# Journal of Information Literacy

## ISSN 1750-5968

**Volume 5 Issue 2**

**December 2011**


## Article


**McClure, R., Cooke, R. and Carlin, A. 2011. The Search for the Skunk Ape: Studying the Impact of an Online Information Literacy Tutorial on Student Writing.** ***Journal of information literacy*****, 5(2), pp 26-45**
***http://ojs.lboro.ac.uk/ojs/index.php/JIL/article/view/PRA-V5-I2-2011-2***

# The Search for the Skunk Ape: Studying the Impact of an Online Information Literacy Tutorial on Student Writing

**Randall McClure, Ph.D., Associate Professor, Department of Writing and Linguistics, Georgia Southern University**
**Email: randallmcclure@georgiasouthern.edu**

**Rachel Cooke MA, MLS, Humanities Librarian, Florida Gulf Coast University**

**Anna Carlin, MLIS, Information Literacy Technology Librarian, Florida Gulf Coast University**

## Abstract

This paper examines the impact of an online information literacy tutorial on source selection, evaluation, and use in essays written by English Composition students. More than 250 students participated in this research, and the essays written by a sample of 60 students are examined. Citation analysis is used first to determine the average number of citations per paper, frequency of source/format type, currency and authority of sources, frequency and length of in-text citations, and frequency of correctly formatted in-text and end-of text documentation. Textual analysis is used second to determine which essays have more frequent, correctly-formatted in-text citations, more paraphrases and summaries of their sources, fewer long quotes, and more source variety, among others. The results of this analysis suggest that online information literacy instruction may increase the number of sources that students locate and use. The textual analysis in this study also highlighted some deficiencies in students' citation practices, such as discrepancies between in-text citations and sources listed in bibliographies, and these problems were present despite information literacy instruction. These results point out areas of instruction, such as integrating sources into writing, to be improved upon in future versions of the online tutorial. The findings offered here should help information literacy professionals planning to develop online tutorials hone the content of the programmes.

## Keywords

Information literacy; undergraduates; citation analysis; online instruction; assessment; academic libraries; student performance; writing; textual analysis;

---

## 1. Introduction

Delivering information literacy instruction has been a driving force in the library profession for more than twenty years. As early as 1989, the American Library Association defined an "information literate person" as one who "must be able to recognise when information is needed and have the ability to locate, evaluate, and use effectively the needed information." (American Library Association, 1989). A decade later, the (American) Association of College and Research Libraries developed the "Information literacy competency standards for higher education" to further guide academic librarians in helping their students achieve performance indicators such as defining the information need, recognizing information is available in different formats, identifying and using appropriate search terms, retrieving information, and citing sources (Association of College & Research Libraries, 2000). With these performance indicators in mind,

Randall McClure, the Composition Director at Florida Gulf Coast University (FGCU), Rachel Cooke, the Humanities Librarian at FGCU, and Anna Carlin, the Information Literacy Instruction Librarian at FGCU joined forces to develop, implement and assess a web-based information literacy tutorial tailored to the information needs of the FGCU first-year English Composition course. English Composition at FGCU is a large-scale introductory course, and at our regional state university, approximately 2,000 students take English Composition each year. There are approximately 80 sections with 25 students enrolled in each section, and the typical Composition student is a first-year, second semester student. For several years, Rachel Cooke, the Humanities Librarian provided one-hour, face-to-face library instruction sessions for Composition instructors who requested them, typically around 20 sessions a term reaching about 500 students, or one-fourth of the students enrolled.

Dedicated to extending information literacy instruction to all Composition students, Cooke together with Randall McClure, the Composition Director, explored ways to develop a comprehensive information literacy programme. Doing so, however, was hampered by significant enrollment growth in the face of declining resources in library staffing. In early 2010, an institutional course redesign grant competition provided the resources necessary to run a pilot designed to fully integrate information literacy into the Composition programme.

Cooke and McClure agreed that an integrated information literacy programme should be one that facilitates assessment of students' information literacy skills, which should ultimately improve the quality of student papers in English Composition. The original plans included offering an interactive lecture in a scale-up setting in which a librarian provides face-to-face instruction to a hundred or more students at a time, using personal response systems or "clickers" to keep students actively engaged and to collect data on students' research habits and information literacy skills. Eventually, the scale-up design was abandoned due to space and cost constraints as well as workload concerns.

Cooke and McClure ultimately decided to focus on the development of a robust and interactive online information literacy tutorial that could be accessed by all Composition students. Students would also be encouraged to seek individual help via the in-person reference desk, asynchronous email reference system, or real-time "Ask a Librarian" chat tool.

### 1.1 The "Skunk Ape" tutorial

Fortunately, our library's Research, Reference, and Instruction (RRI) Department had already developed a basic online tutorial ten years earlier for Composition students. Under the direction of RRI, Anna Carlin, the Information Literacy Technology Librarian, was already in the process of revising the information literacy tutorial, *The Search for the Skunk Ape* (Bhatt and Radermacher, 2004). Responding to the research question "Does the Skunk Ape exist?" (an urban legend common in southwest Florida similar to the sasquatch or yeti myth), the tutorial leads students through the various steps of the research process, from forming a research question to finding print and electronic resources to evaluating the quality of those sources and documenting them. We believe our choice to base the online tutorial on the legend of the Skunk Ape a good fit for the research culture of our university, as the institution is located near the Everglades and has several programmes supporting environmental studies. In addition, student paper topics in English Composition vary widely, and this topic, of a creature that perhaps doesn't even exist, often proves a research challenge for many students. Thus, students completing the tutorial working with such an unusual and challenging topic should be able to independently apply the information literacy performance indicators mentioned earlier, such as

defining the information need and identifying and using appropriate search terms, in other research situations.

The Skunk Ape theme was retained, but Carlin restructured the tutorial using more interactive technologies to meet the instructional needs identified by Cooke and McClure. The revised tutorial is less text-based and takes advantage of new digital affordances such as annotated screen captures thanks to the use of SoftChalk lesson builder software, which makes it easier to include interactive elements like quiz questions along with sorting and labeling activities. Within the scaffolding of the SoftChalk lessons, textual passages, videos, and images relay instruction, and many of the videos within the lessons have been created in-house using Camtasia screen recording and video editing software. It should be noted that the learning objectives of the modules in the new tutorial are based upon key ACRL standards (Association of College of Research Libraries 2000) and first tier information literacy competencies identified in our library's information literacy plan (Florida Gulf Coast University 2008).

As the screen shot below illustrates, the tutorial is comprised of four separate but related modules, each with its own learning objectives (see Appendix A), yet united by the theme of *The Search for the Skunk Ape.* Each module flows logically into the next, yet each can also stand on its own in order to provide focused instruction to students. Each module contains some scored elements, such as quiz questions or sorting and labeling activities. All together, the four modules take about an hour to complete. The modules are posted on the open Web and are accessible from the library's website[1].

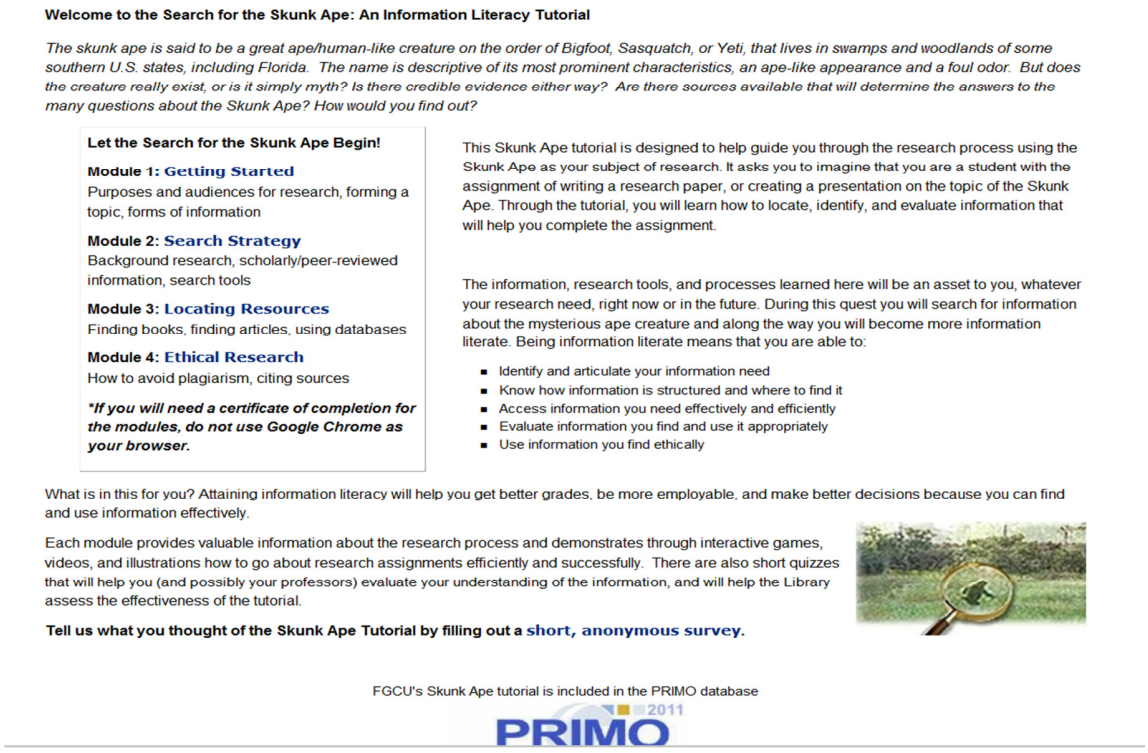


**Figure 1: Screen Shot of Skunk Ape Online Tutorial**

[1] http://library.fgcu.edu/rsd/instruction/skunkape/skunkape.htm [Accessed 24 November 2011].

In the first module, “Getting Started,” the students identify their audience and their purpose for research. By watching a short video, they learn that different purposes exist for research in general and that journal articles and books from the library’s collection are the most appropriate sources for college-level papers. Encyclopaedias, in particular, are highlighted as the best starting point for student research since they provide a quick authoritative summary of the topic, often providing major search terms and a bibliography of scholarly sources for further research.

Students are instructed not to rely heavily on popular magazines, newspapers, and websites, though they are told these types of sources can be useful for certain types of research inquiry. For example, students are told that newspapers provide a local, timely perspective, and websites can provide useful terminology and references to scholarly sources. The students also learn in this module that a topic like “nocturnal habits of the Skunk Ape” may be too narrow, and the topic “mythical creatures” is likely too broad. The first module also suggests that a topic like “Does the Skunk Ape exist?” or “Skunk Apes and other Big Foot phenomena” might be just right for a typical college paper. Throughout this module, students complete twelve multiple-choice questions to reinforce the lesson.

In the second module, “Search Strategy,” students first watch a video, which begins with a Google search on the Skunk Ape. Since Wikipedia is also a popular search tool among college students and we wanted to begin where they often do, the video also discusses the most effective way to search with Wikipedia. The students learn that, while they should not cite Wikipedia in a college paper, it can be a useful starting point in order to glean citations to scholarly references they can find in the library’s collections, and it can also be used to identity more effective search terms. Students are then directed to more authoritative sources such as the *Encyclopedia of Cryptozoology*, *Encyclopaedia Britannica*, and *Oxford Reference Online*.

Later in the module, students watch a second video describing the difference between popular magazines, news magazines, and scholarly journals, including those that are peer-reviewed (Leecylynnlibrarian, 2008). In this second module, students answer eleven multiple-choice questions and complete a drag-and-drop exercise in which they must match the information need (such as a daily stock report) to the most appropriate search tool: internet search engine, library catalogue, or research database.

“Locating Sources,” the third module, demonstrates catalogue and database searches. A video first demonstrates a student’s search of “Bigfoot” in the catalogue, which retrieves several relevant titles and directs the students to a book’s citation pages for more sources. Boolean searching and the use of subject headings are also mentioned in this video. Students then complete two multiple-choice questions in which they must search the library catalogue for the answer.

Later in this third module, students watch a video on the definition of a database and another video on searching a database. In the latter, *Proquest Research Library* is searched for various search strings, including “Skunk Ape or bigfoot or sasquatch.” Students are instructed to limit their searches to scholarly journals and also by date. The students then complete a drag-and-drop exercise to determine if a search string would be effective (“has anyone seen a Skunk Ape” versus “Skunk Ape evidence”). Two more videos, “Getting the full text” and “Finding a Journal or Article from a citation”, lead students step-by-step through locating the actual online or print copy of an article. Throughout this module, a total of eight multiple-choice questions and two activities prompt students to reflect on what they have learned.

In “Ethical Research,” the fourth module, students are introduced to plagiarism as well as MLA and APA citation style. Students watch a short video in which another student checks her paper and adds citations where needed (Paulrobesonlibrary 2007). Another video in this module features a professor explaining the difference between paraphrasing and quoting (Peakdavid 2009). In the closing drag-and-drop exercise, students label the various parts of an MLA and APA citation, and throughout the module eight multiple-choice questions attempt to reinforce learning.

## 2. Review of Literature

The review of current literature suggests that online information literacy instruction remains a topic of debate among library scientists and other information behavior researchers, despite the fact that online self-paced information literacy tutorials like our *The Search for the Skunk Ape* and the University of Texas Libraries' *TILT* have been used by students for more than a decade (Yelinek 2010, p.352). Within the discourse surrounding online information literacy tutorials, four important aspects appear frequently in the literature: namely, the advantages of online tutorials, their effectiveness, their reliance on faculty collaboration, and their evaluation and assessment.

The increase in online course offerings requiring reference support, including English Composition, the ubiquitous nature of the Web, and the challenge of offering face-to-face instruction to a growing student population are amongst the advantages to using online tutorials. In addition, the reductions in staffing common in many college and research libraries have contributed to the appeal of online tutorials for delivering information literacy programmes. Su and Kuo (2010, p. 320) talk about the advantages of online instruction, citing repetitive learning, the ability to “zero in” on needed topics, and self-directed learning as reasons to use online tutorials. They also argue that online tutorials may be better suited for today's net generation of students, who are typically quite comfortable online, have busy schedules, can receive instruction at the point of need by selecting the exact segment or module they need, and may feel uncomfortable asking for help in a face-to-face reference setting.

There are, of course, problems inherent in relying on technology to deliver instruction. Online tutorial creation can require technological skill and expertise that may be hard to find, and the design and production process can be time-consuming. Because they are created and saved at one moment in time, online tutorials also require regular maintenance and updates to keep up with changes in library websites and systems, database interfaces, and access methods. Users must also have appropriate hardware and software to run and view the tutorials, and have adequate network access to handle multimedia elements that may be included (Silver and Nickel 2010).

After determining how online tutorials can serve the needs of library users, librarians should also examine the tutorials to determine their effectiveness. Several studies now show that online tutorials may be just as effective as face-to-face instruction. Zhang, Watson and Banfield (2007), for example, perform a systematic review of comparison studies between face-to-face instruction and computer-assisted instruction and find that both modes are equally effective in increasing student scores on a test of information literacy skills, when pre-test and post-test scores are compared. In their review, only one of ten studies presented finds face-to-face instruction to produce measurably better outcomes than computer-based instruction (p. 480).

If tutorials are effective, then why not replace face-to-face instruction altogether? The question of whether or not tutorials can completely replace in-person instruction is currently under debate in the professional literature. Ganster and Walsh (2008), for example, reveal that most libraries are only using tutorials to supplement their overall information literacy programmes. These authors, in fact, advocate that librarians deliver online tutorials in person (as strange as that sounds), while others suggest librarians be present when students are completing online tutorials in order to provide personal answers to students' questions. In support of this somewhat blended approach, Kraemer, Lombardo and Lepkowski (2007) find that combining online instruction with in-person sessions result in better retention of skills than face-to-face or online instruction alone, yet this finding was not replicated in their more recent experiment. Anderson and May (2010) compare face-to-face, blended/hybrid, and online only methods of instruction, and find that method of instruction does not seem to affect information literacy skills retention.

Some, such as Su and Kuo (2010), support using tutorials to replace face-to-face instruction. They conduct an analysis of some of the newer tutorials in PRIMO (Peer-Reviewed Instructional Materials Online Database) and find that these tutorials effectively integrate core concepts of traditional library instruction. For additional real-time contact, they recommend that tutorials include online discussion among students taking the tutorial, question and answer sessions with online librarians, or other web-based interaction with librarians via video, chat or instant messaging reference services.

As the debate over face-to-face versus online library instruction continues, there remains the challenge of connecting it to the curriculum. Librarians often must find ways to teach information literacy without having regularly scheduled course contact with students. Clearly, the success of a typical "one-shot" 60-minute library session (in person or online) relies on the active participation of both faculty and students. In fact, Kraemer et al. (2007) routinely observe that online tutorials are most effective if they are graded and/or made into course requirements. Fortunately, as discussed below, many librarians are successfully collaborating with their fellow teaching faculty in order to integrate library instruction and online tutorials into the undergraduate curriculum.

At the University at Buffalo, students enrolled in a World Civilisations course completed both a basic and subject-specific online tutorial delivered via a course management system. The students were assessed with a quiz and received an email follow-up from a librarian on questions they answered incorrectly (Ganster and Walsh 2008). Other libraries supporting a large number of online courses are using both online tutorials and librarian-led, web-based information literacy instruction. A prime example is the university library at Rochester Institute of Technology, which offers reference support for more than 600 online courses. In addition to self-serve online tutorials, librarians host online interactive sessions via Access Grid and maintain an active presence on Second Life, with 32 course sections participating (Bower and Mee, 2010). Another library using a hybrid model is Rogers State University, in which some students taking online courses are instructed via an online PowerPoint tutorial and supported by a librarian who responds to students' blog postings on reference topics (Clark and Chinburg, 2010).

Some tutorials are also being offered as stand-alone online courses. A particularly ambitious example of this approach to information literacy instruction is found at Gonzaga University. As Kappus and Jenks (2010) explain, the library developed an online course in which students complete information literacy modules and, afterward, submit an annotated bibliography to the librarian instructor. In the case of the 'Skunk ape tutorial', this programme is designated as a "noncredit continuing education course," although our long-term goal is to develop the content of

the tutorial sufficiently to offer it as a required one-credit course in the School of Professional Studies. If approved, more than 1000 students would complete the course each year.

Methods for evaluating online tutorials can vary according to what is being assessed or measured. Although measuring student learning and retention of information literacy skills is where most libraries focus their evaluative efforts, gathering feedback from teaching faculty should not be overlooked. As mentioned previously, librarians often count on the cooperation and support of teaching faculty to ensure student participation in online information literacy instruction. Appelt and Pendell (2010) describe how the library at their university created an "Evidence-Based Practice" online tutorial, which was then tailored to each of their six health sciences colleges. After conducting focus group sessions with faculty in these colleges to garner feedback on everything, from terminology to the sequencing of concepts, to even the illustrations used in the six tutorials, the researchers discovered that the tutorial is not a good fit for the College of Public Health, for example, because of its overly clinical focus.

There is a wide pool of literature on assessing student learning and information literacy instruction, which sometimes intersects with literature on online tutorials, and many of the same methods can be used to evaluate both face-to-face and online instruction. Amongst the studies reviewed here, knowledge tests, particularly those built using a pre-test and post-test model, are the most commonly used method of assessment. Pre- and post-tests are often used to test the effectiveness of instruction, as they produce data on what students know before and after instruction. Zhang et al. (2010) include only studies that use pre- and post-tests in their review of face-to-face and computer assisted library instruction, and four other studies that we analyzed use pre- and post-tests to measure learning. Some pre- and post-tests only measure skill retention (Tronstad et al, 2009; Lindsay et al, 2006; Anderson and May, 2010), while others include questions about student perception and attitudes toward instruction (Kraemer et al, 2007; Silver and Nickel, 2005).

Studies relying on pre- and post-tests have found that any form of library instruction results in improved retention of skills from information literacy instruction (Tronstad et al, 2009; Kraemer et al, 2007; Anderson and May, 2010). Interestingly, researchers that use more straight-forward pre- and post-tests note that students score surprisingly high on the pre-tests, indicating that either students are already more information literate than previously thought or the questions on the pre-tests are not challenging enough.

Knowledge tests measure student understanding, or cognitive ability, but they do not accurately reflect a student's ability to put those cognitive skills into practice. Knowledge tests are probably used much more often than performance measures because they require less time to create, demand less from faculty collaborators, and in the case of objective test items (multiple choice, true or false, matching) are quick and easy to score. Performance measures are perhaps more valuable or informative, however, since they can show what students actually do with the information and skills they are taught (Radcliff, 2007, pp.89-90, 115-116).

Few studies on assessing the effectiveness of online information literacy tutorials capture data using performance measures. Anderson and May (2010) use pre- and post-tests as well as examine two class assignments as measures of student performance. Before receiving information literacy instruction in one of three modes (face-to-face, blended, and online), students in this study complete a pre-test with eight multiple-choice questions and seven open-ended questions that test library knowledge. After receiving instruction, the students complete the same fifteen-question test, and they are also given two assignments in order to evaluate their behavior. One assignment involves an exercise that requires students to choose a topic

and perform searches for information, while the other asks students to identify, locate, evaluate, and use sources in a presentation. Anderson and May (2010) offer little detail on how student presentations are evaluated, only that the results from the pre-and post-tests and the research exercise show no difference in retention between modes of instruction. Analysis of the presentations themselves demonstrate a significant difference, with the online sections performing better than the blended or face-to-face sections, yet the authors acknowledge that variance in the quality of instruction provided by the sections' teaching assistants is most likely the source of this result.

Citation analysis is another method of assessing student learning that examines if students actually apply what the tutorials attempt to teach them. In citation analysis assessment, the bibliographies of student research papers are examined to determine the types and quality of resources students use. At Rogers State University, researchers assess their online PowerPoint tutorial using this method, and the citation analysis reveals that online students' bibliographies are very similar to students receiving face-to-face instruction (Clark and Chinburg, 2010). Finally, Rosenblatt (2010) measures information behaviour through both traditional citation analysis and textual analysis of student research papers, although the mode of delivery being examined in this study is face-to-face, not online. Through this text-based method of measuring student performance, Rosenblatt finds that the students seem to have little trouble finding scholarly sources to cite in their papers, but overall they do a poor job of incorporating the sources into their writing.

## 3. Methodology

We used citation analysis to assess the effectiveness of the revised version of our Skunk Ape online tutorial. Like Rosenblatt, we too consider the quantity and quality of sources that students use as a measure of the online tutorial's effectiveness. To this end, we combined citation analysis with close reading of student research papers, examining how students use sources within the framework of their essays. Taken together, we believe the citation and textual analysis provide a more comprehensive analysis of the effectiveness of online information literacy tutorials.

In Fall 2009, our Institutional Review Board approved our research design, which included a permission waiver for student participants since we wanted to examine student papers and publish the results of that analysis. That same semester, Cooke visited the Composition instructors' annual meeting to preview the Skunk Ape tutorial and seek volunteers for a study examining its effectiveness. In the end, six instructors representing ten sections participated. Specifically, the "control" group consisted of six sections taught by three different instructors and the "experimental" group consisted of five sections taught by five different instructors (two instructors had both a control group and an experimental group). Each section had twenty-five students enrolled at the start of the semester. All participating instructors had taught Composition multiple times, and all had utilised in-person library instruction as part of their Composition course design in the past.

In Spring 2010, Cooke visited both 'control' and 'experimental' groups to inform students in general terms of the study and ask them to sign the consent form allowing the authors to view their papers and to contact them after the study to discuss our findings. The students were not given specific details of the study, yet they were assured that their papers would remain anonymous and the data would be used to gauge the success of the library's information literacy programme.

Students in the experimental sections were assigned the revised Skunk Ape tutorial and students in the control sections were not. Of course, we did not block students in the experimental or control sections from using other resources, which may have helped them with their papers. This points to a possible limitation in our study, as we did not stop students in the control group from using the tutorial. Whilst students in the control group were never informed of the tutorial, it is possible that a few of them may have come across it when browsing through pages on the library's website. This is a possible confounding variable; however, the results do not seem to reflect this since the control group did not perform as well as the experimental group.

Participating instructors assigned students in both groups a similar research project. The typical Composition research paper assignment can be described as one that asks students to compose an essay at least five pages long and requires them to use at least three "scholarly" sources (typically books or journal articles from the university's library). The use of one or two websites as sources is generally allowed. Popular topics include social issues (off-shore drilling, banned books) or literary criticism of a famous author (Herta Muller, Zora Neale Hurston).

Students in the experimental group were required to complete all four modules in the Skunk Ape tutorial and were asked to print out a certificate of completion at the end of each module. Each certificate recorded time spent on a module and the number of questions answered correctly. Participating instructors were told before the study that each module takes about 15 minutes to complete, so they could target students who were just "clicking through." Also, the authors discouraged instructors from assigning grades or points for correctly answered questions, as the questions were designed to reinforce learning and the student's ability to apply information literacy concepts, such as identifying and using appropriate search terms and citing information correctly. This iterative approach stresses the process of finding the right answer rather than the act of answering the question that is the foundation of an information literate learner. As such, students are encouraged to change their answers, so a 100% quiz score is expected.

At the end of the semester, students who signed the permission form were sent an email asking them to email their papers to the authors. A total of 33 papers were collected from students in the control group, and a total of 38 papers were collected from students in the experimental group. In order to be able to draw appropriate comparisons, the first thirty from each group that contained bibliography pages were used in our analysis.

Student and instructor information was removed and each paper was assigned a control number prior to citation and textual analysis. At this point, each student's research was analysed by the authors to determine how students located, evaluated, and used source material both in their bibliographies and in their papers. Items examined by the authors include:

- the number of citations per paper,
- the frequency of source/format type,
- the currency and authority of sources,
- the frequency and length of in-text citations,
- the frequency of correctly formatted in-text and end-of text documentation.

## 4. Hypotheses

Our hypotheses are that students completing the Skunk Ape online tutorial use more sources, more types of sources, and more authoritative sources in their papers compared with the

students belonging to the control group. We also expected these students to have more complete and correctly formatted entries on their bibliographies.

Although the tutorial instructs students on these concepts, the tutorial only briefly introduces students to the currency of sources and the mechanics of writing, such as how to incorporate a source into a research paper. For example, students watch a video explaining the difference between paraphrasing and quoting, and they complete a drag-and-drop activity to identify the parts of citation. At our university, librarians generally defer to the expertise of Composition instructors and tutors in the Writing Centre on these concepts. Nonetheless, the researchers were curious to see if students completing the tutorial use more current sources, have more frequent, correctly-formatted in-text citations, more paraphrases and summaries of their sources, fewer long quotes, and more source variety in their papers. The authors hoped that mining student research papers for this information could not only serve as a baseline for future research, but also identify areas of need for future revisions to the tutorial.

# 5. Findings

The following items were considered during the citation and textual analysis part of this study:

Locating Information
1. Count of sources as cited in bibliography
2. Source by type as cited in bibliography
3. Individual source as cited in bibliography

Evaluating Information
4. Currency of source
5. Authority of source

Using Information
6. Individual source cited in paper
7. Count of sources as cited in paper
8. Type of source information use (summary, paraphrase, short or long quotation)
9. In-text citation (completeness/accuracy)
10. End-of-text documentation (completeness/accuracy)

## 5.1 Locating information

As readers might expect, students in the experimental group appear to locate significantly more sources of information than those in the control group. Specifically, the 30 students in the experimental group list 225 sources on their collected bibliographies compared with 131 total sources on the collected bibliographies of student essays in the control group, a difference of close to sixty percent (58.2%). The range for the control group is 1-9 sources compared with a range of 1-19 sources for the experimental group. Finally, the average number of sources listed per bibliography is 4.37 for the control group compared with 7.5 for the experimental group. We believe the tutorial, by emphasizing the catalogue and database searching and full-text retrieval processes, gave the experimental group the strategies and confidence to acquire more sources to reference in their papers.

The count of sources suggests that the online tutorial had some impact on the research behaviors of students, yet the data on source type in Figure 2 below offers a different picture. For example, students in both groups list nearly the same percentage of web-based sources (82.4% for the control group; 82.7% for the experimental group). Moreover, students in the control group use slightly more traditional print (non web-based) sources (17.6% for the control group; 14.2% for the experimental group).

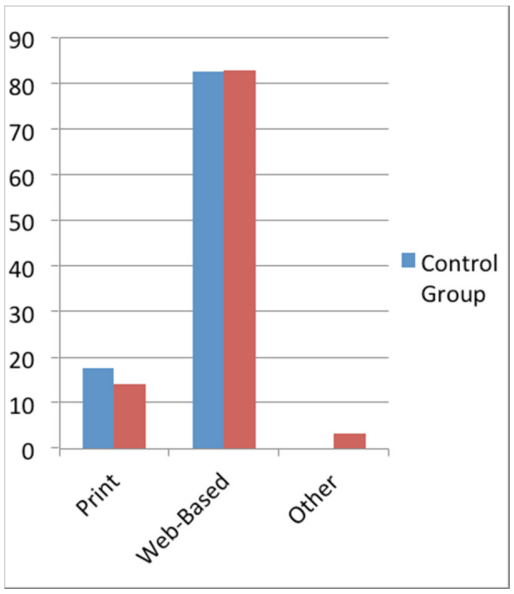


**Figure 2: Bibliographic Entries by Format**

The Skunk Ape tutorial emphasizes that books and journal articles accessed from the university library are the most appropriate sources for college-level research (although websites are mentioned briefly as helpful for gleaning scholarly citations and acquiring background information for search terms), and the typical Composition research paper assignment permits the use of websites as sources of information. For these reasons, one could speculate that students located and used the minimum required amount of print books and journal articles, and then filled out the rest of their research using websites and web-based sources, although it is also possible that instructors allowed traditional print sources to be used in web-based formats (such as .pdf). Informal conversations with students and instructors tend to support this, but future research in this area would be useful.

Some students in the experimental group identified non-traditional sources (3.1% of all sources listed). Taken alongside other data, it is possible that students in the experimental group were cognizant of source variety as they constructed their bibliographies. This is elaborated further in Figure 3 which illustrates that seven of the ten source type categories we considered were represented by at least 7.5% of the total sources listed on the collected bibliographies of students in the experimental group, with no single category representing more than 20%. Students in the control group, by contrast, are heavily reliant on journal articles for close to one-third of their sources (29.8%), with several source types representing less than 4% of sources listed on their bibliographies (.edu websites = 3.9%; magazines = 1.5%; books = 3.9%).

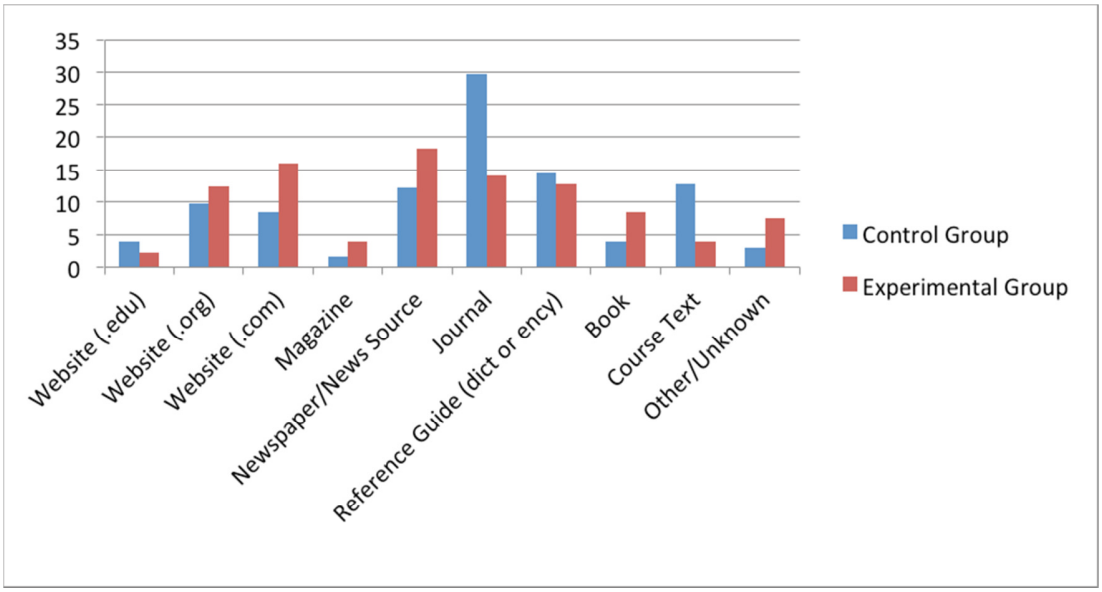


**Figure 3: Percent of Sources on Bibliographies by Type (any format—print or web-based)**

These findings seem to correspond well with the content of the tutorial. Several types of information sources are covered, including websites, magazines, newspapers, reference books, journals, and books. As mentioned earlier, the video "Searching a database" in the third Skunk Ape module demonstrates a search using *Proquest Research Library*, which allows users to limit searches to newspapers, trade publications, popular magazines, and/or scholarly journals. The video also directs students to use the database subject list or librarian research guides, which may have also helped students in the experimental group diversify their searches and the sources that resulted from them.

## 5.2 Evaluating information

Students in this study list current sources on their bibliographies, for the most part, with 73% and 79% of the sources cited by the control and experimental group respectively published after 2005, and most of these no more than two years old. Even the sources determined to be not current, at 5% and 10% respectively, were typically not more than ten years old.

However, one finding of note in our research is the number of sources whose year of publication was difficult to determine. In fact, we could not identify with an appropriate degree of certainty the age of 22% and 12% of the sources listed in the bibliographies of the control group and experimental group respectively. This may be due to the significant number, more than 80%, of web-based sources used by students in both groups, and the fact that verifying the date of publication can be tricky on many websites, particularly for inexperienced researchers such as the students attending Composition courses.

We are not sure that this is a finding worthy of attention in our information literacy curriculum at this time, though it is certainly worth tracking over the years to come. In the end, students in the experimental group seem to work more effectively with identifying current sources and this could be attributed to the fact that, although the tutorial does not emphasize currency, the *Proquest Research Library* search demonstration highlights the date range search and suggests a possible limiter of five years.

The Skunk Ape tutorial emphasizes the authority of different types of sources, and this emphasis is represented to some degree in our data. Whereas students in both the control and the experimental groups identify scholarly sources roughly half of the time, at 50% and 47% respectively, students in the experimental group do a better job of limiting the number of general reference sources, a topic discussed in the tutorial.

Students in the experimental group also use a higher percentage of non-scholarly sources than those in the control group. This finding, though, can be explained as follows. One, students in the experimental group use a greater variety of sources, which may indicate that their searches ended up exploring more non-traditional and non-scholarly sources. Two, despite the fact that the tutorial directs students toward scholarly source, and this produces searches that identify more sources and more of a range and balance of source types, students in the experimental group do not identify a greater percentage of scholarly sources. Students who completed the tutorial apparently felt more comfortable in conducting research, but it does not seem that they found the tutorial's discussion on scholarly sources to be convincing. This finding suggests that future versions of the tutorial should focus more on the differences between scholarly and non-scholarly sources in the academic research process.

### 5.3 Using information

Students in this study, particularly those in the control group, cite far fewer sources in the text of their essays than they list in the bibliographies. Although two students in the control group actually cite more, thirteen of the thirty students in the control group cite fewer sources in their essays than the ones listed in their bibliographies. Even more concerning is the seven students in the control group who fail to cite in their papers three or more sources listed in their bibliographies. The phenomenon of listing sources that are not cited in the essay was also found in essays written by students in the experimental group, with twelve students using fewer sources than those listed in their bibliographies. However, students in the experimental group do cite, on average, twice as many sources in the text of their essays (6.2 sources per paper) than students in the control group (3.1 sources per paper).

Moreover, some authors are cited in student papers but are not listed in the bibliographies and this problem affects both groups. In other words, students not only cite fewer sources than those they attempt to document, but also they use sources not documented at all. For example, only two magazine articles are listed on the collected bibliographies of students in the control group, yet five magazine articles are cited in their collected papers. More alarming were the 54 dot-com sites cited by students in the experimental group, though only 36 dot-com sites appear in their collected bibliographies. Based on these findings, we are obviously concerned about the lack of appropriate citations in student essays across our sample.

Another problem that affects both groups relates to the multiple citation of a source in the essays, which is not always referenced. In the control group, for example, there are 93 sources cited across students' texts, yet there are a total of 130 instances in which source information is cited. This information behavior is evidenced in essays written by students in the experimental group as well, where the 185 sources cited are used a total of 266 times.

Despite this problem, the Skunk Ape tutorial has a positive impact on the effectiveness of student writing, as shown by the 266 citations by the experimental group—nearly nine citations per essay (8.9), that is more than double the 130 citations and average number of citations (4.3) in individual essays written by the control group. Moreover, while students in the control group use short quotes (less than three lines of text) and paraphrase 42% of source material used,

students in the experimental group paraphrase their source material more often, at 52% of total source material used. As discussed earlier, the tutorial's fourth module provides a brief introduction to citing and using source material in a paper and introduces the concept of plagiarism. The data suggests the tutorial's videos on paraphrasing and plagiarism as well as the drag-and-drop activity in which the student identifies the parts of a bibliographic citation seem to have made students in the experimental group more conscientious of their citing behavior leading to greater paraphrasing and citing of source material.

It is clear, though, that this fourth module should be expanded to include more instruction on crafting in-text citations and how in-text citations should have matching entries in students' bibliographies. Upon the examination of student papers in an attempt to better understand source use, we came across a significant number of in-text citations and bibliographic entries in both groups that were incorrectly formatted, incomplete, or both. In a forthcoming essay by Jamieson and Howard, the lead researchers of a national study in the US on college students' source use titled the "Citation Project," the same problem with source documentation is noted: "In some cases we had to go as deep as 30 papers into the stack to get 10 whose sources we could locate. That process taught us a lot about how much students struggle to identify the components of their sources: Who is the author? What is the title? Who is the publisher? These things are far from clear to the majority of students whose papers we source-searched."

In our study, only six (20%) and eight (26.7%) essays written by students in the control and experimental group respectively include in-text citations that are both complete and correctly formatted. In fact, close to half of all of the essays examined in this study (41.7%) contain in-text citations that are both incomplete and incorrectly formatted, and in many instances in-text citations are simply missing. Our findings on bibliographies are slightly better than our findings for in-text citations, as close to a third of essays in the control group (30%) and more than half of the essays written by students in the experimental group (56.7%) have bibliographies that are correctly formatted and complete. In fact, more than three-fourths of all essays included in this study (78%) have complete bibliographies, and most of these only contain minor errors in formatting.

The finding that students often formatted bibliographic entries correctly corresponds with the content of the tutorial, as one activity has students label parts of bibliographic entries. However, we suspect this finding may also be representative of the trend toward students' use of reference generators and citation builders available both online and in current versions of most word-processing applications. Clearly, however, the evidence on faulty, incomplete, and missing in-text citations deserves notice. In future versions of the tutorial's fourth module, librarians should collaborate with Composition instructors, given the instructors' expertise with integrating source material into the text of a research paper.

## 6. Conclusion

Many libraries are creating online information literacy tutorials like the Skunk Ape tutorial presented in this paper because they have been shown to be effective to some degree. For this reason, online tutorials are being considered as supplements and possible replacements for face-to-face information literacy instruction in some libraries. However, the literature suggests that tutorials are most effective if librarians work directly with teaching faculty to tailor the information to a specific class or discipline. For many libraries, the design and assessment of the tutorial is intertwined, as libraries seek input from faculty and students at various points of the tutorial's creation and using more formalised assessment such as pre- and post-tests and citation analysis to gauge student learning.

How does our study, then, fit into this growing body of research? The data from our study supports the use of online tutorials as we found that students are citing more sources and types of sources after completing the modules in our Skunk Ape tutorial. While we do not conduct an analysis of the grades students received for their papers in this study, it is safe to assume that students who completed the tutorial scored better given the results of our analysis that they located more sources, evaluated their sources more effectively, and used them more often and more appropriately in their writing. Still, we have also found that the Skunk Ape tutorial needs to do much more to emphasize proper source use.

With some improvements, is it possible that the Skunk Ape may some day replace in-person instruction at our institution? Comparing the data presented in this paper with data collected on in-person instruction to Composition students by Cooke in 2008 (before the Skunk Ape tutorial was used) suggests this may be the case. In the 2008 study, the data revealed that students were citing more sources and more types of sources, especially books, when they receive in-person instruction as opposed to no instruction at all (Cooke and Rosenthal 2011). Comparing the 2008 study with the study presented here shows that the types of sources students identify remain largely the same. The online tutorial, however, appears to be more effective in increasing source use and the number of citations inside student papers. These data sets taken together suggest that both types of instruction achieve equally positive results; therefore, we believe online instruction offered in the Skunk Ape tutorial may be a suitable replacement for in-person instruction, at least in a large-scale introductory course like English Composition.

Despite the possibilities suggested by the use of the Skunk Ape online information literacy tutorial in English Composition, we believe that online instruction will never fully replace face-to-face information literacy instruction at our institution. In fact, we find it difficult to ever see a time when in-person individual consultations will disappear given the complexities and the changing nature of research in the digital age. Further, the face-to-face approach may be the best way to deliver instruction to upper-division and graduate courses, as these students have increasingly specialized research needs. It is safe to say, though, that online information literacy tutorials have value for both students and libraries and that they are here to stay. It is also safe to say that technological advances will help to improve online instruction over the years to come, perhaps allowing libraries to strike a perfect balance between online and in-person delivery of information literacy programmes.

## References

American Library Association. 1989. *Presidential Committee on Information Literacy: Final Report*. [Online]. Available at: http://www.ala.org/ala/mgrps/divs/acrl/publications/whitepapers/presidential.cfm. [Accessed: 21 Oct 2011].

Anderson, K. and May, F.A. 2010. Does the method of instruction matter? An experimental examination of information literacy instruction in the online, blended, and face-to-face classrooms. *The Journal of Academic Librarianship* 36(6), pp. 495-500.

Appelt, K.M. and Pendell, K. 2010. Assess and invest: faculty feedback on library tutorials. *College & Research Libraries* 71(3), pp. 245-253.

Association of College of Research Libraries. 2000. *Information literacy competency standards for higher education.* [Online]. Available at: http://www.ala.org/ala/mgrps/divs/acrl/standards/standards.pdf. [Accessed: 16 May 2011].

Bhatt, A. and Radermacher, C. 2004. *Skunk ape: engaging freshmen in learning information literacy skills through a story driven and hands-on web based tutorial.* [Poster presentation]. Florida Gulf Coast University Research Day, Fort Myers, FL, April 2004.

Bower, S.L. and Mee, S.A. 2010. Virtual delivery of electronic resources and services to off-campus users: a multifaceted approach. *Journal of Library Administration* 50(5/6), pp. 468-483.

Clark, S. and Chinburg, S. 2010. Research performance in undergraduates receiving face to face versus online library instruction: a citation analysis. *Journal of Library Administration* 50(5/6), pp. 530-542.

Cooke, R. and Rosenthal, D. 2011. Students use more books after library instruction: an analysis of undergraduate paper citations. *College & Research Libraries* 72(4), pp. 332-343. Available at:. [Accessed: 20 September 2011].

Florida Gulf Coast University Library. 2008. Information Literacy Program. [Online]. Available at: http://library.fgcu.edu/RSD/infolit.htm. [Accessed: 16 May 2011]

Ganster, L.A. and Walsh, T.R. 2008. Enhancing library instruction to undergraduates: incorporating online tutorials into the curriculum. *College & Undergraduate Libraries* 15(3), pp. 314-333.

Jamieson, S. and Howard, R.M. (in press) Sentence mining: uncovering the amount of reading and reading comprehension in college writers' researched writing. In: McClure, R. & Purdy, J.P., eds. *The New Digital Scholar: Exploring and Enriching the Research and Writing Practices of NextGen Students*. Medford, NJ: Information Today, Inc.

Kappus, T. and Jenks, K.O. 2010. Angels and demons: online library instruction the Jesuit way. *Journal of Library Administration* 50(5/6), pp. 737-746.

Kraemer, E.W. et al. 2007. The librarian, the machine, or a little of both: a comparative study of three information literacy pedagogies at Oakland University. *College & Research Libraries* 68(4), pp. 330-342.

LeecyLynnLibrarian. 2008. *Magazines vs. scholarly journals (short version)*. [Online]. Available: http://www.youtube.com/watch?v=s6_U9VUHgyQ. [Accessed: 16 May 2011].

Lindsay, E.B. et al. 2006. If you build it, will they learn? Assessing online information literacy tutorials. *College & Research Libraries* 67(5), pp. 429-445.

Paulrobesonlibrary. 2007. *Plagiarism: real life examples (part 2 of 3)* [Online]. Available at: http://www.youtube.com/watch?v=96QEIDznXI4. [Accessed: 16 May 2011].

Peakdavid. 2009. *Avoid plagiarism in research papers with paraphrases & quotations*. [Online] Available at: http://www.youtube.com/watch?v=u1t0G7ZnRG8. [Accessed: 16 May 2011].

Radcliff, C.J. et al. 2007. *A practical guide to information literacy assessment for academic librarians.* Westport, CT: Libraries Unlimited.

Rosenblatt, S. 2010. They can find it, but they don't know what to do with it: describing the use of scholarly literature by undergraduate students. *Journal of Information Literacy* 4(2), pp. 50-61.

Su, S. and Kuo, J. 2010. Design and development of web-based information literacy tutorials. *Journal of Academic Librarianship* 36(4), pp. 320-328.

Silver, S.L. and Nickel, L.T. 2005. Are online tutorials effective? A comparison of online and classroom library instruction methods. *Research Strategies* 20(4), pp. 389-396.

Tronstad, B. et al. 2009. Assessing the TIP online information literacy tutorial. *Reference Services Review* 37(1), pp. 54-64.

Yelinek, K. et. al. 2010. Using Lib Guides for an Information Literacy Tutorial: Tutorial 2.0. *College & Research Libraries News* 71(7) p. 352.

Zhang, L. et al. 2007. The efficacy of computer-assisted instruction versus face-to-face instruction in academic libraries: a systematic review. *The Journal of Academic Librarianship* 33(4), pp. 478-484.

## Appendix A

**Learning Objectives for Modules in *The Search for the Skunk Ape* Online Tutorial**

Module 1: Getting Started with Research
- Effectively use knowledge of research purposes and the intended audience of research results
- Identify your information need
- Formulate a research topic

Module 2: Search Strategy
- Gather background information
- Identify keywords from an information source
- Identify scholarly journals
- Recognize that not all information can be found in one place

Module 3: Locating Sources
- Use the library catalogue to find books and other library materials
- Choose and access an online research database
- Find articles using a database
- Find full-text of an article or journal on the library website

Module 4: Ethical Research
- Define plagiarism and know how to avoid it
- Read and understand a citation
- Properly cite sources

## Appendix B

### Citation and Textual Analysis Data

***Locating Information***

| | | *Control Group* | *Experimental Group* |
|---|---|---|---|
| 1. | Count of sources as cited in bibliography | | |
| | a. total sources | 131 | 225 |
| | b. range | 1-9 | 1-19 |
| | c. average | 4.37 | 7.50 |
| 2. | Source by type as cited in bibliography | | |
| | a. print | 23/131 (17.6%) | 32/225 (14.2%) |
| | b. web-based | 108/131 (82.4%) | 186/225 (82.7%) |
| | c. other (interview, lecture, etc.) | 0/131 (0%) | 7/225 (3.1%) |
| 3. | Individual source as cited in bibliography | | |
| | a. website (.edu) | 5 (3.9%) | 5 or 2.22%) |
| | b. website (.org) | 13 (9.9%) | 28 (12.44%) |
| | c. website (.com) | 11 (8.4%) | 36 (16%) |
| | d. magazine* | 2 (1.5%) | 9 (4%) |
| | e. newspaper * | 16 (12.2%) | 41 (18.22%) |
| | f. journal* | 39 (29.8%) | 32 (14.22%) |
| | g. reference Book* | 19 (14.5%) | 29 (12.9%) |
| | h. book* | 5 (3.9%) | 19 (8.44%) |
| | i. course text* | 17 (12.9%) | 9 (4%) |
| | j. other/Unknown* | 4 (3.0%) | 17 (7.6%) |

**Any *format—print or web-based*

***Evaluating Information***

| | | | |
|---|---|---|---|
| 4. | Currency of source | | |
| | a. current | 95 (72.52%) | 177 (78.67%) |
| | b. not current | 7 (5.34%) | 22 (9.78%) |
| | c. unable to determine | 29 (22.14%) | 26 (11.55%) |
| 5. | Authority of source | | |
| | a. scholarly source | 66 (50.4%) | 105 (46.7%) |
| | b. non-scholarly source | 39 (29.8%) | 92 (40.9%) |
| | c. general reference source | 26 (19.8%) | 28 (12.4%) |

***Using Information***

| | | | |
|---|---|---|---|
| 6. | Count of sources as cited in paper | | |
| | a. total sources | 93 | 185 |
| | b. range | 0-7 | 0-19 |
| | c. average | 3.1 | 6.17 |
| 7. | Individual source as cited in paper | | |
| | a. website (.edu) | 5 (5.4%) | 3 (1.6%) |
| | b. website (.org) | 8 (8.6%) | 14 (7.6%) |
| | c. website (.com) | 5 (5.4%) | 24 (13.0%) |
| | d. magazine* | 5 (5.4%) | 8 (4.3%) |
| | e. newspaper * | 17 (18.3%) | 54 (29.2%) |
| | f. journal* | 20 (21.5%) | 22 (11.9%) |
| | g. reference Book* | 12 (12.9%) | 19 (10.2%) |
| | h. book* | 5 (5.4%) | 13 (7.0%) |

| | | | |
|---|---|---|---|
| i. | course text* | 13 (14.0%) | 12 (6.5%) |
| j. | other/Unknown* | 3 (3.2%) | 16 (8.6%) |
| **Any format—print or web-based* | | | |
| 8. Use of source information | | | |
| a. | total instances of source use | 130 | 266 |
| b. | long quote (>3 lines of text) | 8 (6.2%) | 30 (11.3%) |
| c. | short quote (<3 lines of text) | 55 (42.3%) | 91 (34.2%) |
| d. | paraphrase | 55 (42.3%) | 138 (51.9%) |
| e. | summary | 12 (9.2%) | 7 (2.6%) |
| 9. In-text citation | | | |
| a. | correctly formatted, complete | 6 essays (20%) | 8 essays (26.7%) |
| b. | correctly formatted, incomplete | 3 (10%) | 5 (16.7%) |
| c. | incorrectly formatted, complete | 7 (23.3%) | 6 (20%) |
| d. | incorrectly formatted, incomplete | 14 (46.7%) | 11 (36.7%) |
| 10. End-of-text documentation | | | |
| a. | correctly formatted, complete | 9 essays (30%) | 17 essays (56.7%) |
| b. | correctly formatted, incomplete | 4 (13.3%) | 1 (3.3%) |
| c. | incorrectly formatted, complete | 14 (46.7%) | 7 (23.3%) |
| d. | incorrectly formatted, incomplete | 3 (10%) | 4 (13.3%) |