure to examine relationships, patterns, and trends to develop theory from data by analyzing texts. Constant comparison of data and identification and narrowing of categories allows the researcher to generate theories to account for or to understand processes and change (Strauss & Corbin, 1998). Text analysis using grounded theory is suitable for studying complex phenomena and processes such as IL so that the resulting theory is practically oriented. The final stage of grounded theory, theoretical coding, specifies possible relationships between categories developed during previous coding stages.

Following Charmaz' (2006) approach to grounded theory, the author analyzed student reflective cover statements and the artifacts they included to support their claims to code outcomes as they were manifest-

ed in both. By coding both narrative statements and artifacts, the author was able to uncover whether claims made in statements were supported through the application of concepts in student work. Coding proceeded in three stages. First, initial coding identified processes and actions reflected in the texts. Next, focused coding synthesized and evaluated the initial codes to identify relationships among concepts; focused coding also allowed for development of categories through comparison and revision. Finally, theoretical coding integrated and conceptualized relationships to begin to build theory based on categorization and identification of patterns and trends.

Results: Research Defined by Rhetoric

Based on analysis of portfolios in this case study, students engaged in rhetorically driven research practices. Three categories of research emerged from analysis of portfolios in this case study: academic, applied, and experiential (see table 1). These categories were derived from coding which showed that the rhetorical situation, in which topic, audience, and purpose were intertwined, impacted students' decisions related to research practices and their presentation of information. Viewed in this way, research was situated in practice and context-driven. Table 1 delineates the rhetorical context for student research in which they considered audience for their information search, the purpose for which they would use the results, and how they conducted the search (methods used).

The Academic Research category addresses the types of research typical of academic settings in which the purpose for an assignment is the completion of a research paper or report and the instructor is the only audience. In the student portfolios studied, the purpose of these assignments was informational regardless of the genre used to present results (term paper, research paper, report, website, etc.). Students most often searched for secondary sources as the main method to complete Academic Research. In some cases students used primary methods (surveys or interviews) to collect information; however, they used these less often

Table 1. Research Categories

Focused Code	Audience	Purpose of Results	Methods Used
Academic Research	Instructor only	Informational; summarizing/ reporting results	Secondary and/or primary
Applied Workplace Research	Workplace	Pragmatic; application of results (problem-solving, decision making)	Primary and/or secondary
Experiential Research	Individuals or groups external to instructor	Instructional	First-hand/hands-on and secondary

than searching for information from library databases or the Internet for secondary sources.

The Applied Research category refers to research conducted for purposes in which students sought to solve a problem or identify a strategy for decision making or product improvement. Typically the student associated this type of research with a workplace audience even when the document had been submitted only to an instructor as an assignment. Primary research methods predominated as the method students used to collect information for these assignments. Students used secondary sources as supporting documentation for background or as justification for the use of primary methods. Usability studies were typical of this type of research in which observation or interviews predominated with secondary sources to supplement the results or to explain and justify current use of the primary methods within a technical communication field. In one portfolio, for example, the student described using data and analysis from observation and think-aloud protocols to make a recommendation to improve the product under study.

Experiential Research is the third category that emerged during analysis of student portfolios. This category emerged from coding and analysis of data and was one that was problematic to categorize. Although students made claims that their practices were research (data collection and analysis), initially their descriptions of their processes and practices appeared not to be research at all. At first glance students seemed simply to be learning a tool, application, process, procedure, or something else that was new to them. The difference, however, was that the learning was not for the purpose of the student's own gain or use. The purpose of the student's research process was to gather information related to a product or process to communicate it to an audience for some purpose. In this sense, students conducted Experiential Research for the purpose of seeking information to combine it with what they already knew and to communicate it as new knowledge to others in the form of a product. Students' descriptions of their processes were highly practical and pragmatic in that they were grounded in the need to understand something before they could communicate it to their intended audience.

While practical and pragmatic also defined the Applied Research category, Experiential Research was clearly differentiated from Applied Research by the lack of traditional research methods. Instead, in cases of Experiential Research, students' methods focused on investigating how to use a tool or complete a process to break it down into its component parts to understand it. Other methods were secondary to this process; it was the researcher's own experience, reflection upon, critical thinking about, and application of experience that was the driving force that defined this type of research. Further, the method was embedded within the students' understanding of their task and their audience within the context of the

rhetorical situation: to whom they would communicate information and for what purpose.

For example, in one persuasive statement, the student claimed to have "researched the process and integrated new ideas into my own thinking. . . ." In this case, the process described was learning how to set a table to write "Table Setting" instructions. She described a process in which she sought information from secondary sources and then applied those "new ideas" using her own application of the information prior to composing the instructions for the assignment. The end result was her use of this new knowledge to create a set of instructions for her target audience. If described solely by methods used (searching secondary sources), this research would have been categorized as Academic or, perhaps, Applied Research. However, unlike Academic Research, the student did not search for and locate sources to integrate and cite them as support for a thesis or claim. Nor did she use primary research methods as her main source of information as would be expected in Applied Research. Instead, the student first searched for information and then used the information in a first-hand process of learning and application to combine the "new ideas" with her current understanding of how to set a table. She then applied that new knowledge to create a document for her audience that communicated to them how to complete the same procedure. Therefore, this "Experiential Research" category indicates that students used experience or first-hand inquiry and critical reflection to uncover needed information (alone or in conjunction with other methods).

Another example of Experiential Research came from another portfolio in which the student worked through the process of learning to fly a kite. The student used Adobe Illustrator to prepare one set of instructions for use by both children and adults. In this case, the Experiential Research involved a process (kite flying) that was rhetorically driven through the recognition of a need to meet the expectations of two audiences (children and adults) and to design a document that would be useable by both. In addition, the research in this example was compounded by a secondary need for the student: researching and learning to use a software application (Adobe Illustrator) to complete the product.

IL Beyond Research
In addition to research processes, student portfolios demonstrated aspects of IL related to the organization or management of information such as format (organization or arrangement of information), use of multiple genres to present the same information to different audiences, storage and labeling of information, and indexing and classification. Two artifacts from the same portfolio were representative of how information management was manifested in portfolios. The student claimed in his narrative statement to have been responsible for tasks associated with the classifi-

cation of content for search engine optimization for two websites. The purpose was to index information for easy accessibility by the sites' users. The student's work in this case was highly contextualized to reflect understanding the audience for the information (the sites' users) as well as the purpose for their use (search and retrieval of information).

Analysis also uncovered aspects of IL related to ethical and legal uses of information, in particular as they related to copyright and intellectual property, the use of standards or regulations, and citation and documentation practices. While it may be expected that these outcomes were identified in the context of the academic use of information and the need to avoid plagiarism, students also recognized the importance of ethical uses of information and the need to adhere to policy, regulations, and legal matters in the workplace. For example, one student claimed in his narrative statement that he researched and incorporated regulations from the workplace in an instruction manual for employees, demonstrating understanding of the organizational context in which the manual would exist.

Discussion

The significance of the three categories for IL identified in this case study is that they shift the creation of taxonomies of research practices for undergraduate students into categories that reflect rhetorical constructs rather than products or methods. Traditional categories of research (primary vs. secondary, qualitative vs. quantitative) revolve around the methods used. As a result, instructors often teach research as data collection separate from the rest of the research and writing process(es), from rhetorical considerations of audience and purpose for the research results, and from the genre and medium used to communicate the information. Consequently, the focus of IL instruction remains data collection rather than the more complex, situated, and contextualized process of gathering, analyzing, using, and presenting information for a specific audience and purpose.

Some research texts do describe the research process in phases or stages. Frey (Frey, Botan, & Kreps, 2000) delineates five phases: conceptualization, planning and design, methodologies, analyzing/interpreting data, and re-conceptualization (including presentation of results). Creswell's research design process is explicated in six steps: questions, theoretical lens, data collection, data analysis, write-up, and validation (Creswell, 2003). Kuhlthau based her stages of the information search process on extensive studies of middle school students, college students, and professionals. Kuhlthau's process includes six stages: task initiation, topic selection, pre-focus exploration, focus formulation, information collection, and search closure/presentation (Kuhlthau, 2004; Kuhlthau, Heinstrom, & Todd, 2008). In all of these research process descriptions, data collection is a middle or later stage. Yet, research, as taught in most under-

graduate course work, remains focused on methods and data collection. Schwegler and Shamoon's (1982) research, for example, showed that students perceived research in their assignments as a close-ended information-gathering exercise. Nelson and Hayes (1988) found differences in students who approached papers as content-driven vs. issue-driven. Students who approached research as only finding content performed less well than those who approached research as issue-driven. Other studies support that students' research practices are more complex and effective when they recognize the contextual and situated nature of the task for which the research is conducted (Fister, 1993; Heinstrom, 2002; Lantz & Brage, 2006; Lloyd & Somerville, 2006; Lupton, 2004). Nelson (1992; 1994), however, found that both librarians and instructors encouraged an information-gathering approach so that students engaged in fact-finding and compiling rather than a recursive process approach.

The proposed shift in categorizing research resulting from this case study is perhaps a subtle one; however, one that might aid changing students' conceptions of the purpose of research as data or information gathering by helping them understand the task (or assignment), the purpose for the task, who they are conducting the research for, and why. The view of research as fact-finding and compiling (or data gathering and regurgitation) reinforces the distinction between *seeking* meaning vs. *constructing* meaning. Research as data gathering is informational with the instructor as the only audience. For students, then, the research assignment may represent finding information to demonstrate the learning of content or subject knowledge assessed (graded) at the completion of the assignment and for which research is about the method used to collect the information. There is little context beyond telling the instructor what he or she wishes to know. While in some cases (demonstrating learning of subject knowledge, for example), this may be a valid and needed activity; higher-level skills require a different perspective of what research is and how to teach it.

The categories suggested by the case study reported on in this article attempt to shift current conceptions of research away from methods or data collection and toward a fuller understanding of research as a process. In that process, researchers make decisions about topic formulation, data collection strategies, analysis of data, and presentation of results based on understanding of the rhetorical situation: the audience for whom the research is conducted (who will use the results) and the purpose for which the results will be used by that audience. An understanding of rhetorical context allows the student to learn and understand discourse practices of the community (whether that be disciplinary or workplace) so that the presentation of information becomes grounded in the use of accepted genres and media. Rude (2004), for example, connected research to genre and argued that different types of decision-making reports require

different types of research that is guided by the question or problem to be investigated so that research and the report genre are contextual. Based on the analysis of student portfolios in this case study, this understanding of the rhetorical situation is what appeared to drive student research practices, their selection of methods, and the presentation of their results.

Beyond pedagogy, student research as rhetorically driven has further significance for how we assess IL. In the reported assessment of a technical communication program, the New Jersey Institute of Technology defined IL within the context of citation and documentation practices to develop criteria for its model of assessment (Scharf et al., 2006). Yet, one of the concluding questions was whether the criteria for assessment of IL appropriately defined what IL is within the context of learning. Citation practices are more likely to be associated with Academic Research than workplace research; if students are conducting the type of research seen in Applied Research or Experiential Research, they potentially are penalized in assessment practices that value Academic Research. Further, by focusing on assessment of the mechanics of information use, we emphasize the basic skills and tools-based instruction associated with training rather than learning of higher order skills identified as needed in the twenty-first century workplace. We also risk devaluing the type of methods and practices associated with industry and business environments in which practices associated with information, including research, are highly contextualized and situated within social contexts.

The results from the case study reported here seem to support Lloyd and Somerville's (2006) contention that traditional educational frameworks of IL fail to explain manifestations of it in the workplace. In addition, the types of IL manifested in the portfolios in this case study would seem to fall into Bruce's seventh "face" in her taxonomy of IL: the wisdom conception (1997). In the wise use of information, the individual places his or her use of information in context and experiences. In this case study, Experiential Research was consistent with that which occurs in the technical communication workplace, which can be seen as the underlying context for research, decision making, and use of information. The technical communicator breaks down complex processes and technical information to understand it and then repackage or reformulate it in a way that can be understood by the intended audience. Unfortunately, this practice is not commonly understood or labeled research, especially in academia. Some in the field of technical communication, however, have called for more use of research to aid document design decisions (Krull, 1997). Others, meanwhile, have described technical communication research practices within the context of observation and walking through processes and simulating audience situations (Campbell, 2000). The results from this case study would seem to suggest a way for technical communication to re-conceptualize what research is to better understand how

practitioners use it to aid presentation of complex information to a variety of audiences. This study was limited and specifically focused on technical communication. However, as a profession that researches and communicates complex information to a variety of audiences, the results from this study may be relevant or analogous to other fields. Health-related professions, for example, also communicate complex information related to diseases and conditions, treatments, pharmaceuticals, and medical devices.

Conclusion

Research categorized as a rhetorically driven process de-emphasizes the view of IL as accessing and retrieving information that has been critiqued (Johnston & Webber, 2003; Lupton, 2004; Webber & Johnson, 2000). Viewing IL as rhetorically or contextually situated helps to move teaching and learning to pedagogies that assist students to understand practical applications of research methods that may transfer more effectively to the workplace. Seeing research as a rhetorically driven process also helps to prevent what Norgaard identified as a danger inherent in IL as it is currently perceived: as a mechanical skill conflated with technology use or with current traditional pedagogy (Norgaard, 2003). It also avoids what Toledano O'Farrell calls "a cascade of *literacies* that vie for recognition and supremacy . . ." (2008, p. 163) and the confusion over terminology based on disciplinary differences or academic vs. workplace language.

Classifying and viewing IL as rhetorically driven (situated and context-oriented within an environment) allows for the creation of effective pedagogy and assessment to develop educational practices relevant for and applicable to the workplace in the twenty-first century.

References

Association of College and Research Libraries. (2000). *Information literacy competency standards for higher education.* Retrieved December 1, 2011, from http://www.ala.org/ala/mgrps/divs/acrl/standards/informationliteracycompetency.cfm
Bruce, C. (1997). *The seven faces of information literacy.* Adelaide: Auslib Press.
Campbell, K. S. (2000). Research methods course work for students specializing in business and technical communication. *Journal of Business and Technical Communication, 14*(2), 223–241.
Catts, R., & Lau, J. (2008) *Towards information literacy indicators.* Paris: UNESCO.
Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis.* Thousand Oaks, CA: Sage.
Cheuk, B. (2008). Delivering business value through information literacy in the workplace. *Libri, 58,* 137–143.
Crawford, J., & Irving, C. (2009). Information literacy in the workplace: A qualitative exploratory study. *Journal of Librarianship and Information Science, 41*(1), 29–38.
Creswell, J. W. (2003). *Research design: Quantitative, qualitative, and mixed methods approaches.* Thousand Oaks: SAGE.
D'Angelo, B. J., & Maid, B. M. (2004). Moving beyond definitions: Implementing information literacy across the curriculum. *Journal of Academic Librarianship, 30*(3), 212–217.
D'Angelo, B. J., & Maid, B. M. (2009). Assessing outcomes in a technical communication capstone. In C. Schreiner (Ed.), *Handbook of Research on Assessment Technologies, Methods, and Applications in Higher Education* (pp. 152–166). Hershey, PA: IGI Global.
Drucker, P. F. (1994, August 29). Infoliteracy. *Forbes.* Retrieved January 9, 2011, from http://

login.ezproxy1.lib.asu.edu/login?url=http://search.proquest.com/docview/194960236 ?accountid=4485

Elmborg, J. K. (2005). Libraries and writing centers in collaboration: A basis in theory. In J. K. Elmborg & S. Hook (Eds.), *Centers for learning: Writing centers and libraries in collaboration* (pp. 1–20). Chicago: Association of College and Research Libraries.

Fister, B. (1993). Teaching the rhetorical dimensions of research. *Research Strategies, 11*(4), 211–219.

Frey, L. R., Botan, C. H., & Kreps, G. L. (2000). *Investigating communication: An introduction to research methods* (2nd ed.). Needham Heights, MA: Allyn & Bacon.

Gratch-Lindauer, B. (2002). Comparing the regional accreditation standards: Outcomes assessment and other trends. *Journal of Academic Librarianship, 28*(1), 14–25.

Heinstrom, J. (2002). *Fast surfers, broad scanners and deep divers. Personality and information-seeking behaviour.* Finland: Scar Abo Akademi University Press.

Johnston, B., & Webber, S. (2003). Information literacy in higher education: A review and case study. *Studies in Higher Education, 28*(3), 335–352.

Krull, R. (1997). What practitioners need to know to evaluate research. *IEEE Transactions on Professional Communication, 40*(3), 168–181.

Kuhlthau, C. C. (2004). *Seeking meaning: A process approach to library and information services* (2nd ed.). Westport, CT: Libraries Unlimited.

Kuhlthau, C. C., Heinstrom, J., & Todd, R.J. (2008, December). The "information search process" revisited: Is the model still useful? *Information Research, 13*(4), paper 355. Retrieved December 1, 2011, from http://InformationR.net/ir/13-4/paper355.html

Lantz, A., & Brage, C. (2006). Towards a Learning Society: Exploring the Challenge of Applied Information Literacy through Reality-Based Scenarios. Retrieved January 9, 2011, from http://www.ics.heacademy.ac.uk/italics/vol5-1/pdf/lantz-brage-final.pdf

Lloyd, A., & Somerville, M. (2006). Working information. *Journal of Workplace Learning, 18*(3), 186–198.

Lupton, M. (2004). *The learning connection. Information literacy and the student experience.* Adelaide, Australia: Auslib Press.

National Forum on Information Literacy. (2003). *International alliance for information literacy.* Retrieved December 11, 2011,from http://infolit.org/about-the-national-forum/international-alliance-2/

Nelson, J. (1992). *Constructing a research paper: A study of students goals and approaches. Technical report no. 59* (Technical Report No. 9). Washington, DC: ERIC.

Nelson, J. (1994). The research paper: A "rhetoric of doing" or a "rhetoric of the finished word"? *Composition Studies, 22*(2), 65–75.

Nelson, J., & Hayes, J.R. (1988). How the writing context shapes college students' strategies for writing from sources. Berkeley, CA: Center for the Study of Writing. Technical Report 16, ERIC ED297374.

New Media Consortium and EDUCAUSE Learning Initiative. (2007). *2007 horizon report.* Austin: New Media Consortium. Retrieved December 1, 2011, from http://www.nmc.org/pdf/2007_Horizon_Report.pdf

Norgaard, R. (2003). Writing information literacy in the classroom: Contributions to a concept. *Reference & User Services Quarterly, 43*(2), 124–130.

Norgaard, R. (2004). Writing information literacy in the classroom: Pedagogical enactments and implications. *Reference & User Services Quarterly, 43*(3), 220–226.

Office of Economic Cooperation and Development. (1996). *The knowledge-based economy.* Paris: OECD 96(102).

O'Sullivan, C. (2002). Is information literacy relevant in the real world? *Reference Services Review, 30*(1), 7014.

Partnership for 21st Century Skills. (2008). *21st century skills, education & competitiveness: A resource and policy guide.* Tucson. Retrieved December 1, 2011, from http://www.p21.org/

Rude, C. D. (2004). The report for decision making. In J. Johnson-Eilola & S. A. Selber (Eds.), *Central works in technical communication* (pp. 70–90). New York: Oxford University Press.

Samson, S. (2010). Information literacy learning outcomes and student success. *Journal of Academic Librarianship*, 36(3), 202–210.

Scharf, D., Elliot, N., Huey, H., Briller, V., Joshi, K., Katz, I., et al. (2006*). Information literacy at NJIT: Toward validity.* Paper presented at the ETS ICT National Advisory Committee.

Retrieved December 1, 2011, from http://library.njit.edu/researchhelpdesk/infolit/as
sessment.php
Schwegler, R. A., & Shamoon, L. K. (1982). The aims and process of the research paper. *College English, 44*(8), 817–824.
Society of College, National and University Libraries. (2004). *Learning outcomes and information literacy*. Retrieved December 1, 2011, from http://www.sconul.ac.uk/groups/information
_literacy/papers/outcomes.pdf
Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd ed.). Thousand Oaks, CA: Sage.
Toledano O'Farrell, R. (2008). Information literacy and knowledge management: Preparations for an arranged marriage. *Libri, 58*,155–171.
United Nations Educational, Scientific, and Cultural Organization. (2007). *Media and information literacy*. Retrieved December 1, 2011, from http://portal.unesco.org/ci/en/ev.php-URL
_ID=15886&URL_DO=DO_TOPIC&URL_SECTION=201.html
Webber, S., & Johnson, B. (2000). Conceptions of information literacy: New perspectives and implications. *Journal of Information Science, 26*(6), 381–397.
White, E. M. (2005). The scoring of writing portfolios: Phase 2. *College Composition and Communication, 56*(4), 581–600.
Yancey, K. B., & Smith, J. B. (2000). Reflections on self-assessment. In J. B. Smith & K. B. Yancey (Eds.), *Self-assessment and development in writing* (pp. 169–176). Creskill, NJ: Hampton Press.

Barbara J. D'Angelo is assistant clinical professor of technical communication at Arizona State University Polytechnic Campus. She received her MSLIS from the University of Illinois at Urbana-Champaign and her PhD in technical communication and rhetoric from Texas Tech University. She teaches courses in technical communication, business communication, health communication, and intellectual property. Her research interests include writing assessment; the impact of assessment on curriculum development, outcomes, and pedagogy; electronic portfolios; and information literacy.