

The Transferability of Library Research Skills from High School to College

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In the following paper, M. Elspeth Goodin describes a study designed to determine whether a program of instruction could be developed to teach high school students library and information-gathering skills that would prove useful to them in college. Interestingly, the results of her pretest (Study I) showed the same patterns as the actual study (Study II). The results indicate that a program of instruction makes a significant impact on students' attitudes and performance but that the transfer of these beneficial effects to undergraduate study is less clear.

A study was designed and conducted to investigate three interrelated questions:

- Can a program of instruction be developed to teach high school seniors efficient and effective search strategies and information-gathering skills useful to them as college freshmen?
- Can these skills be reflected in a research paper?
- How can these skills be measured for transferability?

Background

In 1983, Dr. Edward Bloustein, then president of Rutgers University, in his "President's Statement on Pre-College Preparation," stated that "nationwide, too many high school graduates are coming to college inadequately prepared for college level study. We cannot continue to ignore this problem."

Dennis Dickinson discusses this issue in more specific terms by stating, "Even those students not crippled in other ways by their preparatory education are, almost without exception, totally innocent of how a library works and do not have even a vague idea how to set about finding information they need or want when they arrive at a college or university."

Discussions with college librarians involved with library instruction programs indicate that a significant number of students have been entering college unprepared to function efficiently and effectively in an academic library. If, as the librarians questioned specified, it is essential that

students should have acquired certain basic skills necessary to conduct undergraduate research, it becomes obvious that such skills should be taught while these students are still in high school.

Learning theory stresses the importance of integrating instruction of library research skills with specific course requirements for research papers. Benjamin Bloom stressed this need for integration by stating, "Our general understanding of learning theory would seem to indicate that knowledge which is organized and related is better learned and retained than knowledge which is specific and isolated." Kuhlthau noted the attention being given to the instructional role of the library media specialist and to the integration of the library media instructional program into the total curriculum of the school. Eisenberg and Berkowitz added that "library and information skills are integrally related to the information needs of students and should be integrally tied to the content, activities, and processes of the classroom."

For the present study to focus on the design and testing of a program of instruction that is appropriate for college-bound information users (i.e., high school seniors) and can be taught by the library media specialist, the program had to provide for the transition to college of research skills learned in high school and to furnish appropriate strategies that the students could adopt to meet their current information needs.

Mellon lists the following objectives that should be stressed in presenting the library to students:

1. an understanding of the intrinsic role of library research in undergraduate education;
2. a sense of benefit to result from effective library use;
3. the development of an attitude of library competence in the student;
4. an appreciation of the reference librarian's professional role and the complexity of academic libraries;
5. an understanding of library research as challenging rather than frustrating; and
6. a redefinition of library success as competence in research processes rather than as number of items retrieved.

One criterion for evaluating whether knowledge or information has been retained is the evidence that students can do something with their knowledge specifically, that they can apply it to new situations and problems. This ability has been variously labeled "critical thinking," reflective thinking," and "problem solving." Bloom labels this process "intellectual abilities and skills." He states, "The most general operational definition of these abilities and skills is that the individual can find appropriate information and techniques in his previous experiences to bring to bear on new problems and situations. This requires some analysis or understanding of the new situation; it requires a background of knowledge or methods which can be readily utilized; and it also requires some facility in discerning the appropriate relations between previous experience and the new situation."

Methodology

The sample for this research study was comprised of 159 high school seniors drawn from the college and preparatory English classes of two high schools of comparable socioeconomic

makeup and geographic location. The students were divided into one control and one experimental group for an initial study (Study 1) and for a second study (Study 11).

Students in the experimental group in each study were given a pretest on basic college library information knowledge, followed by a series of six lessons on the research process; the assignment of a research paper, including one week of scheduled library media center research time; and a post-test on basic college library information knowledge. Students in the control groups were given the pretest; the research paper assignment, with one week of scheduled library media center time; and the posttest. Two college-level faculty members in the English Department independently graded all of the papers and returned them to the students in each group. To account for the possible influence of bias, the high school library media specialists in both studies kept daily journals and noted the amounts and kinds of interventions between the library media specialist and students.

After the review of the students' research papers and before the students graduated from high school, a Likert-type attitude scale questionnaire was administered to all students involved in the project to determine their general attitudes toward high school library media centers and toward the research process. After the students completed their first semester in college, another Likert-type attitude scale questionnaire was administered to determine the students' general attitudes toward college libraries and the research process.

Pre-test and Post-test

A Library Orientation Test for College Freshmen, by Ethel M. Feagley, Dorothy W. Curtiss, Mary V. Gaver, and Esther Greene, originally published in 1955 by the Teachers College of Columbia University, was the test chosen for this study; it was revised somewhat, however, to reflect current library resources. The Feagley test specifically measures to what extent, and in what areas, entering college freshmen need instruction in using the resources of a college library. In a review of the test, Anne Roberts states, "The test attempts to help students recognize that they need help, and it was designed to provide the necessary information to the librarians giving the test so they in turn could develop and plan a program of library instruction based on the test results and fitted to the needs of the students. . . . The Feagley test has stood up well over the years, and it is still one of the best of its type.

The use of the Feagley test in the initial phase of the research determined what the students already knew at the study's outset. Its use as a posttest determined to what extent the students mastered the content of instruction and, further, provided the students with an objective, concrete example of any improvement they might have achieved in their knowledge of basic library skills as a result of the instruction.

Sample tasks on the eighty-item test include choosing the most appropriate index likely to provide the required information, selecting from a list of reference books the one that would give the fullest information on each of several questions, and selecting the correct terms (e.g., serial, anthology, annotation) to which specific definitions apply.

Program of Instruction

The program of instruction, taught by the library media specialist, reflected the responses of sixty-two college faculty members to a questionnaire on library-related course requirements. These faculty members, drawn from the departments of education, English, history, political science, psychology, and sociology at Rutgers University, were asked to rank eleven criteria for evaluating a research paper, with number one being the most important. Their responses resulted in the following list of criteria:

1. overall grasp of subject;
2. organization;
3. precision of focus;
4. thesis statement;
5. logical summary;
6. paragraph development and unity;
7. spelling and punctuation;
8. bibliography (quantity);
9. footnotes (form and use);
10. use of direct quotes;
11. appearance of paper.

Additional evaluative criteria were creativity and originality, appropriate development and analysis of subject, clarity and quality of writing, synthesis of material, comprehensive evaluation of sources, taking a stand, and grammar.

The research paper evaluation form constructed for this study incorporated the eleven criteria from the college faculty questionnaire, while maintaining the instructional framework and content of the curriculum already in place in both high schools. See figure 1.

Figure 1. Evaluation of Research Paper

Evaluation of Research Paper						
Student Name:				Grade:		
		Poor (1)	Fair (2)	Good (3)	Very Good (4)	Excellent (5)
1. Thesis Statement	Focus of paper defined and delimited					
2. Organization and Development	a. Over-all development of idea					
	b. Paragraph unity and development					
	c. Use of transitions					

3. Logical Summary and Conclusion	Ability to summarize					
4. Logical Incorporation of Sources	a. Use of direct quotes					
	b. Use of footnotes to credit all sources					
5. Bibliography	Appropriateness, timeliness, and scope					
Total						
Comments:						

Results

The high school students who received direct library skills instruction scored significantly higher on the posttest of basic college library information than did the students who did not receive such instruction (see tables 1 and 2). The two college level English faculty members evaluating the high school students' research papers determined that the research skills taught by the library media specialist were reflected in the research papers and that the papers were acceptable at the college freshman level (see tables 3 and 4).

Table 1. Pre-Test and Post-Test Descriptive Data for Control and Experimental Groups on the Feagley Test, Study I (n=82)

	Mean	Standard Division	Range
Pre-Test			
Control Group	40.43	9.82	23 to 62
Experimental Group	49.52	8.12	33 to 65
Post-Test			
Control Group	39.40	12.50	6 to 65
Experimental Group	61.52	8.12	42 to 78

Table 2. Pre-Test and Post-Test Descriptive Data For Control and Experimental Groups on the Feagley Test, Study II (n=77)

	Mean	Standard Division	Range
Pre-Test			
Control Group	45.63	7.49	31 to 62
Experimental Group	48.54	7.71	33 to 63

Post-Test			
Control Group	47.10	8.60	25 to 65
Experimental Group	59.49	6.37	45 to 73

	Mean	Range
First Paper Evaluation		
Control Group	D/66	50 to 85
Experimental Group	C+/78	59 to 95
Second Paper Evaluation		
Control Group	D+/68	50 to 93
Experimental Group	B-/81	58 to 95

	Mean	Range
First Paper Evaluation		
Control Group	D-/62	40 to 84
Experimental Group	C/74	55 to 95
Second Paper Evaluation		
Control Group	D/66	50 to 85
Experimental Group	C/76	56 to 94

The minimum competency performance for the posttest on basic college library information knowledge was 65 percent, representing a numerical score of 52. Six students in the control group in Study I obtained a score of 52 or better (15 percent). Thirty-seven students in the experimental group obtained a score of 52 or better (88 percent). Thirteen students in the control group in Study II obtained a score of 52 or better (33 percent). Thirty-three students in the experimental group obtain a score of 52 or better (89 percent).

An analysis of variance comparing the mean scores of the control and experimental groups in Study I and Study II for posttest scores showed a significant difference at the .001 level between the posttest means of each of the two groups (see tables 5 and 6). Analyses of variance comparing the mean scores of the experimental and control groups for the first evaluation (see tables 7 and 8), and for the second evaluation (see tables 9 and 10), of the research papers showed a significant difference at the .001 level between the means of the control and experimental groups for the first and second evaluations of the research papers for Study I and Study II.

Table 5. Analysis of Variance Comparing Post-Test Scores of Control Group and Experimental Group, Study I (n=82)

Source	DF	Sum of Squares	Mean Squares	F	Level of Significance
Main Effects	1	9813.341	9813.341	85.630	0.000
Explained	1	9813.341	9813.341	85.630	0.000
Residual	80	9168.171	114.602		
Total	81	18981.512	234.340		

Table 6. Analysis of Variance Comparing Post-Test Scores of Control Group and Experimental Group, Study II (n=77)

Source	DF	Sum of Squares	Mean Squares	F	Level of Significance
Main Effects	1	2706.422	2706.422	45.274	0.000
Explained	1	2706.422	2706.422	45.274	0.000
Residual	75	4483.370	59.778		
Total	76	7189.792	94.603		

Table 7. Analysis of Variance Comparing Mean Scores of Control Group and Experimental Group in Study I for First Evaluation of Research Papers (n=82)

Source	DF	Sum of Squares	Mean Squares	F	Level of Significance
Main Effects	1	3371.724	3371.724	3.718	0.000
Explained	1	3371.724	3371.724	3.719	0.000
Residual	80	6169.886	77.124		
Total		81	9541.610	117.798	

Table 8. Analysis of Variance Comparing Mean Scores of Control Group and Experimental Group In Study I for Second Evaluation of Research Papers (n=82)

Source	DF	Sum of Squares	Mean Squares	F	Level of Significance
Main Effects	1	3764.257	3764.257	4.388	0.000
Explained	1	3764.257	3764.257	4.388	0.000
Residual	80	8757.219	109.465		
Total	81	12521.476			

Table 9. Analysis of Variance Comparing Mean Scores of Control Group and Experimental Group In Study II for First Evaluation of Research Papers (n=77)

Source	DF	Sum of Squares	Mean Squares	F	Level of Significance
Main Effects	1	1292.800	1292.800	22.805	0.000
Explained	1	1292.800	1292.800	22.805	0.000
Residual	75	7155.898	82.914		
Total	76	8720.505	102.198		

Table 10. Analysis of Variance Comparing Mean Scores of Control Group and Experimental Group In Study II for Second Evaluation of Research Papers (n=77)

Source	DF	Sum of Squares	Mean Squares	F	Level of Significance
Main Effects	1	1564.607	1564.607	15.798	0.000
Explained	1	1564.607	1564.607	15.798	0.000
Residual	75	7427.705	99.036		
Total	76	8992.312	118.320		

Results of the attitude questionnaire administered to the students while they were still in high school indicated that there was a significant difference between the two groups on specific items. For example, students in the experimental group in Study I noted stronger feelings of confidence than the control group did in their ability to access the card catalog successfully. These students also found a higher degree of usefulness for the pre-and posttests, as well as for the evaluation of the research papers. There was a significant difference at the .05 level regarding the degree of agreement with the statement, "I will feel confident in using a college library," while the majority of students in the control group were undecided (see table 11).

Table 11. Comparison of Means for Control Group and Experimental Group in Study I for High School Student Opinion and Evaluation Form (n=82)

No.	Control	Experimental	Degrees of Freedom	t	Level of Significance
1	4.075	4.143	80	.46	N.S.
2	4.0	4.357	79	2.54	p<.01
3	4.025	4.262	80	1.58	N.S.
4	4.051	4.120	79	.46	N.S.
5	2.325	2.024	80	1.50	N.S.
6	4.125	3.905	80	1.29	N.S.

7	2.4	2.333	80	.30	N.S.
8	3.1	3.762	80	3.05	p<.01
9	3.65	4.333	80	3.25	p<.01
10	3.35	3.738	80	2.34	p<.05

Results from the attitude test for Study II also indicated there was a significant difference between the two groups on specific items. For example, in response to the statement, “Using the library is a frustrating experience,” students from the experimental group, interpreting “frustrating” to mean finding the appropriate sources for their research assignments, indicated they felt more successful in their search for materials than did students from the control group (see table 12).

Table 12. Comparison of Means for Control Group and Experimental Group in Study II for High School Student Opinion and Evaluation Form (n=77)

No.	Control	Experimental	Degrees of Freedom	t	Level of Significance
1	3.7	4.0	75	1.6	N.S.
2	4.05	4.378	75	2.33	p<.05
3	3.225	4.108	75	4.11	p<.001
4	3.9	4.108	75	1.26	N.S.
5	2.4	1.973	75	2.61	p<.05.
6	2.075	2.0	75	.19	N.S.
7	1.8	2.0	75	1.19	N.S.
8	2.8	3.743	75	5.18	p<.001
9	3.65	4.0	75	1.39	N.S.
10	3.15	3.595	75	2.54	p<.05

A review of the journals kept by each library media specialist confirmed observations that students from the experimental groups were more systematic and purposeful in their approach to information gathering than students in the control groups. According to journal entries, the experimental groups exhibited an independence and confidence in selecting their topics and in formulating a thesis statement. Further, the majority of students from the experimental groups tended to involve the library media specialist in all aspects of the assignment to a much greater degree than did the majority of student . . . from the control groups.

In terms of the attitude of students in college (from Study I) regarding using academic libraries, results from the questionnaire showed no significant differences between groups.

Implications for Researchers

From a research perspective, there is a clear need for further investigation; more specifically:

1. Students' responses to the college attitude questionnaire indicated the need for the development of an instrument to measure more clearly the transferability of research skills from high school to college. To meet this need, a larger sample should be randomly selected and tracked through their entire freshman year, with a questionnaire sent to these students at the conclusion of each semester.
2. Replication is necessary to establish whether the findings of this research study can be generalized. Now that this program of instruction has been tested, library media specialists in other high schools may be encouraged to replicate the study using the methodology described.

Additional research is needed in the area of evaluation of students' work as represented by a grade. It was evident that the high school students involved in both Study I and Study II were unprepared for the more rigorous evaluation standards employed by the two college-level English faculty members. Students were often surprised and disappointed that they had not received higher grades.

This study directly addressed the concept of library intimidation, or what has been termed as the "research shock" phenomenon observed in college freshmen, by making the librarian in the research setting approachable. Learning to use the librarian as a resource is perhaps the most transferable skill acquired by students as a result of this study. Further research could lead to encouraging students to take full advantage of the linking agent between their high school and college-the library media specialist.

Implications For Practitioners

Although expanded study is desirable, the research does offer direct conclusions for practice:

1. A further examination of the journals revealed that during the research sessions for the experimental groups in the library media center, both library media specialists were able to assist an average of five students per session. This finding supports the need not only for the library media specialist and the classroom teacher to work closely together on these projects, but it also supports the need for an adequate number of library media specialists so that students may receive the professional guidance and expertise they require.
2. College students exposed to the program of instruction indicated through narrative responses that they were able to utilize effectively the research skills learned in high school when conducting college-level research.
3. College students indicated that the high school program of instruction should be made available to all college-bound seniors.
4. The findings of this study strongly indicate the importance of the school library media specialist assuming the role of educator. To facilitate the transfer of library research skills from one grade level to another, school library media specialists at all grade levels need to consider themselves full participants in the total educational program of their respective institutions.
5. The assumption of the role of educator by the library media specialist appears to be dependent on a combination of professional training and a willingness to initiate and

present a specific series of lessons designed to meet students' research needs. College instructors at certification programs for library media specialists should encourage the development of this role by structuring courses that not only include the theoretical preparation but also provide for the optimum practical application in the classroom setting, working in partnership with the teacher.

Side Benefits of the Study

The relationship formed between the high school teachers and the library media specialist redefined the role of the school library media specialist and encouraged a positive change in the per. Exceptions each held regarding their roles in the educational process. Learners had an opportunity to understand the research process in an applied and relevant context through one person teaching in two settings-the library media specialist as educator.

Classroom teachers involved in the study became aware of the informed perspectives that the library media specialist could bring to the instructional process. The traditional role of the library media specialist was expanded and enhanced by teaching students not only how to gather appropriate information but also how to use that information in order to meet their research needs.

References and Notes

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7. Bloom, *Taxonomy of Educational Objectives*, p.58.
8. The questionnaires are reproduced in M. Elspeth Goodin, "The Transferability of Library Research Skills from High School to College" (Ph.D. diss., Rutgers Univ., 1987), appendix, available through University Microfilms International.
9. Anne Roberts, "Library Skills Tests: A Defense and Critique," *Teaching Library Use Competence* (Ann Arbor, Mich.: Pierian, 1982), p.82.
10. Although the Feagley test is currently out of print, it has been reproduced in full in Goodin, "The Transferability of Library Research Skills," appendix.