Assessment = Improved Teaching and Learning: Using Rubrics to Measure Information Literacy Skills

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Abstract
Librarians and teaching faculty at the University of North Carolina at Greensboro (UNCG) conducted a three-semester information literacy assessment study in 2009-2010 with Communication Studies 300, a core course required of all Communication Studies (CST) majors. The assessment coordinators from the University Libraries and and the CST Department collaborated to develop a rubric and applied it to score a worksheet that required students to state their research topic and find appropriate books and articles. Initial evidence gathered during the first indicated that students did not gain important information literacy skills. During the subsequent two semesters the pedagogy changed to include online tutorials in addition to the traditional library instruction lecture. As a result, students' performance improved dramatically.

Introduction
The University of North Carolina at Greensboro (UNCG) is a publicly-supported University with High Research Activity with an enrollment of 14,300 undergraduates and 3,225 graduate students. There are 1,064.50 FTE faculty and a student faculty ratio of 17:1. The University Libraries have a long history of commitment to information literacy and hosts active programs for first-year, upper undergraduate and graduate level students. In 2008-2009, librarians conducted 519 instructions sessions with 10,575 contact hours. An online tutorial has been in place since 2000 and in 2008 an information literacy game created that received national attention. During the past few years the Libraries took several steps to create a culture of assessment. In 2007, the Libraries established an assessment team to coordinate such efforts and ensure that useful quantitative data and qualitative information is available for accountability, strategic planning

and improvement of the Libraries' services and resources. The team also develops an annual action plan, forms guidelines and oversees projects. For information literacy, librarians have experimented with a variety of assessment methods such as pre and post-tests, one minute papers, clickers, worksheets and attending student presentations to gain data on how well our students acquire these important skills.

The Libraries have also been successful integrating information literacy into the curriculum and participating in the campus assessment culture. Librarians at UNCG have faculty status and participate actively in Faculty Senate curriculum committees. A librarian serves on the Undergraduate Curriculum Committee and when the General Education Council formed in 2007, a librarian was appointed to it and contributed to the revision of General Education. Information literacy is included in one of the four core learning goals approved by the UNCG Faculty Senate in 2008:

LG1. Foundational Skills:
Think critically, communicate effectively, and develop appropriate fundamental skills in quantitative and information literacies.

As part of General Education assessment efforts, the Council administered the James Madison iSkills test to 350 juniors and seniors in spring 2010 along with standardized measurements for other subject areas. Results were not disseminated by publication date for this article. Also, during the summer of 2010, two librarians participated in a two-week General Education assessment workshop that included and information literacy component. In 2010, a new Senate committee was formed, the Student Learning Enhancement

Committee focused on assessment; a librarian serves on it as well. In the effort to integrate information literacy further into the curriculum at UNCG, the Libraries formed a university-wide Information literacy Council during 2009-10. It is co-chaired by two librarians and includes faculty representatives from the College of Arts and Sciences, all the professional schools and key assessment staff.

Background

Academic librarians have experimented with and researched numerous methods to assess students' information literacy skills. One method widely used in education is rubrics, a descriptive scoring scheme. They usually applied to performance evaluations, a qualitative measure that requires students to conduct real-life applications of knowledge and skills and measure higher-order thinking skills as opposed to recalling specific pieces of information.[1] Although not yet used extensively by librarians there are studies that utilized rubrics to assess information literacy skills. One of the most rigorous conducted was at the North Carolina State University (NCSU) Library where Megan Oakleaf used a rubric to analyze over 800 student responses to an open-ended questionnaire about website authority. Twenty-five raters, including librarians from NCSU and other ARL libraries, English instructors and English students, scored the questionnaires.[2] At the University of Mississippi, Elizabeth Choinski, Amy Mark, and Missy Murphy employed a rubric to assess objectively outcomes for EDLS, a for-credit information literacy skills course. They scored student papers that discussed information structure, resources, and research methods.[3] In 2006, Lorrie Knight published a study that used a rubric to measure five learning outcomes for first-year students enrolled in freshman seminars. A librarian and a trained student assistant analyzed two hundred and sixty bibliographies.[4] At the University of Washington Vancouver, librarians helped assess the University's General Education Program which included information literacy outcomes. Students submitted ePortfolios with two pieces of evidence for each learning goal.[5]

In general, librarians have found rubrics to be a valuable tool for assessing performance evaluations. They are particularly effective in providing useful evidence from assignments such as worksheets or annotated bibliographies. There are, however, some challenges. Developing a good rubric that successfully extracts the needed information takes time.[6] It is also time-consuming to score the performance tool. Furthermore, unlike standardized or fixed-choice measures, performance evaluations are also not always generalizable to other settings and it may be difficult to benchmark results with other institutions.[7]

Before designing any assessment instrument it is essential first to establish specific learning outcomes. Crafting a good outcome statement provides an important initial step in planning instruction and learning. As stated by Mark Battersby in "So What's a Learning Outcome Anyway?" the outcome approach focuses on integration and application of knowledge and what the students should be able to do at the end of a course or program. Battersby also emphasized that the method of assessing an outcome is crucial to its educational value. He recommended "authentic assessment" which stresses simulating situations where students make use of the knowledge, skills, and values taught in the course.[8]

Debra Gilchrist and Anne Zald applied this approach to information literacy in their chapter, "Instruction & Program Design through Assessment" in *The Information Literacy Handbook* and created a useful template for closing the loop between outcomes and assessment:

1.	Outcome	What do you want the student to be able to do?
2.	Information Literacy Curriculum	What does the student need to know in order to do this well?
3.	Pedagogy	What type of instruction will best enable the learning?
4.	Assessment	How will the student demonstrate the learning?
5.	Criteria for Evaluation	How will I know the student has done this well?[9]

They advocate the "assessment as learning" process so that such an evaluation goes beyond accountability and impacts and enhances our pedagogical decisions.[10]

Assessment Study

The assessment coordinators from the University Libraries and the Communication Studies (CST) Department at UNCG collaborated to conduct a study of CST students' information literacy skills.[11] The librarian is also the Libraries' liaison to CST. They applied the methodologies described above of developing student learning outcomes and a supporting pedagogy along with scoring a performance evaluation with a rubric. The study was conducted over three semesters with several sections of CST 300, a Communication Theory course. The Libraries had worked with this course for over 15 years; CST faculty, however, were still frustrated with the poor quality of sources selected by students and their lack of citation skills. The project provided the chance to gain more solid evidence of students' skills and an ideal situation to apply skills acquired at ACRL's Information Literacy Assessment Immersion. It was also an opportunity to provide a model of assessment that could be adopted by other librarians.

Communication Theory 300 is an upper-level core course in CST. Students are required to write a 8-10 page paper that places a communication theory in a context or application and uses primary research articles from Communication Studies and allied journals. Because it is required of all CST majors it is an ideal course to target for information literacy. The assignment provides the opportunity for students to learn the concepts of developing a search strategy with Boolean operators and using appropriate databases and other tools to find research material. The long-established pedagogy for the information literacy section of the course required the students to attend one library instruction session and complete a worksheet evaluated by both the librarian and the faculty member. An online research guide is prepared and pushed through Blackboard and available on the Libraries' website.[12] The worksheet is a "real-life" performance evaluation that asks students to define their theory and application and then choose books and articles related to their paper topic. The CST Department requires the American Psychological Association (APA) format for their citations. When evaluating the worksheets the librarian looked to see if the articles were from appropriate journals, were primary sources and if they included both the theory and the context. Suggestions and comments were noted and then sent to the professor for further comments and grading before being returned to the students. The worksheet is part of a sequence of assignments that later includes an annotated bibliography and early drafts leading up to the final paper.

The assessment project began with a pilot in spring 2009 with three sections of the course. To begin the librarian and professor met to discuss information literacy goals for the course and established three specific learning outcomes:
1. Students construct a search strategy using appropriate vocabulary and Boolean operators in order to search for information effectively.
2. Students distinguish primary source journal articles in order to gather appropriate resources for a research paper.
3. Students apply an established citation style in order to document the sources they use appropriately.

In addition, the professor added a more concrete information literacy outcome to the syllabus for the course:
*   Apply a working knowledge of information literacy as a tool for scholarship in communication studies including APA style for professional writing, library search techniques and use of primary sources (journal articles and other research publications)

Following the established pattern, the students had one session with the librarian who covered:
*   Using subject encyclopedias and texts to choose relevant vocabulary
    o   Selecting and using databases, particularly the Communication and Mass Media Complete (CMMC)
*   Choosing terms and applying Boolean operators
    o   Identifying scholarly and primary source articles
    o   Identifying Communication Studies and allied journals

A handout for APA was distributed but little time was spent on citation styles during the class session. The session was very hands-on and student given time to search for material on their topics and begin completing the worksheet. The worksheet was due one week later.
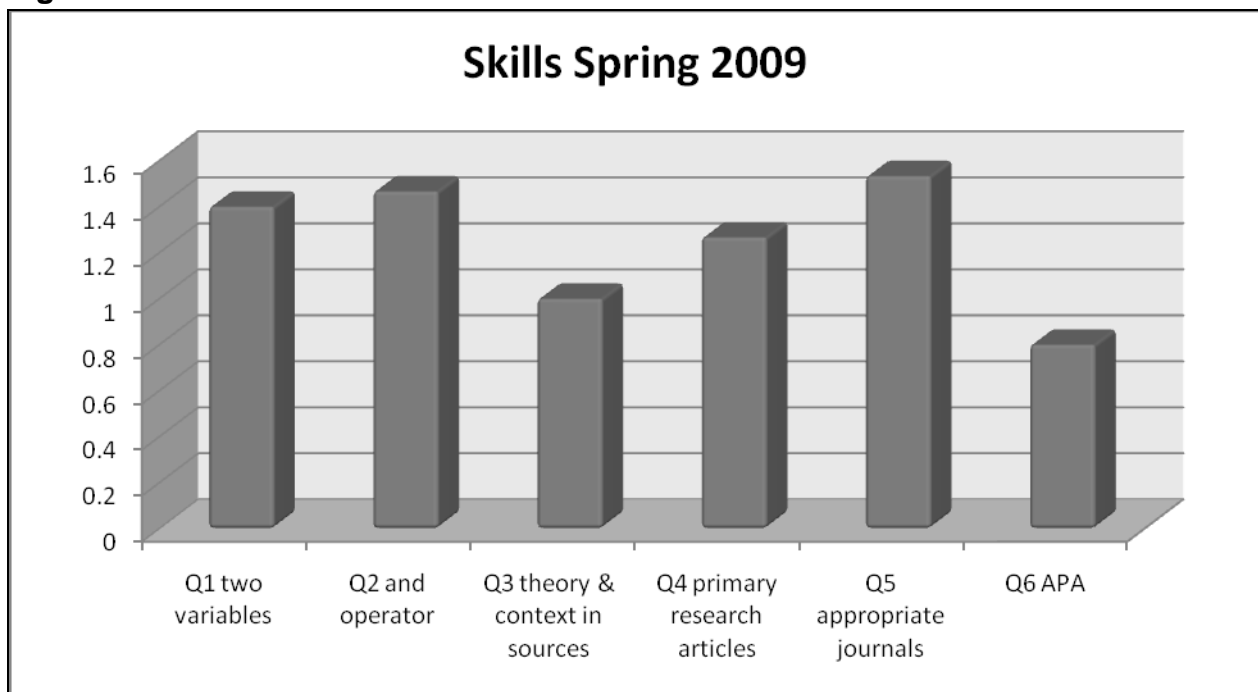
The library worksheet (Appendix I) was revised to reflect the newly-established information literacy outcomes more closely. The librarian developed a rubric with criteria to score the worksheet that had three levels: Needs Improvement, Acceptable, Excellent (0-2). The librarian provided the usual comments for the students and also scored the worksheets with the rubric. Scores for each skill were entered into an Excel spreadsheet. Appropriate skills were merged to compute an average for each learning outcome. The students did not perform well:

Table 1: Spring 2009 Results

Outcomes	Score N=34
Outcome 1 (search strategy)	1.10
Outcome 2 (appropriate sources)	1.36
Outcome 3 (citation style)	.72

Figure 1

The results provided clear evidence that students did not gain the knowledge identified in the learning outcomes and that changes in the pedagogy were needed for them to be successful. After discussing the results with the CST faculty member several recommendations we made for fall 2009 semester courses:

- Require students to take three specific chapters of the Libraries' online Research Tutorial before the instruction section with the librarian, ("Computer Searching," "Finding Articles," Citing Your Sources") to provide more background in developing a search strategy, Boolean operators, choosing appropriate articles and the APA citation style.[13] Students had been encouraged to take

the tutorial in the past but it was not a requirement.

- Delay the instruction session so that students have more time to develop their topics and absorb material from the tutorial.
- Revise the rubric to include four levels: Needs Improvement, Acceptable, Good and Excellent with a scoring of 0-3 to allow for a broader range of performance.
- Score the annotated bibliography with the rubric in addition to the worksheet to evaluate especially the use of primary sources and improvement in APA style.
- Compare scores to determine improvement from the previous semester.

In addition to the above changes, the Communication Studies Department Assessment Report for 2008 noted: "Students are clearly unskilled in professional style as a form of documentation. They are also weak in the basic ability to search using Boolean techniques and to discover primary sources."[14] The report included a specific recommendation:

Review undergraduate research skills in all of our core courses in the major (CST 105, 200, 207, 210, 300). As a result of the poor showing in the information literacy assessment the faculty began a process of reviewing using the table of skills provided by the Office of Undergraduate Research. A more planned program of teaching research skills across the core will support higher achievement of learning outcome by the senior year.[15]

The study continued in the fall 2009 with two sections of the course. At this point we completed the IRB process so that results could be published. Only students who signed the IRB form were included in the study. The recommendations discussed above were followed and, as a result, the students were much better prepared when they came to the instruction session with the librarian. The librarian re-scored the worksheets from spring 2008 with the new rubric (Appendix II) so that all scores could be compared. The students' performance improved dramatically from the previous semester with an increase of 78% for outcome 1, 30% for outcome 2, and 27% for outcome 3.

Table 2: Outcomes Spring and Fall 2009

Outcome	Spring 2009 (N=34) (re-scored)	Fall 2009 N=60 score
Outcome 1 (search strategy)	1.33	2.38
Outcome 2 (appropriate sources)	1.90	2.47
Outcome 3 (citation style)	1.33	1.69

The librarian also used the rubric to score the annotated bibliographies, an assignment turned in several weeks after the worksheet, to assess improvement on identifying primary sources and citation style between the worksheet and it. Students showed an improvement of 10.3% in primary sources and 51.5% in citation style.

One concept that is difficult for students to grasp is primary sources in the social sciences. It is even more of a challenge in Communication Studies because that discipline does not always produce empirical studies. Primary research in that field may also include critical analysis, rhetorical studies or extension of a theory. To help students apply these concepts better, the Libraries developed a brief five minute flash tutorial, "Finding Primary Sources in Communication Studies," again in consultation with the CST teaching faculty.[16] In spring 2010, students were required to take the new tutorial in addition to the chapters from the general one assigned the previous semester. Two sections of the course again participated in the study (n=24). Scores improved again albeit not as dramatically as between the first two semesters of the study. Scores did increase 9.5% for the primary sources skill between fall 2009 and spring 2010 after

adding the new tutorial to the requirements. The CST Department assessment report for 2009 noted the improvement and commitment to continued collaboration with the Libraries:

> Continue collaboration with Jackson Library to assess information literacy. This past year we participated in the second year of a pilot

project with Jackson Library to assess information literacy skills in our CST 300 courses. The results for the second year demonstrated improvement. We are committed to increasing the information literacy competency of our students as a core skill set for CST majors.[17]

Figure 2: Outcomes Spring 2009, Fall 2009, Spring 2010
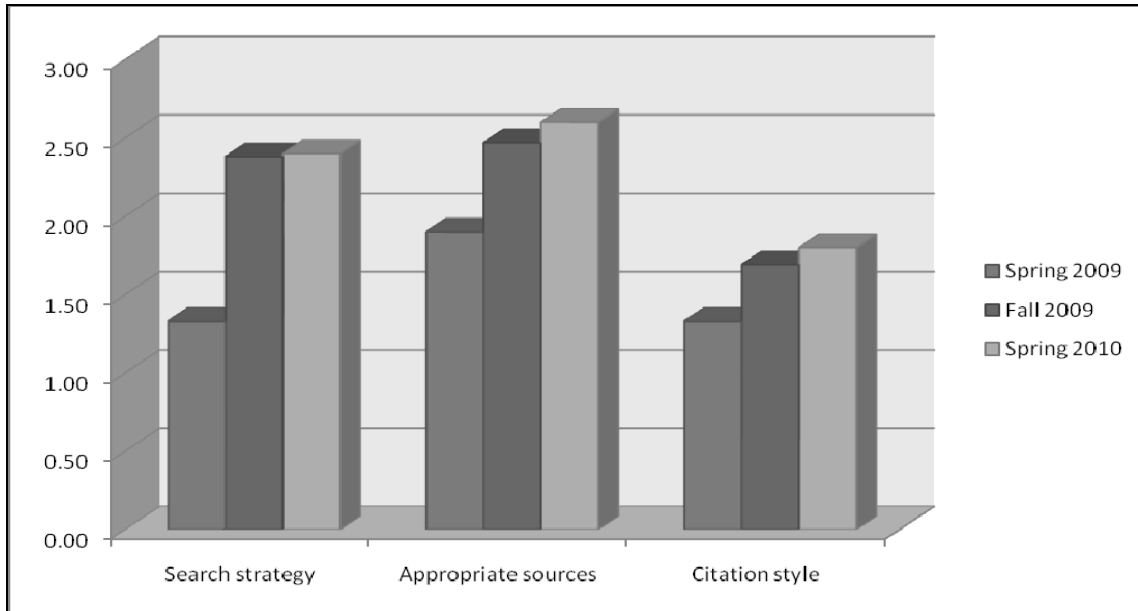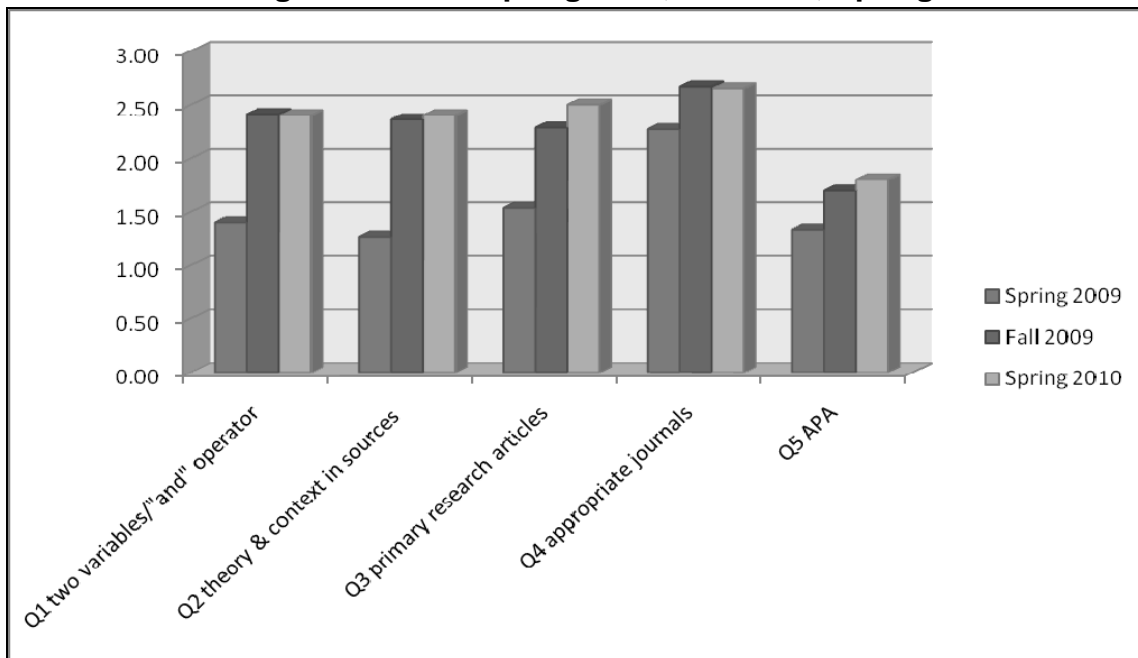

Figure 3: Skills Spring 2009, Fall 2009, Spring 2010

Conclusions and future plans

This study provided solid data in the initial pilot in the spring of 2009 that CST students were not gaining the information literacy skills that they needed to succeed in their major. Although the Libraries had long collaborated with the department and used a performance measure that fit into the sequence of assignments for the course, true assessment had not taken place. The initial evidence indicated that the "one-shot lecture" and worksheet were not providing adequate instruction or content for the students. Adding the general tutorial and delaying the timing of the instruction session resulted in greatly improved scores in the subsequent semesters, especially for outcomes one and two. Interestingly, the author had tried to implement these suggestions for some time but needed this evidence so that the CST faculty realized that they were needed! Adding the primary source tutorial during the 3rd semester helped to improve their performance with that outcome. Although performance improved for APA style over the course of the project, it was still the area with the lowest scores. It was encouraging, however, that scores did improve for that outcome when the annotated bibliographies were scored in fall 2009. Hopefully, feedback on the worksheets made it evident to the students that they had problems with citation styles and they corrected them with their next assignment.

The study offered an excellent opportunity to build upon a successful collaborative relationship between the Libraries and the Communication Studies Department. This authentic assessment of an assignment that was part of the sequence of the course provided evidence that students were not acquiring the skills that both the teaching faculty and librarians wanted them to learn. The Libraries and the CST Department partnered more closely to develop focused outcomes and measure them more rigorously. As a result we worked together to revise the pedagogy which improved students' performance and integrated information literacy further into the CST curriculum. Conversations with CST will continue to explore implementing information literacy at the 200- level so that they are better prepared for CST 300.

The project was also a valuable learning experience. As others who have used rubrics have noted, it was time-consuming to devise the rubric to ensure that it evaluated the worksheet. And it was discovered after the initial pilot that the rubric needed four instead of three levels to provide a better range of student performance. It took approximately 7-10 minutes to score each worksheet and enter the data. For some worksheets it was necessary to search for the articles to see if they were primary sources and if they included both the theory and the context. Fortunately, finding the articles in the online environment is easily accomplished! The important evidence and information that was collected, though, far outweighed these challenges.

Applying a rubric to a performance evaluation offered a good model for other librarians at UNCG. The Libraries established student learning outcomes for information literacy based on the ACRL Standards and are embarking on a five-year plan to assess these outcomes and our instruction program. This method will be applied in a variety of classes along with other assessment techniques. Further refinements are needed in the future. For example, the rubric was not shared with students and should be so that they are more aware of the expectations. The scoring was only done by one librarian. For a more rigorous approach, additional raters should be added so that the data is more reliable and valid. This assessment experience has been an excellent first step, however, that the University Libraries looks forward to using more broadly in the future

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Notes

1. Lois M. Pausch and Mary Pagliero Popp, *Assessment of Information Literacy: Lessons from the Higher Education Assessment Movement*, (Chicago: Association of College and Research Libraries, undated), http://www.ala.org/ala/mgrps/divs/acrl/publications/whitepapers/nashville/pauschpopp.cfm.

2. Megan Oakleaf, "Using Rubrics to Assess Information Literacy: An Examination of Methodology and Interrater Reliability," *Journal of the American Society for Information Science and Technology* 60, 6 (May 2009): 972-973.

3. Elizabeth Choinski, Amy E. Mark, and Missy Murphey, "Assessment with Rubrics: An Efficient and Objective Means of Assessing Student Outcomes in an Information Resources Class," p*ortal: Libraries and the Academy* 3 4(October 2003):565-566, http://muse.jhu.edu/journals/portal_libraries_and_the_academy/v003/3.4choinski.pdf.

4. Lorrie A. Knight, "Using Rubrics to Assess Information Literacy," *Reference Services Review* 34, 1 (2006): 47-48.

5. Karen R. Diller and Sue F. Phelps, "Learning Outcomes, Portfolios, and Rubrics, Oh My! Authentic Assessment of an Information Literacy Program," *portal: Libraries and the Academy* 8, 1 (January 2008): 78-79, http://muse.jhu.edu/journals/portal_libraries_and_the_academy/v008/8.1diller.pdf.

6. Knight, 52.

7. Megan Oakleaf, "Dangers and Opportunities: A Conceptual Map of Information Literacy Assessment Approaches," p*ortal: Libraries and the Academy* 8, no. 8 (January 2008): 243, http://muse.jhu.edu/journals/portal_libraries_and_the_academy/v008/8.3.oakleaf.pdf.

8. Mark Battersby, "So, What's a Learning Outcome Anyway?" (ERIC Document Reproduction Service No. ED430611), 1-2.

9. Debra Gilchrist and Anne Zald, "Instruction & Program Design through Assessment," In *The Information Literacy Instruction Handbook,* eds Christopher N. Cox and Elizabeth Blakesley Lindsay (Chicago: Association of College and Research Libraries, 2008), 168 (reprinted with permission). *They also presented these concepts at ACRL's Information Literacy Assessment Immersion in Nashville, TN in December 2008, attended by the author.*

10. Ibid., 167.

11. The author thanks Dr. Elizabeth J. Natalle, Assessment Coordinator for the Department of Communication Studies, UNCG, for her collaboration on this project.

12. University of North Carolina at Greensboro, Library Guides, http://uncg.libguides.com/cst300.

13. The University Libraries online tutorial has been revised since the study was conducted. The new tutorial is available at: http://library.uncg.edu/tutorials. CST 300 students are now required to take modules 2, 5, 6, 8, and 10.

14. The University of North Carolina at Greensboro, Department of Communication Studies, "2008 Assessment Report" (2008): 8. (Prepared by Elizabeth J. Natalle, Assessment Chair, Department of Communication Studies.)

15. Ibid., 6.

16. The University of North Carolina at Greensboro, "Finding Primary Sources in Communication Studies," http://library.uncg.edu/research/tutorials/ComStudiesPrimarySources/ComStudiesPrimarySources.html.

17. The University of North Carolina at Greensboro, Department of Communication Studies, "2009 Assessment Report" (2009): 6. (Prepared by Elizabeth J. Natalle, Assessment Chair, Department of Communication Studies.)

Name: _____

CST 300
Library Worksheet

       This worksheet is the first step in planning and researching your term project for CST 300. Your project involves selecting a communication theory from our course and then taking steps to see if you can apply and evaluate it in the real world. If you are successful making the preliminary decisions required on this worksheet, you will have accomplished some goals for the project that will make your research and writing go well over the next few weeks.

       For a successful worksheet, you will need your course textbook, the Library Catalog, the CST 300 Subject Guide, and an APA Handout or Manual to access the necessary information. This assignment is worth 10 points and is due at the beginning of the next class period.

All worksheets must be word-processed!

1.A. List the **theory** you have selected that will be the focus of the paper (e.g. relational dialectics)	B. What **communication context** are you considering the application of the theory? (e.g. friendship)

Book or book chapter

       2**.** . Use the UNCG Libraries' online catalog and do a search by SUBJECT or KEYWORD or AUTHOR to find a book or a chapter on your theory by the author who created the theory or by a researcher who is directly working with the theory. List the book here:

Author (of the book or chapter) _____

Editor of Book (if applicable)_____

Title of chapter (if applicable) :_____ _____

Title of book_____

Publisher: _____

Copyright Date: _____Call Number: _____
Is the book available? _____   If so, on which floor? _____

What key terms or author names did you use to locate the book?

Journal articles

3. Using the Communication and Mass Media Complete (CMMC) database (located on the CST 300 subject guide: http://library.uncg.edu/depts/ref/bibs/cst/cst300.asp), list a **primary source journal article** that deals directly with your theory **and** context. **Remember to check the box "peer reviewed articles."**

       A. Put the citation below in correct APA style.

       B. Write the terms you used in CMMC in the boxes below:

and	
and	

4. Find two more articles* from either CMMC or another appropriate database (e.g., PsychInfo, SocIndex, etc., located on the CST 300 subject guide) that support your theory and context. Put citations in correct APA format.

(*Do not list dissertations, conference papers, or book reviews. We are interested here in **primary sources that have been peer-reviewed**—that is, research reports of studies done on your topic area.) Review the tutorial on primary sources if needed. http://library.uncg.edu/research/tutorials/ComStudiesPrimarySources/ComStudiesPrimarySources.html

A. Database Used:

Citation:

B. Database Used:

Citation:

5. What questions or concerns, if any, do you have about your research at this time?

CST 300 Rubric

Outcome #1
Students construct a search strategy using appropriate vocabulary in order to search for information effectively.

Criteria	Excellent 3	Good 2	Acceptable 1	Needs improvement 0
Uses two variables in search strategy with "and" operator	Uses two topic-related variables with "and" operator appropriately	Uses two variables but 1 term doesn't match topic or uses "and" operator inappropriately	Uses one topic-related variable and doesn't use "and" appropriately	Missing variables and terms don't match topic. Doesn't use "and" operator

Outcome #2
Students distinguish primary source research material in order to gather appropriate resources for a research paper.

Criteria	Excellent 3	Good 2	Acceptable 1	Needs improvement 0
Student selects primary source research material	All items are primary source research	Two items are primary sources material	1 item is a primary source	No items are primary research
Appropriate journals or books	All items from Communication/Allied journals or scholarly books	2 items from Communication/Allied journals or scholarly books	1 item from Communication/Allied journals or scholarly books	No items from Communication/Allied journals or scholarly books
Includes theory and context in material	Theory and context in all items	Theory and context in 2 items	Theory and context in 1 item	Does not include theory in context in any items.

Outcome #3
Students apply an established citation style in order to document the sources they use appropriately.

Criteria – APA format	Excellent	Good	Acceptable	Needs Improvement
Student includes all components of a citation in correct order, format and punctuation in accordance with the APA style.	Citations include all components with correct order, format and punctuation	Citations are missing one of the following: 1 item out of order 1 punctuation item	Citations are missing one of the following: 1 component 1 item out of order 1 punctuation item	Citations are missing two of the following: 1 component 1 item out of order 1 punctuation item