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Educational Assessment

Assessing Information Literacy Instruction in the Basic Communication Course

Kevin R. Meyer, Stephen K. Hunt, K. Megan Hopper,
Kashmira V. Thakkar, Vicky Tsoubakopoulos &
Kaylee J. Van Hoose

Information literacy is becoming a key component of general education programs nationwide. As a critical part of most general education programs, the basic communication course is on the frontlines of the charge to teach information literacy skills to first-year students. Thus, the information literacy skills of basic course students should be assessed to track the effectiveness of instruction and pedagogical practices. The present study used a pretest/posttest design with experimental and control groups to assess the effectiveness of information literacy instruction in the basic course. As predicted, students in the experimental group outperformed students in the control group on the information literacy measure. Results of the present study have implications for basic course directors and instructors, general education curriculum specialists, and librarians.

Library instruction is rapidly becoming a key component of general education programs for first-year students (Jacobson & Mark, 2000) under the assumptions that information literacy is important and that students should be instructed in this area as soon as they start college (Breivik, 1998; Jacobson & Mark, 2000; Samson & Granath, 2001). Thus, information literacy instruction must be integrated into first-year classes. Information literacy skills must also be assessed to gauge the effectiveness of instruction.

The basic communication course is assuming a larger role in the general education requirements of universities (Cutspec, McPherson, & Spiro, 1999; Morreale, Hanna, Berko, & Gibson, 1999). As a result, the basic course is at the forefront of the push to teach information literacy skills to first-year students and is typically responsible for, and often charged with the mission of, advancing students' information literacy skills.

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As the role of the basic course in general education expands, the pressure to demonstrate student mastery of information literacy through assessment measures will likely increase. Assessment can indicate if the basic course is effectively teaching information literacy skills and identify areas where the pedagogy of the basic course may need to be modified (Hunt, Novak, Semlak, & Meyer, 2005). Pedagogical content knowledge, or the content knowledge the communication discipline has of the best ways to teach communication (Friedrich, 2002), should be expanded to include an evaluation of the instructional practices employed in the basic course with regard to library instruction and information literacy. Consequently, the purpose of the present study was to determine the most effective practices for information literacy instruction, expand basic course pedagogy to include information literacy, and identify the areas of deficiency for students' information literacy skills.

Review of Literature

Defining Information Literacy

Information literacy refers to students' ability to find, analyze, and synthesize information. Several specific skills are involved in the development of information literacy. The American Library Association Presidential Committee on Information Literacy (1989) observed that "to be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (p. 1). In addition, information literacy entails finding and locating sources, analyzing and synthesizing the material, evaluating the credibility of the source, using and citing ethically and legally, focusing topics and formulating research questions in an accurate, effective, and efficient manner (Eisenberg, Lowe, & Spitzer, 2004). Furthermore, Stern (2003) argues that students, as lifelong learners, should be able to "effectively find, analyze, and apply relevant and reliable data from a variety of regulated and unregulated sources such as are found on the Internet" (p. 114).

General Education and the Basic Communication Course

The basic course is a vital component of general education (Cutspec et al., 1999; Morreale et al., 1999) and serves as the cornerstone of the communication discipline (Dance, 2002). Both public speaking and hybrid versions of the basic course provide an ideal environment to teach and assess information literacy, because students apply what they learn about library information in the construction of speeches and presentations. In essence, the opportunity to practice information literacy skills in an applied manner forces students to combine their content knowledge of communication with their library instruction. To enhance information literacy, Jacobson and Mark (2000) suggest communication instructors and librarians should work in concert, allowing students the opportunity to apply newly acquired skills to specific assignments.

Importance of Information Literacy

Information literacy establishes the foundation for lifelong learning through the process of students assuming control for their own learning (American Association of College and Research Libraries, 2000; Lakos & Phipps, 2004; Phillips & Kearley, 2003; Rockman, 2002b). Specifically, effective instruction in information literacy prepares students for college and career success, and for making contributions to society (Jacobson & Mark, 2000) through the application of these skills in both professional and personal pursuits (DeMars, Cameron, & Erwin, 2003). In fact, information literacy is “central to the practice of democracy” (DeMars et al., p. 253). “Critical literacy pushes students toward self-reflection, interpretation, understanding, and ultimately action” (Swanson, 2004, p. 264). Thus, information literacy is also intertwined with, and linked to, the development of critical thinking skills (Eisenberg et al., 2004; Mackey & Jacobson, 2004), which makes it an integral part of students’ intellectual growth.

Information Literacy at Illinois State University

Illinois State University (ISU), like many other institutions of higher learning, has a mission to teach information literacy to its students. Toward this end, ISU has established information literacy competencies and standards which require that students be able to understand the assignment by accessing appropriate tools and evaluating the credibility of sources (Milner Library, 2004). In this endeavor, ISU provides Library Instruction for Language and Communication (LILAC), during which students spend one class session with a librarian learning to utilize the university library’s on-line catalog and electronic periodical databases. Additionally, students complete a research worksheet on an informative speech topic. However, this type of library instruction is not the most effective means for students to become information literate (Jacobson & Mark, 2000).

Deficiencies in Information Literacy Skills

Most first-year students are not information-literate, due to poor proficiency in database searches and critical thinking skills (Jacobson & Mark, 2000). Many students, as Jacobson and Mark note, know how to use the Internet to access needed information; however, most do not know how to build and expand effectively upon this knowledge. Students also face the somewhat daunting task of sifting through the abundance of information; distinguishing between useful and useless information. Proliferating information resources, due to rapid technological changes and easier access to resources via the Internet, complicate matters for students (American Association of College and Research Libraries, 2000; Swanson, 2004; Wilder, 2005).

Additional fundamental skills students should learn include the ability to distinguish between credible and non-credible sources and cite information correctly (Seamans, 2002). Training students about ethical and legal issues brings many

instructors to discussions on plagiarism and the task of teaching proper source citation. Unfortunately, most universities attempt to teach information literacy skills at the surface level by taking students to the library for a one-time tour and possibly a follow-up assignment. Consequently, Phillips and Kearley (2003) point out, after completing library skills assignments, students cannot differentiate between a library catalog and an index, scholarly journal and a magazine, and web and library sources.

Information Literacy Instruction

Library research should be integrated throughout the learning process and may be the key to success in facilitating information literacy skills (Lederer, 2000). Moreover, Seamans (2002) suggests faculty should work with librarians in designing research assignments. To develop information literate students and to close the gap between the library and the classroom, it is essential for an integration of the university library into the curriculum (Samson & Granath, 2001). As Rockman (2002a) states:

The challenge ahead for educators is to recognize the value of including information literacy skills vertically and horizontally throughout the curriculum, integrated into such areas as lower and upper division general education courses, courses in the major, electives, and capstone learning experiences. When educators do so, all students will have the requisite skills, knowledge, and abilities to become both critical consumers and ethical producers of information. (n.p.)

Rockman (2002b) posits information literacy should be woven into both lower-and upper-division courses. These efforts must also be linked to an ongoing assessment process, which provides meaningful feedback about the quality of institutional initiatives and the resulting impact on student learning (Rockman, 2002b).

Information Literacy Pedagogy

A variety of successful pedagogical practices can be incorporated into information literacy instruction. Indeed, Hunt et al. (2005) argue basic course pedagogy must be modified. Initially, information literacy must be student-centered and account for multiple learning styles. Additionally, information literacy instruction must move away from the “show and tell” pedagogy and also teach e-research skills along with evaluation of sources and critical thinking skills (Samson & Granath, 2001). Furthermore, information literacy instruction should be assignment- and content-based (Jacobson & Mark, 2000). Students must apply new-found skills in the classroom in order to see the relevance and importance of information literacy. Finally, instruction must be interactive, and discussion must be student-centered (American Association of College and Research Libraries, 2000; Lederer, 2000; Swanson, 2004). To address deficiencies in information literacy, educators must better understand how and why students gather information, and design instruction to determine “*what* students know, *what* they *think* they know, and *what* they *need* to know” (Stern, 2003, p. 118).

The innovation of the World Wide Web has drastically changed the way faculty and students conduct research (Stern, 2003). Because of the abundance of information available on the Internet, students in the 21st century are able to access information easily. Students use electronic sources to access information that had previously been unavailable in print or otherwise difficult to use because of library collection policies (Robinson & Schlegl, 2004). Thus, the Internet not only allows students easy access to information but also broadens their access to source materials.

Information literacy is essential in using the Internet as a research tool, because digital information may be unregulated by qualified individuals, requiring users to critically evaluate each Internet source for reliability, quality, and validity (Stern, 2003). Additionally, students may benefit from classroom exercises allowing them to practice evaluating websites (Choinski, Mark, & Murphey, 2003). Information literacy can be a helpful tool when trying to make sense of the new ways in which information is being created and disseminated (Sellen, 2002). In the 21st century, researchers must be able to effectively utilize both electronic resources and traditional reference works, and be able to distinguish the legitimacy and usefulness of electronic resources. "Minimally, information literacy gives students the skills to understand the structure, use, and evaluation of information. Through this understanding students gain a framework to evaluate the impact of these technologies on the decisions and choices they make" (Sellen, p. 125).

Finally, to determine if the instructional goals are met, the effectiveness of teaching methods should be assessed (Westphal-Johnson & Fitzpatrick, 2002). At the same time, it is also important that students immediately use and apply these newfound skills to assignments not only in their basic courses, but throughout their lifetime (Jacobson & Mark, 2000). Consequently, assessment is a necessary component of the pedagogical content knowledge of the basic course.

Hypothesis and Research Question

Since existing literature indicates active learning and intensive instruction can improve students' information literacy skills, students who are exposed to more information literacy training should improve their skills at a rate greater than students who receive less intensive library training. The following hypothesis was advanced:

H: There will be significant differences in the relationship between pretest and posttest information literacy scores between the experimental and control groups.

Although existing literature indicates students struggle with information literacy, it is unclear exactly which information literacy skills are of most concern. Therefore, the following research question was posed:

RQ: For which information literacy test items will the experimental group outperform the control group between the pretest and posttest?

Methods

Participants

Overall participants

The sample consisted of 324 undergraduate students from 16 sections of the basic communication course at ISU. Eight sections were randomly assigned to the experimental group (155 students), and eight sections were randomly assigned to the control group (169 students). Of the sample, 137 participants were male (42.30%), and 187 were female (57.70%). Participants were mostly first-year students (94.10%), followed by seniors (2.50%), sophomores (2.20%), and juniors (1.20%). The mean age of participants was 18.58 years ($SD = .99$). Participants were mostly Caucasian (90.10%), followed by African American (3.70%), Latino/Latina (3.70%), bi-racial or mixed (1.20%), Asian/Pacific Islander (.60%), and other (.60%). The mean self-reported GPA of participants was 2.95 ($SD = .70$). Furthermore, the groups do not differ significantly in regard to race, age, year in school, or mean self-reported GPA.

Experimental participants

Of the 155 participants in the experimental group, 66 were male (42.60%) and 89 were female (57.40%). Participants were mostly first-year students (91.60%), followed by seniors (3.90%), juniors (2.60%), and sophomores (1.90%). The mean age of participants was 18.69 ($SD = 1.18$). Participants were mostly Caucasian (90.90%), followed by African American (3.90%), Latino/Latina (3.20%), other (1.30%), bi-racial or mixed (.60%), and Asian/Pacific Islander (.00%). The mean self-reported GPA for the experimental group was 2.93 ($SD = .72$).

Control participants

Of the 169 participants in the control group, 71 were male (42.00%), and 98 were female (58.00%). Participants were mostly first-year students (96.40%), followed by sophomores (2.40%), seniors (1.20%), and juniors (.00%). The mean age of participants was 18.48 ($SD = .77$). Participants were mostly Caucasian (89.30%), followed by Latino/Latina (4.10%), African American (3.60%), bi-racial or mixed (1.80%), Asian/Pacific Islander (1.20%), and other (.00%). The mean self-reported GPA for the control group was 2.96 ($SD = .68$).

Experimental and Control Conditions

A pretest/posttest design using experimental and control groups was employed. In assessing information literacy, pretest/posttest measurements are objective because these tests can be designed to address the intended student learning outcomes (Choinski et al., 2003). The experimental group received three contact sessions with librarians, two in-class visits and one in the library, and completed three research logs. The experimental group also received a lesson covering tests of evidence, a lesson covering logical fallacies, and a glossary of argumentation terms. The control

group received the traditional LILAC library session, which consisted of one visit to the library for instruction on database retrieval.

Measures

A pretest, containing 10 items, was administered to participants during weeks 3 and 4 of the semester. Specifically, the pretest contained two items asking participants to indicate how many class sessions they had with the university library and how often they had visited either the physical university library or the library website. Six multiple-choice items tested participants on identifying keywords, the purpose of particular indexes and resources, locating timely information, documenting information from sources, and differences in types of resources. Given that an important aspect of information literacy is the ability to use and cite sources ethically and legally (Eisenberg et al., 2004; Seamans, 2002), one item asked participants to construct a properly formatted American Psychological Association (APA) citation using source information and sample citations. The final item asked participants to match five information categories to the best source. The Kuder–Richardson (KR-20) reliability estimate for the pretest was .71. A posttest was administered during weeks 13 and 14 of the semester. The posttest contained the same 10 items as the pretest. Ennis (2003) argues using the same instrument for the pretest and posttest is preferable to developing different forms of the instrument because different forms are really different tests.

Data Analysis

A MANOVA was calculated to explore differences between means for the groups. The pretest and posttest information literacy measure served as the repeated measure, while the experimental and control groups served as the between variable. In addition, univariate follow-up tests and paired-samples *t*-tests were employed to determine where the differences occurred. Finally, each item of the information literacy measure was analyzed by examining the percentage of correct responses given by the experimental and control groups.

Results

Hypothesis

The hypothesis predicted significant differences in the relationship between pretest and posttest information literacy scores between the experimental and control groups. A MANOVA was calculated to explore differences between the experimental and control groups for the information literacy measure. The MANOVA yielded a significant difference between the groups Wilks $\lambda = .91$ [$F(6, 192) = 3.21$, $p < .05$, $\eta^2 = .09$]. Univariate follow-up tests indicated that the experimental group produced a significantly higher mean for the information literacy measure [$F(1, 170) = 4.34$,

Table 1 Descriptive Statistics for Information Literacy Measures

	Pretest		Posttest	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Control	6.25	1.68	6.08 _a	1.63
Experimental	6.08 _b	1.69	6.56 _{ab}	1.76

Note. Means with the same subscripts are significantly different.

$p < .05$, $\eta^2 = .03$] on the posttest. Table 1 provides the descriptive statistics for the MANOVA.

In addition, paired-samples *t*-tests indicated that the experimental group improved significantly over time on the information literacy measure [$t(133) = -2.47$, $p < .05$]. In contrast, the control group did not improve their performance over time on the information literacy measure [$t(131) = .93$, $p > .05$].

Research Question

The research question examined differences on particular information literacy test items on which the experimental group outperformed the control group between the pretest and posttest. Due to the exploratory nature of this research question, descriptive statistics were calculated, but tests of significance were not conducted. The data show that the experimental group outperformed the control group on 9 of the 10 information literacy test items. Performance was calculated by determining the difference between the pretest and posttest in the percentage of participants who correctly answered the test items. Table 2 provides the descriptive statistics for the items on the information literacy measure. Specifically, the greatest change in the experimental group occurred on the ability to identify keywords and citing the volume number in APA format. Conversely, the control group decreased in their ability to identify keywords. Furthermore, the control group improved at citing the volume number in APA format; however, the experimental group's improvement was greater. Although the experimental group had many positive changes in their information literacy scores between the pretest and the posttest, their ability to locate research decreased. Likewise, the control group also decreased in their ability to locate research. For the information literacy item on identifying journal characteristics, the control group had a negative change, whereas the experimental group had a positive change in their mean scores. Lastly, another difference between the groups occurred on citing the source component in APA format. While the control group's scores decreased on citing the source, the experimental group's scores increased.

Discussion

Effective instruction in information literacy prepares students for college and career success, and for becoming contributing members of society (Jacobson & Mark, 2000).

Table 2 Valid Percentages of Correct Answers on Information Literacy Pretest and Posttest

	Control group			Experimental group		
	Pretest	Posttest	Change	Pretest	Posttest	Change
Identifying Keywords	36.7	36.0	−0.7	33.8	57.2	+23.4
Finding Current Information	93.5	95.3	+1.8	91.6	95.2	+3.6
Identifying Journal Characteristics	42.6	40.0	−2.6	40.0	42.1	+2.1
Knowing the Purpose of a Periodical Index	87.0	89.3	+2.3	89.0	93.8	+4.8
Locating Current Research	66.9	45.7	−21.2	59.3	55.0	−4.3
Locating Recent Speeches	86.3	90.0	+3.7	86.8	89.3	+2.5
Locating an Association's Contact Information	68.5	70.0	+1.5	66.0	72.7	+6.7
Locating Data for a Previous Year	77.8	77.9	+0.1	77.3	82.9	+5.6
Locating the Latest Election Results	68.9	59.3	−9.6	73.7	67.1	−6.6
APA Full Citation Format	0.0	0.7	+0.7	0.6	1.4	+0.8
Citation Format Name	0.0	2.0	+2.0	1.3	4.8	+3.5
Citation Format Date	54.4	68.9	+14.5	64.5	77.9	+13.4
Citation Format Title	70.4	77.5	+7.1	72.9	80.7	+7.8
Citation Format Source	69.2	68.2	−1.0	63.2	73.1	+9.9
Citation Format Volume	10.7	23.8	+13.1	11.0	37.2	+26.2
Citation Format Page	68.6	74.2	+5.6	65.8	73.1	+7.3
Citation Format Order	76.3	88.7	+12.4	78.7	93.1	+14.4

Note. Pretest and posttest results are reported as valid percentages of the total sample who answered a particular item correctly. The change is reported as a positive or negative difference in valid percentages from the pretest to the posttest.

Information literacy is important to all disciplines, to all subjects, and at all levels of education (Mackey & Jacobson, 2004; Milner Library, 2004). As an important component of many general education programs, the basic communication course offers an ideal place to cultivate students' information literacy skills. Teaching students to acquire, use, and evaluate information is a staple of communication education. However, communication educators have not sufficiently discussed the pedagogy of information literacy. Therefore, the present study sought to determine the most effective practices for information literacy instruction, thereby expanding basic course pedagogy.

Summary of Findings

Based upon prior research indicating active learning and intensive instruction can improve students' information literacy skills (Hunt & Birks, 2004; Lederer, 2000; Swanson, 2004), our hypothesis predicted that students in the experimental group would significantly improve their scores on the information literacy measure in comparison to the control group. In general, findings support the hypothesis. Specifically, the present study demonstrates that information literacy instruction which includes multiple contact sessions with librarians, use of research logs, as well as lessons on tests of evidence and glossary of argumentation enhances students'

information literacy skills. The experimental group was able to improve their information literacy skills significantly over time, whereas the control group did not improve their information literacy skills over time. Furthermore, the experimental group was able to demonstrate significantly greater improvement on the information literacy measure, at the time of the posttest, than did the control group.

Students seem to be lacking in information literacy skills (American Association of College and Research Libraries, 2000; Jacobson & Mark, 2000; Swanson, 2004; Wilder, 2005), but studies have not explored which areas of information literacy are most deficient among college students. Our research question examined differences on particular information literacy test items on which the experimental group outperformed the control group. Both groups decreased in their ability to locate research. Thus, information literacy instruction needs to further address the enhancement of students' knowledge of effectively locating research.

Although the experimental group's scores improved in the areas of identifying keywords, identifying journal characteristics, and citing the source component in APA format, the control group's scores decreased in those areas. Therefore, the additional information literacy instruction the experimental group received improved their abilities in these areas. Although the experimental group improved in 9 out of the 10 information literacy test items, further research is needed to match information literacy instruction with the areas most in need of attention.

Implications

The results of the present study have several implications for the basic course, and should be of interest to all university faculty, staff, and administrators. Because information literacy forms the basis for lifelong learning, not only should it be a part of the basic course in the first year, but also students should be encouraged to continue building upon their information literacy skills throughout all 4 years of college in other curricular areas. Students' information literacy skills should be developed as they progress both horizontally and vertically through the college curriculum.

Although the basic course provides an ideal environment to teach and assess information literacy, currently the basic course focuses mainly on students' public speaking skills and platform abilities (Dance, 2002). Although teaching students to acquire, use, and evaluate information is a staple of communication education, communication educators have not sufficiently discussed the pedagogy of information literacy. The present study provides support for addressing the deficiencies in information literacy instruction because the students who received additional information literacy instruction outperformed those who did not.

In order for information literacy to be fully implemented, key individuals must first buy into the idea. There needs to be a collaborative effort among the librarians, administrators, and faculty for the successful implementation of information literacy skills. As demonstrated in the present study, additional library instruction strengthened the experimental group's information literacy test scores.

Limitations and Suggestions for Future Research

Since the present study used an information literacy measure not previously tested, several limitations deserve mention. In the future, the information literacy measure may need to be modified slightly. For example, a test bank of questions could be developed to allow the pretest and posttest to be similar, but slightly different. A test bank of questions would guard against any test–retest bias. Additionally, the use of handwritten APA citations on the information literacy measure was not ideal, because it was difficult for coders to determine such components as commas and periods. Electronic versions of this item, where students type the citation, may eliminate confusion. Thus, when conducting future research with the same assessment measure, having students complete the entire pretest and posttest electronically would be preferable and ideal. Also, although the coders received training, intercoder reliability was not calculated for the grading of the APA citation item.

Another limitation of the present study was that it did not employ typical control groups, because these sections still received LILAC training. Due to the existing curriculum in the basic course at ISU, it was not possible to use traditional control groups. Future studies could compare control groups that do not receive any information literacy training with experimental groups that receive intensive information literacy instruction. Additionally, continual modifications to the information literacy instruction that the experimental groups received is warranted given the findings for the research question.

The present study suggests several areas for future research. Results of the present study indicate students struggle in their ability to locate research despite increased information literacy instruction. Thus, the use of a multidimensional design would add to the richness of the data. For example, portfolios are an excellent way to determine student success (Hunt & Birks, 2004). Furthermore, future research could follow a longitudinal study design. Tracking either the effectiveness of the information literacy instruction over a longer period of time, or comparing the present study to similar studies in the future may add to information literacy pedagogy.

Finally, future studies could tap into the effects of the Internet on information literacy instruction. Although the process of gathering information in the electronic age has accelerated, the ability to analyze and evaluate information has lagged behind (Bazillion & Braun, 1995). Samson and Granath (2001) explain that:

To foster information literate students who graduate with the ability to be life-long learners, two important elements need to be incorporated into their academic careers—the ability to conduct electronic research in tandem with evaluation and critical thinking and the integration of these processes into the university curriculum. (p. 1)

Thus, future studies could design specific measures to assess students' ability to apply information literacy skills to electronically retrieved sources.

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