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This study compares whether library anxiety is reduced more in first-year students who participated in computer-assisted instruction (i.e., a computer-based tutorial) or attended a traditional library-staff led bibliographic instruction session. First-year students who participated in a method of instruction were surveyed before and after instruction, and they were compared to a control group consisting of first-year students who did not participate in either type of instruction. Using Bostick's Library Anxiety Scale, this study found that students who took part of bibliographic instruction led by a library staff member experienced significantly less library anxiety compared to the control group. Controlling for previous library experience and prior knowledge of the library did not alter this finding. This study also separately examined each of the five sub-scales of Bostick's Library Anxiety Scale. Analyses revealed significant differences between groups for two of the five sub-scales (the "Barriers with Staff" sub-scale and the "Affective Barriers" sub-scale). Discussion focuses on how these findings are important for academic librarians conceptualizing instructional programs.

Headings:

Bibliographic instruction – College and university students

Research and the library – Evaluation

Use studies – College and university libraries

Computer-assisted instruction

REDUCING LIBRARY ANXIETY IN FIRST-YEAR STUDENTS: COMPUTER-ASSISTED INSTRUCTION VS. BIBLIOGRPAHIC INSTRUCTION

by
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Introduction

The transition from high school to college can be frightening for first-year college students. With the anticipation of making new friends, living on their own, and becoming familiar with new surroundings, college can be an overwhelming experience. Along with these lifestyle changes, college classes and coursework also confront students. In order for students to do research for a project or a paper, they will need to enter a place that many have never been before: the college library.

Librarians recognize that certain skills are needed to perform college research. Accordingly, colleges and universities have implemented library or bibliographic instruction sessions in their curricula to orient first-year students to research procedures and sources. Ideally, bibliographic instruction also assists students in increasing their levels of information literacy and acquiring life-long learning skills. With the advancement of technology and the Internet, traditional bibliographic instruction sessions are being augmented or replaced entirely by computer-based tutorials at some universities and colleges.

A primary goal of both traditional bibliographic instruction and computer-based tutorials is to teach students how to properly use the college library (e.g., locate sources within the college library). Even with libraries providing traditional bibliographic

instruction and computer-based tutorials, many students remain uncomfortable using college libraries. The discomfort many students feel about library research is referred to as library anxiety. Library anxiety was first identified by Mellon (1986) in a qualitative study of college students' feelings about using the library. Through further studies, library anxiety has been defined simply as "negative feelings toward using an academic library" (Bostick, 1993, p. 1). More recently, Jiao, Onwuegbuzie, and Lichtenstein (1996) added more substance to the library anxiety concept, explaining that students' uncomfortable feelings lead to cognitive, affective, physiological, and behavioral ramifications that interfere with their abilities to accomplish library tasks.

The question asked by this study is whether library anxiety is reduced more by bibliographic instruction or computer-assisted instruction. More specifically, does library staff-led bibliographic instruction reduce first-year students' library anxiety more than computer-based tutorials? Literature reviewed covers the research on library anxiety (specifically that using Bostick's Library Anxiety Scale), bibliographic instruction and computer-assisted instruction. Following this literature review, the methodology section describes the operational definitions, the procedures for sampling, the design of the study, and the analytic framework. The results from the analyses are presented followed by a discussion and conclusion.

Literature Review

Library Anxiety

The theory of "library anxiety" was formed from a two-year study on college students' feelings about using the library; it was found that students described their initial reaction to library research in terms of fear (Mellon, 1986). This fear presented itself in three ways: 1) students perceive their own library skills as inadequate, while other students' skills are perceived as adequate; 2) they perceive their feelings of inadequacy as embarrassing; and 3) they avoid asking questions because they do not want to reveal their inadequacy (Id, 1986). Mellon (1988) later concluded that "students become so anxious about having to gather information in a library for their research paper that they are unable to approach the problem logically or effectively (p. 138).

Using the theory developed by Mellon's qualitative study, Bostick (1993) developed a reliable Library Anxiety Scale that has been used to quantify library anxiety. The Library Anxiety Scale identifies five dimensions of library anxiety: 1) Barriers with Staff, 2) Affective Barriers, 3) Comfort with the Library, 4) Knowledge of the Library, and 5) Mechanical Barriers. "Barriers with staff" relates to the students' perception that librarians, as well as other library employees, are unapproachable or too busy to assist them (Jiao & Onwuegbuzie, 1999a; Mellon, 1986). "Affective barriers"

refers to students feeling inadequate about their abilities to effectively use the library (Jiao & Onwuebguzie, 1999a). Feelings of inadequacy can be identified if students feel that other students have adequate skills to effectively use the library (Mellon, 1986). "Comfort with the library" refers to students' reactions to the ambiance of the library. If students do not feel the library is welcoming and non-threatening, they are unlikely to feel at ease to use the library effectively (Jiao & Onwuegbuzie, 1999a, Jiao, Onwuebguzie, & Lichtenstein, 1996). "Knowledge of the library" relates to students' perceptions of familiarity they have of the library (Jiao & Onwuebguzie, 1999a). The less familiar students are with the library, the more frustrated or anxious they may become – therefore, behaviors are affected (Mellon, 1988). The final dimension, "mechanical barriers," deals with students' reliance on mechanical library equipment, including change machines, computer printers, etc. (Jiao & Onwuegbuzie, 1999a).

Prior studies using Bostick's Library Anxiety Scale include those researching different variables contributing to library anxiety. Jiao, Onwuegbuzie, & Lichtenstein (1996) found that eight different variables (age, sex, year of study, native language, grade point average, employment status, frequency of library visits, and reason for using the library) each contributed significantly to the prediction of library anxiety. In another study, Jiao & Onwuegbuzie (1999b) found that students with the lowest self-perception tended to have the highest levels of library anxiety.

Bibliographic Instruction & Computer-Assisted Instruction

Library instruction or bibliographic instruction is a service that has been offered by librarians in the United States for over 180 years (Graff, Proctor, Chang & Schwartz,

1997). Bibliographic instruction can be simply defined as "an area in the library sciences that deals with imparting to others strategies for the use of libraries" (Landrum & Muench, 1994, p. 1619). Over the years, as college curricula have changed, so has the model of bibliographic instruction. Olivetti (1979) states that bibliographic instruction has two objectives: 1) familiarization with specific resources and 2) increased utilization of those resources. Even with the advancement of technology and the advent of the Internet these two objectives persist.

As the amount of accessible information has grown exponentially, bibliographic instruction has evolved from showing students how to successfully complete assignments using the library to fostering the "independent and analytical thinking and information skills" that are "demanded by an increasingly technological and information-dependent environment" (MacAdam, 1990, p. 948). Therefore in addition to the two objectives originally outlined by Olivetti, it is now recognized that bibliographic instruction should also focus on enhancing a student's information literacy, which is the student's ability to find, evaluate and use information effectively throughout his or her personal and professional life (MacAdam, 1990). Information literacy has increasingly become an important focus for academic librarians today. The Board of the American College and Research Libraries (ACRL) recently approved "Objectives for Information Literacy Instruction: A Model Statement for Academic Librarians," which outlines five Competency Standards for academic libraries to use as a guide for library instruction (2001).

Along with the responsibility to teach the basic and life-long learning skills, librarians have become aware that the exponential growth of information available to

students can be overwhelming. Mellon's (1986) study shows are likely to feel more comfortable using the library after attending a traditional staff-led bibliographic instruction, mainly due to the interaction the students have with the librarian. Apparently a staff-led library instruction can serve as a time for the students to meet and get to know the librarian as someone who can be a valuable resource in the future. Therefore, bibliographic instruction should be used not only as a session teaching students how to efficiently and effectively use on-line catalogs and electronic databases, but also as a time to ensure that students feel comfortable in the library and with the librarian.

Computer-assisted instruction (CAI) is a specific method used for bibliographic instruction. Beginning at the University of Illinois at Urbana-Champaign and The Ohio State University, librarians have been using CAI since the early 1970's (Fjallbrandt & Malley, 1984). In order for a library-focused CAI (e.g., online computer tutorial) to be an effective tool for students, CAI should fulfill the basic requirements of traditional bibliographic instructional as were outlined above (i.e., familiarization with specific resources, increased utilization of those resources, enhancement of information literacy, and reduction of discomfort in the library). Kaplowitz & Contini (1998) evaluated the use of CAI on a large undergraduate survey class, and concluded that the students "viewed CAI as a very viable option for bibliographic instruction" (p. 26).

Bibliographic instruction coordinators are encouraged to take into account students' different learning style preferences in order to reduce a student's library anxiety (Jiao & Onwuegbuzie, 1999a; Mellon & Pagles, 1987). A learning style

preference can include using CAI methods to teach students how to effectively and efficiently use the library and its sources.

Evaluation of Bibliographic Instruction & Computer-Assisted Instruction

Evaluating bibliographic instruction is an important part of an academic library's instructional services department. With bibliographic instruction's various objectives, it can be difficult to determine what specific component should be evaluated. Bober, Poulin, and Vileno (1995) published a critical literature review focusing on bibliographic instruction evaluation in academic libraries. Through this literature review, which focused on literature from 1980-1993, the authors found that academic librarians focused on evaluating any one or a combination of four major library instruction objectives: student learning, scholarly achievement, long-term effects, and attitudes (Id, 1995).

The methods academic libraries use to assess and evaluate their bibliographic instruction programs also vary. Ragains (1997) surveyed forty-four colleges and universities about their respective bibliographic instruction evaluation practices. Thirty-two out of the forty-four (73%) college and universities measured bibliographic instruction's impact with a student evaluation, which focused on the students' satisfaction with the session (Id, 1997). Just over half (55%) of the reporting college and universities used peer observation, and nineteen out of the forty-four (43%) institutions tested student learning to evaluate bibliographic instruction (Id, 1997).

There are numerous examples using combinations of "what" instructional services departments want to evaluate and "how" they want to evaluate it. For example,

Cherry, Yuan, and Clinton (1995) evaluated the effectiveness of computer tutorials in two studies, both using pre- and post-tests to determine if students completing the computer tutorial demonstrated improvement in performance. Fenske and Roselle (1999) used a combination of methods to measure of combination of bibliographic instruction objectives. Their evaluation consisted of 1) a survey asking the students about their opinions and attitudes toward the bibliographic instruction; 2) a questionnaire for the instructors' opinions; 3) a post-assignment survey to measure opinions and attitudes; and 4) peer evaluation for feedback to make improvements in presentation style, organization, etc. (Id, 1999).

It has been stated that bibliographic instruction's success should not be evaluated solely on the students' attitudes or opinions, because this focus does not appropriately measure student ability to work in the library (Bober, Poulin, & Vileno, 1995). As previously noted, students' levels of library anxiety can affect their ability to function effectively in the library. If students do not feel comfortable or familiar with the library, they may not be able to use it to the best of their abilities regardless of the bibliographic information they gain. Therefore, it appears that an evaluation of whether one form of bibliographic instruction reduces anxiety as much or more than another bibliographic instruction method (e.g., computer based tutorials) is warranted.

CAI can be used to relay the same information as a traditional library staff-led bibliographic instruction, but whether these two methods of instruction comparably reduce library anxiety levels is unknown. Because CAI can be programmed to cover the same material as library staff-led bibliographic instruction, CAI can provide students with the same practical information as library staff-led bibliographic instruction. It is

unclear, however, whether CAI, without providing the contact with library staff and the flexibility of a human instructor, can reduce students' library anxiety.

Methodology

Objective of the Study

The goal of this study is to determine the influence of different types of bibliographic instruction, a computer-based tutorial and a library staff-led bibliographic instruction session, on the levels of library anxiety among first-year university students.

Operational Definitions

The following definitions are used for this study. The first-year students were enrolled in the English 11 course during the Fall of 2000 at the University of North Carolina at Chapel Hill. Library anxiety refers to the level of anxiety that a student reports on the Library Anxiety Scale. The bibliographic instruction consists of a 30 – 40 minute instructional session led by a librarian or a library science graduate student, demonstrating use of on-line sources (including the on-line catalog, reserve materials, and electronic databases) via liquid crystal display (LCD). Bibliographic instruction sessions take place in instructional classrooms at the Walter Royal Davis Library. The classrooms provide each student with a computer that he or she can use for hands-on training during the instructional session. The computer-based tutorial is a self-paced, 30 – 45 minute computer-assisted, interactive, instructional tool providing instruction about using the on-line resources (including the on-line catalog, reserve materials, and

electronic databases). Students can access the computer-based tutorial remotely from any computer via the Internet (e.g., residence hall, library, home, etc.). The tutorial includes questions at the end of its modules, so students can apply what they have learned from the tutorial. These questions can be answered by using the sources explained in the tutorial.

Sample

The sample in the study is comprised of fifteen English Composition and Rhetoric (English 11) classes at The University of North Carolina at Chapel Hill from the Fall 2000 semester. These classes ranged from seven to twenty-two students. With the exception of relatively few students who test out of the course, English 11 is required for all entering students. All English 11 classes currently participate in a library orientation as a part of the class curriculum. Instructors of English 11 were asked whether they were interested in having their classes participate in the study. Once interested instructors were identified, classes were randomly placed into one of three groups: 1) the control group, 2) the traditional bibliographic instruction group, and 3) the computer-based tutorial group.

Composition of the Study

The computer-based tutorial is normally completed by the time the students take part in a library staff-led bibliographic instruction session. For this study, however, participating classes followed a different pattern. A self-reporting, voluntary questionnaire (the pre- and post-tests) was administered to each of the three groups of

students. To examine the objective of the study, data were collected from participating students in the following manner:

A) One third of the participating classes were placed in the control group. They did not receive any treatment (i.e., an instructional session) between the pre- and post-tests. They took the pre-test and the post-test approximately one week apart. These tests were administered before the instructor assigned the computer-based tutorial and before the students participated in their scheduled bibliographic instruction session at the library. Participants experienced a one-week maturation, but they did not have any organized bibliographic instructional sessions in the interim. The relative timing of the pre- and post-test mirrored that experienced by the treatment groups. To ensure the students experienced the same educational sources experienced by other students in English 11, the classes in the control group were assigned the computer-based tutorial and attended a library staff-led bibliographic instruction session scheduled by their instructor after the post-test was completed.

B) One third of the participating classes were assigned to the bibliographic instruction (BI) group. Participants in the BI group were pre-tested in their classroom during a regularly scheduled class held before their bibliographic instructional session. They completed the post-test after the bibliographic instruction session in their classroom during a regularly scheduled English 11 class. For example, if their bibliographic instruction took place on a Monday, they may have taken the pre-test on the previous Friday during a

regularly scheduled class and taken the post-test on a Wednesday during their regularly scheduled class. To ensure the students received the same educational experiences as other students in English 11, the classes in the BI group were assigned the computer-based tutorial after the post-test.

C) One third of the participating classes were assigned to the computer-based tutorial (CBT) group. Participants in the CBT group were pre-tested in their classroom during a regularly scheduled class before the English 11 instructor assigned the computer-based tutorial. The students had approximately one week to complete the computer-based tutorial. The students took their post-tests (approximately one week after the pre-test) during a regularly scheduled class in their classroom before they attended a library staff-led bibliographic instruction session.

Data Collected

As previously stated, a self-reporting, voluntary questionnaire was used for the pre- and post-test. Pre- and post-tests were identical. Therefore, differences in student responses between the two tests are clearly due to changes in the attitudes measured, not subtle differences in question format. Students were asked their birthday and their sex. These two pieces of information, as well as the codes assigned to each class, were used to created unique identifiers for each student. The unique identifiers were used to match pre- and post-tests.

Items on the tests included questions about the students' comfort with the library staff, comfort with the library, confidence of library use in relation to their classmates,

knowledge of the library, and familiarity with machines in the library. These questions are specifically part of the Library Anxiety Scale developed and validated by Bostick (1993). The Library Anxiety Scale is a forty-three item, five-point Likert-format instrument that assesses levels of library anxiety. Scores for an individual item on the scale can range from one (low anxiety) to five (high anxiety). In order to take missing data into account, calculations for both the pre-test and the post-test used the average of the respondent's answers from the Library Anxiety Scale items. An average was used, instead of the total score (summing up the answers from the 43-item scale), because using the average substitutes a student's average score from all of his or her non-missing items for any missing values. In contrast, summing all of the respondent's answers to create a "total" score assumes all missing scores were intended to be zeros.

Bostick reported a Cronbach's alpha reliability of .80, as well as a three-week retest reliability of .74. Onwuegbuzie (1997) found the reliability of the sub-scales as measured by coefficient alpha, to range from .71 (Mechanical Barriers) to .88 (Barriers with Staff).

For the study reported herein focusing on the students at the University of North Carolina at Chapel Hill, the alpha reliability of the total Library Anxiety Scale was .91 for the pre-tests and .94 for the post-tests. Reliability for the sub-scales ranged from .56 (Knowledge of the Library) to .90 (Barriers with Staff) for the pre-tests, and from .68 (Mechanical Barriers) to .90 (Barriers with Staff) for the post-tests. This study focused on the R. B. House Undergraduate Library at the University of North Carolina at Chapel Hill, so the Library Anxiety Scale was somewhat altered to reflect specific attitudes toward this particular library.

In addition to the Library Anxiety Scales' questions, simple demographic questions (e.g., sex, year in school, etc.), knowledge/practical questions about the library (e.g., the process to locate books, the classification system used, etc.) and library experience questions (e.g., whether participants asked librarians for help, etc.) were asked to collect information about these particular areas.

A total experience score/variable was created for those students who answered three out of the four Undergraduate Library experience questions. The experience questions were binary (i.e., yes/no questions). If students had done as the question asked (i.e., if they answered the question "yes"), they scored a "1". Therefore, the highest score for the experience variable is a "4."

A total knowledge score/variable was created for those students who answered at least three out of the five knowledge/practical questions. The knowledge questions were binary (i.e., true/false questions). If they correctly answered the question, they scored a "1." Therefore, the highest score for the knowledge variable is a "5."

Analyses

Data will be analyzed to determine whether changes in library anxiety are decreased more by bibliographic instruction or computer-assisted instruction. Accordingly, between-group differences on the total Library Anxiety Scale scores, as well as each of the five sub-scales, will be examined. A preliminary analysis will be run to determine whether random assignment evenly distributed initial library anxiety across groups. Similarity of initial library anxiety across groups is necessary to conclude that post-tests' differences between the treatment and control groups are caused by

differences in treatment. If groups are found to be similar at pre-testing, post-test differences on the different scales can be examined with simple one-way ANOVAs. If groups differ in initial/pre-test library anxiety, however, an ANCOVA or a MANCOVA will be appropriately performed to control for these initial differences.

Additional analyses will be run to evaluate overall library anxiety scores between groups taking into account previous experience and prior knowledge. The overall library anxiety post-test scores between groups will be analyzed controlling for previous experience with the library. Additionally, the overall library anxiety post-test scores between groups will be analyzed controlling for prior knowledge about the library.

Results

Initial Analyses

Two hundred ninety seven students participated in the study; however, all data could not be used in the analyses. First, any student that did not complete both the pre-test and the post-test was eliminated. The data of 54 students had to be eliminated from the study for missing either the pre- or the post-test. Second, frequencies, histograms, and standardized scores were examined in order to identify outliers. Five cases were found to have extreme pre-test scores on the entire Library Anxiety Scale and were deleted from further analyses. After dropping these cases, the total number of students remaining in the study was 238. The number of students (as well as male/female breakdown) in each of the three groups used to investigate the reduction of library anxiety is shown in Table 1.

Table 1 – Number and sex of participants in each of the three study groups

Group	Number of Students	Sex	
		Male	Female
Control	96	28	68
Bibliographic Instruction	84	29	55
Computer-Based Tutorial	58	18	40
Total	238	75	163

If randomization was successful in equating the groups, pre-test scores should not significantly vary between groups, because at the time of the pre-test no group has undergone any sort of treatment. In order to determine whether randomization worked, differences between the three groups' pre-tests were examined. The analysis of variance (ANOVA) revealed a significant difference ($F(2,235) = 3.827$, $p < .05$) between the three groups' pre-test scores, suggesting that randomization did not work. Means and standard deviations are presented in Table 2.

Post hoc comparisons using the Fisher LSD test revealed that at the time of the pre-test both the BI group and the CBT group were significantly less anxious (at the .05 level) about using the library than the control group. (Note: A Bonferroni's test could have also been used, but the Bonferroni is more conservative in finding differences. In examining this assumption, however, it is more prudent to be less conservative.)

The probable reason that the randomization did not work is that although there were 238 subjects, the unit of randomization was entire classes of which there were only

15. Therefore, randomization had few opportunities to equate the treatment and control groups.

Table 2 – Comparison between groups' pre-test overall library anxiety scores

Group	Number	Mean	Standard Deviation
Control	96	2.8108	.2436
Bibliographic Instruction[1]	84	2.7092	.3032
Computer-Based Tutorial[2]	58	2.7117	.2820

[1]Significant difference between BI group and control group at the .05 level.
[2]Significant difference between CBT group and control group at the .05 level.

Library Anxiety Analyses

In order to control for the between-group differences found in the preliminary analysis, an analysis of covariance (ANCOVA) was used to examine between-group differences on the overall Library Anxiety Scale scores. The ANCOVA revealed a significant difference ($F(3,234) = 4.416$, $p < .05$) between the three groups' post-test scores. This indicates that there was a significant difference in library anxiety according to the group in which the subjects belonged. Means and standard deviations are presented in Table 3.

Pairwise comparisons between group means were calculated to determine between which groups significant differences existed. The comparisons revealed that the mean-level library anxiety scores at the post-tests for the BI group were significantly less than those of the control group ($p < .05$); however, the CBT group's mean-level scores were not significantly different than the control group ($p > .05$). This indicates

that compared to the control group, anxiety was significantly lower for those students in the BI group, but not the CBT group. Therefore, bibliographic instruction significantly reduced library anxiety. The same could not be said for computer-assisted instruction (i.e., the computer-based tutorial).

Table 3 – Comparison between groups' post-test overall library anxiety scores controlling for differences between groups' pre-test overall library anxiety scores

Group	Number	Mean	Standard Deviation
Control	96	2.7805	.2900
Bibliographic Instruction[1]	84	2.5917	.3690
Computer-Based Tutorial	58	2.6322	.3267

[1]Signficant difference between BI group and control group at .05 level controlling for pre-test library anxiety differences.

Library Anxiety Analyses – Controlling for Specific Variables

Separate analyses were preformed to determine if results held up when taking prior library experience into account. Students had to answer three of the four experience questions to be calculated in the following analysis. Data from 231 out of the 238 subjects were used to examine between-group differences for library anxiety controlling for prior library experience, as well as library anxiety pre-test scores. An analysis of covariance (ANCOVA) again revealed a significant difference ($F(4,226) = 4.863$, $p < .05$) between the three groups' post-test scores controlling for prior library experience (i.e., adding it as a second covariate along with pre-test library anxiety scores). This indicates that taking prior library experience into consideration, there was

still a significant difference in library anxiety according to what group in which the subjects belonged. Means and standard deviations are presented in Table 4.

Pairwise comparisons between group means were calculated to determine between which groups significant differences existed. Comparisons revealed that even when controlling for prior library experience (as well as pre-test library anxiety scores) the post-test library anxiety scores for the BI group were significantly lower than those of the control group ($p < .05$). This indicates that compared to the control group, anxiety was significantly lower for those students in the BI group. More importantly, controlling for prior experience did not remove the affects of bibliographic instruction on library anxiety. Therefore, the students' prior library experience did not account for the lower library anxiety scores of the BI group.

Table 4 – Comparison between groups' post-test overall library anxiety scores controlling for students' prior library experience and differences between groups' pre-test overall library anxiety scores

Group	Number	Mean	Standard Deviation
Control	93	2.7871	.2919
Bibliographic Instruction[1]	82	2.6050	.3629
Computer-Based Tutorial	56	2.6249	.3301

[1]Signficant difference between BI group and control group at .05 level controlling for prior library experience, as well as pre-test library anxiety differences.

Separate analyses were performed to determine if results held up when taking previous knowledge into account. Students had to answer four of the five knowledge/practical questions for their information to be calculated in the following

analysis. Only data for 177 of the 238 students were used to examine between-group differences for library anxiety controlling for previous knowledge. An analysis of covariance (ANCOVA) revealed a significant difference ($F(4,172) = 3.532$, $p < .05$) between the three groups' post-test scores controlling for previous library knowledge. This indicates that taking previous library knowledge into consideration, there was still a significant difference in library anxiety according to the training received by students. Means and standard deviations are presented in Table 5.

Pairwise comparisons between group means were calculated to determine between which groups significant differences existed. Comparisons revealed that even when controlling for previous library knowledge (as well as pre-test library anxiety scores) the post-test library anxiety scores of the BI group were significantly lower than those of the control group ($p < .05$). This indicates that compared to the control group, anxiety was significantly lower for those students in the BI group. More importantly, the student's previous library knowledge did not affect the reduction of library anxiety. Therefore, the students' previous knowledge about using the library did not account for the lower library anxiety scores of the BI group.

Table 5 – Comparison between groups' post-test overall library anxiety scores controlling for students' previous library knowledge and differences between groups' pre-test overall library anxiety scores

Group	Number	Mean	Standard Deviation
Control	69	2.7722	.3078
Bibliographic Instruction[1]	63	2.5830	.3689
Computer-Based Tutorial	45	2.6356	.3090

[1]Signficant difference between bibliographic instruction group and control group at .05 level controlling for prior library experience as well as pre-test library anxiety differences.

Library Anxiety Analyses – Sub-Scales

To examine between-group differences on the five sub-scales (Barriers with Staff, Affective Barriers, Comfort with the Library, Knowledge of the Library, and Mechanical Barriers), while controlling for the initial differences found in the preliminary analysis (i.e., the between-group differences in the library anxiety pre-tests), a multivariate analysis of covariance (MANCOVA) was used. With the use of the Wilks' criterion, it was determined that the combined dependent variables (the five sub-scales) were significantly affected by the "group" variable ($F(10, 452) = 2.788$, $p < .05$). This indicates that there is a significant difference in library anxiety according to which group the subjects belonged. The MANCOVA revealed a significant difference between groups for two of the five sub-scales: Barriers with Staff ($F(2,230) = 5.679$, $p < .05$) and Affective Barriers ($F(2,230) = 6.372$, $p < .05$). This indicates that levels of library anxiety were different across groups (i.e., BI, CBT, and control groups) for these two sub-scales. Means and standard deviations for each of the five sub-scales are presented in Table 6.

Pairwise comparisons between group means were calculated to determine between which groups significant differences existed. Comparisons revealed that the mean Barriers with Staff scores at the post-tests for the BI group were significantly less than those of the control group ($p < .05$) and those of the CBT group ($p < .05$). This indicates that compared to the control group, anxiety was significantly lower for those students in the BI group. More importantly, this also indicates that compared to the CBT group, anxiety was significantly lower for those students in the BI group. In other words, the BI group's Barriers with Staff library anxiety was significantly reduced compared to the control group and the CBT group.

Pairwise comparisons also revealed that the mean Affective Barriers scores at the post-tests for the BI group ($p < .05$) and the CBT group ($p < .05$) were significantly less than the control group's scores. This indicates that compared to the control group, anxiety was significantly lower for both students in the BI group and the CBT group. Therefore, both instruction methods significantly reduced students' library anxiety related to the Affective Barriers sub-scale.

Table 6 – Comparison between groups' post-test sub-scale scores for the five library anxiety sub-scales controlling for differences between groups' pre-test overall library anxiety scores

Sub-Scale	Group	Number	Mean	Standard Deviation
Barriers with Staff	Control	96	2.7646	.3881
	Bibliographic Instruction[1]	84	2.4891	.5042
	Computer-Based Tutorial	58	2.6057	.4629
Affective Barriers	Control	96	2.9691	.4092
	Bibliographic Instruction[2]	84	2.7082	.4700
	Computer-Based Tutorial[3]	58	2.7109	.4162
Comfort with the Library	Control	96	2.7638	.3410
	Bibliographic Instruction	84	2.6181	.3677
	Computer-Based Tutorial	58	2.6703	.3366
Knowledge of the Library	Control	96	2.2406	.4553
	Bibliographic Instruction	84	2.3393	.5560
	Computer-Based Tutorial	58	2.3009	.4560
Mechanical Barriers	Control	96	2.9549	.2587
	Bibliographic Instruction	84	2.8810	.3682
	Computer-Based Tutorial	58	2.8678	.3300

[1]Significant difference between BI group and control group, as well as between the BI group and CBT group at the .05 level controlling for pre-test library anxiety differences.

[2]Significant difference between BI group and control group at the .05 level controlling for pre-test library anxiety differences.

[3]Significant difference between CBT group and control group at the .05 level controlling for pre-test library anxiety differences.

Discussion and Conclusion

The main purpose of this study was to determine whether library anxiety is reduced more by bibliographic instruction or computer-assisted instruction. After developing and validating the Library Anxiety Scale, Bostick (1993) stated that the scale could "be used to measure library anxiety pre and post treatment, with the treatment consisting of a series of instructional interventions to teach college students uses and methods of library research" (p. 7). This study did exactly that. It found that students who took part of bibliographic instruction led by a library staff member reported significantly less overall library anxiety compared to a control group, who did not participate in either bibliographic instruction or complete a computer-based tutorial. This finding held up to analyses that controlled for previous library experience and prior knowledge of the library.

In addition to examining an overall measure of library anxiety, this study also separately examined each of Bostick's five sub-scales library anxiety. Analyses revealed significant differences for two of the five sub-scales. The analysis of the first sub-scale, Barriers with Staff, which refers to how students perceive the library staff, revealed that students who participated in library staff-led bibliographic instruction experienced significantly less library anxiety compared to those students who did not

participate in either bibliographic instruction or complete the computer-based tutorial. Additionally, and more notably, it was found that those students who participated in library staff-led bibliographic instruction reported significantly less Barriers with Staff library anxiety compared to those students who completed the computer-based tutorial.

This particular finding is important, because the Barriers with Staff sub-scale is the largest of the five sub-scales (the sub-scale consists of 15 of the 43 items on the Library Anxiety Scale). Therefore, students' perceptions of the library staff are a major part of students' overall anxiety related to using the library – at least as measured by the Library Anxiety Scale.

This difference in results for the two instructional methods may be due to the lack of student-to-librarian contact of computer-assisted instruction. It may be that personal contact plays an important part in reducing students' anxious feelings about using the library. The personal contact students receive in a library-staff led bibliographic instruction is more likely to create a positive impression upon them. Additionally, students participating in a library-staff led bibliographic instruction have the opportunity to make initial contact with librarians, therefore creating rapport for future contact.

The Affective Barriers scale, which relates to the inadequacy students feel about effectively using the library, consists of 12 out of the 43 items, making it the second largest of the five sub-scales. Therefore, how students perceive their own abilities to use the library has an important influence on overall library anxiety. The analysis of this sub-scale revealed that students who participated in library staff-led bibliographic instruction reported significantly less library anxiety compared to those students who

did not participate in either bibliographic instruction or complete the computer-based tutorial. Additionally, it was found that those students who completed the computer-based tutorial experienced significantly less library anxiety compared to those students who did not participate in either bibliographic instruction or complete the computer-based tutorial. Apparently, either method of instruction is successful in reducing the anxious feelings students have about their abilities compared to their peers.

Limitations to the Study

This study is not without limitations. One limitation is the location where the bibliographic instruction sessions were held. The study focused on students' feelings using the R. B. House Undergraduate Library. Because there are no instructional labs in the R. B. House Undergraduate Library, however, the bibliographic instruction sessions, took place in the Walter Royal Davis Library. Although the analyses revealed that bibliographic instruction sessions significantly reduced library anxiety, it is possible the effects would have been stronger if the bibliographic instruction sessions were held at the R. B. House Undergraduate Library. Students would have had a chance to become familiar with the facility, its environment, its physical resources, and its staff, which may have additionally affected their library anxiety levels.

Maturation is another concern with this study. The pre- and post-tests took place anywhere from three to twelve days apart. Students in any of the three groups could have acquired skills, knowledge, and confidence about using the library through their own experiences during the time between the pre- and post-tests.

Finally, the instrument itself can be considered a limitation of the study. Though Bostick (1993) found the scale to be a reliable quantitative tool for measuring library anxiety, it should be noted that it was created in the early 1990's. The basic academic library has changed considerably since the scale's creation. Technology and equipment, as well as students' experience with using on-line catalogs, electronic indexes, and the Internet, are not properly evaluated in the current Library Anxiety Scale. For example, the scale only has three items making up the Mechanical Barriers sub-scale. At minimum, this particular sub-scale should be re-evaluated.

In addition to the limitations related to the questions from Bostick's Library Anxiety Scale, the experience and knowledge questions were constructed specifically for this study and their validity has not been separately evaluated.

Conclusion

The potentially negative effects of library anxiety on students' abilities to use the library, its resources, and its staff should not be ignored. Many librarians are fully aware of the importance in reducing library anxiety in students at all levels of the university or college. Using library instruction to teach students how to use the library effectively and efficiently, to give students guidance with their initial use of library resources, and to create an opportunity for students to meet library staff has been recognized as an excellent method to reduce student's anxiety about using the library. With the increased use of computer-assisted instruction (e.g., computer-based tutorials) to reach greater numbers of students with less staff, it is a concern whether the lack of

the person-to-person contact is appropriately reducing students' anxieties about the library.

This study found that the library staff-led bibliographic instruction is more effective in reducing students' overall library anxiety. Those students who took part of the library staff-led bibliographic instruction were significantly less anxious about the library staff than those who completed the computer-based tutorial. The bibliographic instruction allows students to initiate contact with a librarian, whereas the computer-based tutorial does not provide for person-to-person contact with a library staff member. Because computer-based tutorials can be completed from any computer, it is not necessary for students to actually enter the library. Traditional library staff-led bibliographic instruction creates a reason for students to come to the library. With students' initial entrance to the library, students' anxieties may begin to decrease as they start to become familiar with its surroundings and staff.

All of this suggests that academic librarians cannot solely rely on computer-based tutorials. There are benefits to the library staff-led bibliographic instruction that computer-based tutorials do not offer. Computer-assisted instruction should not completely replace students' opportunities to experience the library, as well as make contact with a librarian. These experiences and contacts can have a great effect on students and their future use and success with the academic library. Traditional library staff-led bibliographic instructional sessions should not be completely phased out as an option for students.

Appendix A

Consent Form

Consent to Participate in Research Study

My name is Anna Cleveland and I am a graduate student in the School of Information and Library Science. As part of the English 11 curriculum, your class will 1) take part in an instructional session at the library and 2) complete a computer-based tutorial. I am inviting you to volunteer in a research study of students' feelings about using House Undergraduate Library at the University of North Carolina, and how it might be improved. The purpose of the study is to determine whether library anxiety is reduced more with a library staff-led instructional session or a computer-based tutorial. The findings from this study will be used to enhance library instruction to ensure that students feel more comfortable using the House Undergraduate Library and its resources.

This is what will happen during the study (which will take place around your instructional session and the computer-based tutorial at the library):

- You will be asked to complete two surveys at separate times. Each survey will take approximately 15 minutes.
- The survey will include questions dealing with your feelings about the library, as well as some basic questions about yourself and how you use the library.
- If you have any questions about being in the study, you can contact Anna Cleveland by phone (969-9339) or email (cleva@ils.unc.edu), or you can contact my project advisor Dr. Robert M. Losee by phone (962-7150) or email (losee@ils.unc.edu)

Every effort will be made to protect your privacy. Your name will not be asked for on the survey. Additionally, the completed surveys will be destroyed when the study is completed.

Participation is completely voluntary, so you may decide on your own whether you want to be a part of the study. Your instructor will not know if you volunteered to be in the study. If you do not participate in the study, the instructor will not treat you differently. If you do decide to be in the study, you have the right to skip any question you don't want to answer or stop completing the survey at any time. As far as the researcher knows, there is no personal risk or discomfort you will experience from being in the study.

The Academic Affairs Institutional Review Board (AA-IRB) on the University of North Carolina at Chapel Hill has approved this study. If you have any questions or concerns about your rights as a research participant, you may contact the Chair of the UNC-CH Academic Affairs Institutional Review Board, David A. Eckerman, Ph.D., at CB# 4100, 201 Bynum Hall, UNC-CH, Chapel Hill, North Carolina 27599-4100, (919) 962-7761, or email: aa-irb@unc.edu.

I have had the chance to ask any questions I have about this study, and they have been answered for me. I have read the information on this consent form, and I agree to be in the study. I understand that I will get a copy of this consent form after I sign it

_____ _____

Signature of Participant Date Signature of Researcher Date

Appendix B

Tests & Treatment Schedule

Group	Instructor	Pre-Test Date	Treatment Date	Post-Test Date
Control 1	Maria Stalnaker	8/30/2000		9/6/2000
Control 2	Matthew Spangler	9/5/2000		9/12/2000
Control 3	Kimberly Thomas	9/8/2000		9/15/2000
Control 4	Philip Kowalski	9/8/2000		9/15/2000
Control 5	Philip Kowalski	9/8/2000		9/15/2000
BI 1	George Stackpole	9/5/2000	9/7/2000	9/12/2000
BI 2	Robin Brown	9/11/2000	9/13/2000	9/15/2000
BI 3	John Adrian	9/25/2000	9/27/2000	9/29/2000
BI 4	Maria Hebert	9/27/2000	9/29/2000	10/2/2000
BI 5	Jennifer Heller	9/27/2000	10/2/2000	10/9/2000
CBT 1	Louis Schroeder	9/11/2000	9/11 – 9/14/2000	9/15/2000
CBT 2	Teri DeVoe	9/11/2000	9/11 – 9/19/2000	9/20/2000
CBT 3	Patrick Lynch	9/29/2000	9/29 – 10/1/2000	10/2/2000
CBT 4	Tara Robbins	9/29/2000	9/29 – 10/3/2000	10/4/2000
CBT 5	Margaret Swezey	10/10/2000	10/10 – 10/16/2000	10/17/2000

Appendix C

Pre- and Post-Tests
(Reformatted from original)

Please answer the following questions regarding your feelings about and ability to use the House Undergraduate Library (referred to below as "UL"). Please circle the number that most closely matches your feelings about the statement using the following key:

1=Strongly Disagree **2**=Disagree **3**=Undecided **4**=Agree **5**=Strongly Agree

1. I'm embarrassed that I don't know how to use the Undergraduate Library (UL).

1 2 3 4 5

2. A lot of the university is confusing to me.

1 2 3 4 5

3. The librarians at the UL are unapproachable.

1 2 3 4 5

4. The UL reference librarians are unhelpful.

1 2 3 4 5

5. The librarians at the UL don't have time to help me.

1 2 3 4 5

6. I can't get help in the UL at the times I need it.

1 2 3 4 5

7. Library clerks at the UL don't have time to help me.

1 2 3 4 5

8. The UL reference librarians don't have to help me because they're always busy doing something else.

1 2 3 4 5

9. I am unsure about how to begin my English 11 research paper.

1 2 3 4 5

10. I get confused trying to find my way around the UL.

1 2 3 4 5

11. I don't know what to do next when the book I need is not on the shelf.

1 2 3 4 5

12. The UL reference librarians are not approachable.

1 2 3 4 5

13. I enjoy learning new things about the UL.

1 2 3 4 5

1=Strongly Disagree	**2**=Disagree	**3**=Undecided	**4**=Agree	**5**=Strongly Agree

14. If I can't find a book on the shelf, the staff at the UL will help me.

1 2 3 4 5

15. There is often no one available in the UL to help me.

1 2 3 4 5

16. I feel comfortable using the UL.

1 2 3 4 5

17. I feel like I'm bothering the UL reference librarian if I ask a question.

1 2 3 4 5

18. I feel safe in the UL.

1 2 3 4 5

19. I feel comfortable in the UL.

1 2 3 4 5

20. The UL reference librarians are unfriendly.

1 2 3 4 5

21. I can always ask a librarian at the UL if I don't know how to work a piece of equipment in the library.

1 2 3 4 5

22. The UL is a comfortable place to study.

1 2 3 4 5

23. The UL never has the materials I need.

1 2 3 4 5

24. I can never find things in the UL.

1 2 3 4 5

25. There is too much crime in the UL.

1 2 3 4 5

26. The people who work at the circulation desk in the UL are helpful.

1 2 3 4 5

27. The library staff at the UL doesn't care about students.

1 2 3 4 5

28. The UL is an important part of my school.

1 2 3 4 5

29. I want to learn to do my own research.

1 2 3 4 5

30. The copy machines are usually "out-of-order."

1 2 3 4 5

31. I don't understand the overdue fines at the UL.

1 2 3 4 5

32. Good instructions for using the computers at the UL are available.

1 2 3 4 5

1=**Strongly Disagree** 2=**Disagree** 3=**Undecided** 4=**Agree** 5=**Strongly Agree**

33. Librarians at the UL usually don't have time to help me.

1 2 3 4 5

34. The UL's rules are too restrictive.

1 2 3 4 5

35. I don't feel physically safe in the UL.

1 2 3 4 5

36. The computer printers at the UL are often out of paper.

1 2 3 4 5

37. The directions for using the computers at the UL are not clear.

1 2 3 4 5

38. I don't know what resources are available at the UL.

1 2 3 4 5

39. The staff the UL doesn't listen to students.

1 2 3 4 5

40. The Tar Heel Teller is usually out of order at the UL.

1 2 3 4 5

41. The UL is a safe place.

1 2 3 4 5

42. The UL won't let me check out as many items as I need.

1 2 3 4 5

43. I can't find enough space in the UL to study.

1 2 3 4 5

For each the following, please circle <u>one</u> of the choices provided or fill in the blank appropriately:

44. You are:

a. male

b. female

45. What is your birthday (MM/DD/YY)?

____ / ____ / ____

46. Is this your first semester that you have taken 12 or more credits at a college/university?

a. yes
b. no

47. How may course credits have you *completed* at UNC-CH?
a. 0
b. 1-6
c. 7-14
d. 15-29
e. 30-59
f. 60 or more

48. Please rank (1-2-3) by preference the following learning methods (1=most preferred to 3= least preferred):
____ working through a project/task on my own
____ reading instructions on my own
____ learning through classroom instruction

49. Using menu screens on the on-line library catalog to find materials written by Robert Wright, it would be best to first select the option for author, title, subject search.
a. true b. false

50. Reserve articles can be printed from a reserve materials web page.
a. true b. false

51. The electronic indexes, *Infotrac* and *ProQuest*, include only items housed in the UNC Libraries.
a. true b. false

52. If you have a citation to an article that is in the journal *Behavioral Science* and you want to find the full-text of the article in the journal at UNC-CH, would it be best to do a title search with the title of the article in the UNC-CH on-line catalog
a. yes b. no

53. Have you ever asked a reference librarian at the UL for assistance on locating information for a class assignment?
a. yes b. no

54. Have you used UNC-CH's on-line library catalog?
a. yes b. no

55. Have you asked a reference librarian at the UL for assistance using the on-line catalog?
a. yes b. no

56. Have you used one of UNC-CH's electronic periodicals index (e.g., *Infotrac*, *EBSCOHost*)?
a. yes b. no

57. If you have used the copiers at the UL, was it out of paper?
a. yes
b. no
c. haven't used the copiers

58. If you have tried to use the Tar Heel Teller at the UL, how was working?
a. very well, no problems
b. some problems, but it worked okay
c. couldn't get it to work
d. haven't tried to use the Tar Heel Teller at the UL

59. If you have used a UNI-PRINT printer (pay per copy) at that the UL, how well did the printer work?
a. very well, no problems
b. some problems, but it worked okay
c. couldn't get it work work
d. haven't used a UNI-PRINT printer at the UL

60. Would you feel safe studying at the UL at 10:30 p.m. on a Sunday night?
a. yes b. no

61. Before starting school at UNC-CH, did you visit the UL's home page?
a. yes
b. no
c. don't know

62. The UL organizes its books according to the Dewey Decimal Classification System.
a. true b. false

63. Which of the following best describes your use of the UL and Davis Library:
a. I only use the UL.
b. I use the UL more than Davis Library.
c. I use the UL and Davis the same amount
d. I use Davis Library more than the UL.
e. I only use Davis Library.
f. I don't use either library.

Please place this survey in the self-addressed envelope provided. You can either give the completed survey to the researcher or mail it via campus mail. Thanks for your participation in this study!

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