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Improving Information Seeking Behavior Among Business Majors

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Improving Information Seeking Behavior Among Business Majors

Abstract

The current generation of college students has used the Internet to access information since the early 1990s. No assessment of information use, quality, variety, and reliability of information generally occurs at both the student and faculty level. In this paper we use a package of teaching methods targeted towards improving information-seeking behavior among graduate and undergraduate business majors. The effectiveness of the teaching package is assessed through an evaluation of student term-papers and quality of resources used. We find that the package of teaching methods implemented does result in significant improvement in information seeking behavior, especially among undergraduate business majors.

1. INTRODUCTION

We live in an era of burgeoning information. Needless to say, the learning environment at universities can be safely characterized as one that provides a plethora of resources and fairly easy access to both web-based and non-web-based information. However, just living in such an environment does not ensure that students become information-literate, particularly vis-a-vis business information where the number of competing information sources may overwhelm the student. As Feast (2003) suggests, university educators often inadvertently assume or, at least hope, that students will develop the information literacy skills needed to recognize, access, and utilize quality information effectively as a bonus fallout from their presence at the University. Frequent reports of plagiarism, poorly cited information sources, and over-reliance on non-authoritative web-based sources however indicate that more needs to be done to improve the information-seeking behavior and utilization of information by students.

Recognizing that students do not innately possess the information literacy skills desired by instructors or employers, we integrated information literacy training into an International Finance elective course that was offered at the graduate and undergraduate levels. Over the course of three semesters, we measured the impact of such information literacy training on the information quality and utilization of information in the term-papers written by different student teams in each semester. The question we focused on was, "How does formal information literacy training improve business students' information-seeking behavior as reflected in the quality and utilization of information in their term-papers?" In this paper, we discuss how the integration of information literacy training impacted information-seeking behavior among undergraduate and graduate business students. In addition, we highlight the observed differences between the information-seeking behavior of undergraduate and graduate students.

2. LITERATURE REVIEW

Information literacy reflects an ability in the student to access, use and evaluate information to facilitate learning, to enhance problem solving, and to generate new knowledge. Confident in the power of the Internet and their own searching skills, students often simply type terms in Google and scan through the results until information on their topic is found. No assessment of quality, reliability or accuracy generally occurs (O'Keefe, 1998; Fiegen, Cherry, & Watson, 2002). According to a study by the ENDER (Formative Evaluation of the Nationally Distributed Electronic Resource) Project, nearly 64% of the students in the ENDER (2002) study start their research with Google, Yahoo, Lycos, or Ask Jeeves. This trend is confirmed by a white paper produced by OCLC (2002) in the United States which found that 42% of the 1050 graduate and undergraduate students between the ages of 18-24 surveyed use commercial search engines to begin all of their assignments. Students in OCLC's survey also reported that they feel that the Internet provides most of the data needed to complete assignments and write research papers.

Though many students seem satisfied with information gathered via a search engine or in a business information portal, such as Yahoo! Finance, they often do not possess the skills needed to identify, utilize, and properly cite appropriate information resources. A survey on students' web searching preferences conducted by Morrison, Kim, and Kydd (1998) reveals that students place a higher value on locating and collecting information than critically evaluating the source of the data. In an article reviewing literature on college student web research techniques, Thompson (2003) highlights an interesting point made by Arnold and Jayne (1998) regarding the difficulties students face in trying to analyze the quality of web-based information. Thompson quotes Arnold and Jayne,

> Even when the point is made with examples and in class discussion, students find it hard to remember that when they use the web not only do they have the responsibility of judging a document's usefulness for their assignment (second stage evaluation) but also they must assume the role publishers and librarians would otherwise play (first stage evaluation) in the initial selection of books and articles they use…

In addition, a study on plagiarism conducted by Donald McCabe[1] (Muha, 2003), which surveyed more than 18,000 students from 23 schools, found that the number of undergraduates, who copied and pasted information found from the web directly without citation into their papers, rose by 10% over the results reported in a previous study. Of the sample, over 40% of the undergraduates and nearly 25% of the graduate students confessed to incorporating text in their papers lifted directly from the Internet or print sources.

Roldan and Wu (2004) as well as Rutledge and Maehler (2003) found that business library resources were used better and more efficiently than before by simply introducing students to the library resources through a hands-on exercise, encouraging them to be selective with resources used within their paper, and providing the opportunity for additional research assistance through individual consultations. The number of students who identified the library as one of their primary sources for conducting research nearly doubled after Lombardo and Miree (2003) included an in-depth discussion with business students regarding the difference between print, electronic, and Internet sources. Overall, these studies confirm King and Ory's (1981) case-based conclusion that students receiving instruction from a library staff member produce bibliographies with a greater variety of resources. In addition, each of these examples illustrates

[1] The study was conducted at Rutgers University in conjunction with the Center for Academic Integrity at Duke University.

the benefits of a partnership between a librarian and a faculty member in improving the information literacy skills of students.

These success stories are encouraging, but each of these studies only assesses the first stage of developing an information literacy training model. Few information literacy studies, including non-business related studies, document the benefits of using continual assessment to improve an information literacy model or to enhance results. Stein and Lamb (1998) and Boudreau and Bicknell-Holmes (2003) are examples of studies which describe a successful model developed through long-term collaboration and implementation, but do not explain how the changes in the training improved student performance in each phase of the model's evolution. Judd, Tims, Farrow, and Periatt (2004) refer to adjustments made to an existing information literacy training model in a business cornerstone class, but only describe the results of one formal assessment of the instruction sessions.

Most information literacy studies so far have been single assessment studies looking at the impact at the end of one evaluation period (see Fenske & Roselle, 1998). We identified just three studies that span two semesters but none over longer periods of time. D'Angelo (2001) and Webster and Reilly (2003) tracked the impact of a revised information literacy training model for two semesters. Ursin, Blakesley, and Johnson (2004) analyzed citations in student bibliographies over two semesters to determine if students use the resources recommended by the library guides distributed in information literacy training sessions. Emmons and Martin (2002) conducted a study including papers from 10 semesters, equally divided into before and after a change in the instruction method. Results were tallied as a single assessment, before and after, without any insight into variations that may have occurred between semesters.

Our study is unique in that it was conducted over the course of four semesters and demonstrates the long-term impact of sustained librarian-faculty collaboration and assessment.[2] In this study, we use a package of teaching methods targeted towards improving information-seeking behavior among graduate and undergraduate business majors. The effectiveness of the teaching package is assessed through an evaluation of student term-papers and quality of resources used. We find that the package resulted in significant improvement in information-seeking behavior, especially among undergraduate business majors.

Our study also compares and contrasts the effects of inputs on graduate versus undergraduate business majors. In describing their motivation for assessing the impact of information literacy training in a graduate business class, Cooney and Hiris (2003) indicate that there are substantially more studies on undergraduate information literacy training than graduate information literacy training. In reviewing the literature it is also evident that there are few studies describing the differences in the training needs of undergraduate and graduate students. Findings from studies that do compare differences between graduates and undergraduates reveal that graduate students are more interested in instruction than undergraduate students (Paterson, 1978) and graduate students are also more likely to utilize library services (Martin, 2003). In contrast, we record differences in information literacy training needs and consequent differences in impact on graduate and undergraduate business-majors.

Finally, our approach to information literacy training is markedly different from most library literature in that we focus on reducing plagiarism in addition to improving information-seeking and citation skills. In addition to most of the attributes mentioned in a list of criteria

[2] Only a series of three separately published studies conducted by Davis and Cohen (2001), and Davis (2002, 2003), in which he tracks changes in undergraduate citations between the years 1996, 1999, 2000, and 2001, comes close to tracking the impact of changes in an instruction model over time. These studies, however, focus on the role of the instructor rather than the role of information literacy training.

outlined by Young and Ackerson (1995), we incorporate the degree to which students misused (or plagiarized) information. We assess different attributes of information-seeking behavior, namely, quality of resources, variety of resources, citations, and utilization of information, reflected comprehensively in the quality of term-papers submitted by student teams.

3. METHODOLOGY

We tested the impact of information literacy skills training on information quality and information usage in term papers submitted by different graduate and undergraduate student teams[3] in the International Finance elective course during three consecutive semesters and compared these papers to a set of papers written by student teams in a control group. A total of 34 graduate papers and 37 undergraduate papers were analyzed. The control group consisted of 18 graduate papers and 5 undergraduate papers. This control group is referred to as Stage I in our project. In Stages II, III, and IV, students received information literacy training. In each of these stages, 10-11 undergraduate papers were analyzed. Since graduate students were not taught in Stage II, no graduate papers were evaluated. In Stages III and IV, however, we analyzed 8 graduate papers in each stage for the impact of information literacy skills training.

As mentioned earlier, Stage I of our field-study was a *control* group that had no information literacy training. We started information literacy training in Stage II. We focused on training students to use higher quality resources and provide better citations. So, the student learning objectives at the onset of Stage II centered on how to use the library to identify and use quality business information. These objectives included understanding what types of resources are available through the library, how to use the online catalog, how to identify an appropriate database for various types of information, and understanding the importance of proper citation.

[3] Each semester, the student teams were made up of a new set of students. The student teams were independently and randomly formed within each class, each semester.

The weaknesses in information literacy skills identified at the end of Stage II through an analysis of term-papers submitted by these student teams led us to refine the learning objectives. Drawing on the ACRL Information Literacy Competency Standards for Higher Education, our learning objectives for the remaining stages of the project included:

- Ensuring students are familiar with key business information sources.
- Training students on how to find information quickly and efficiently.
- Encouraging students to select quality information resources that will lend credibility to their arguments and assertions.
- Helping students learn to determine the amount of information and the type of information needed to present an argument, develop a case, or provide a comprehensive overview of a subject.
- Teaching students to properly cite and use the information gathered appropriately within a research paper.

We learnt how to improve the quality of information literacy training in keeping with student needs in each stage of the field-study, through a systematic feedback process consisting of conversations with students, questions raised in class and areas of weakness we identified in student papers. Changes in training included encouraging students to set-up team research consultations, greater focus during in-class library instruction sessions on how to use and cite information properly, and an effective introduction to the research planning process. In addition, we made the in-class library instruction sessions more interactive, offered more hands-on experience (for example, by Stage IV, one of the two sessions was conducted in a computer lab) and tailored the sessions to the different learning abilities of the graduate and undergraduate students. Concerned about plagiarism and/or poorly paraphrased information, we clearly defined

plagiarism, illustrating plagiarized/misused information. Exhibit 1 provides an overview of the improvements in the package of teaching methods across different stages of the field-study.

Exhibit 1. Improvements Across the Different Stages

	Stage I	**Stage II**	**Stage III**	**Stage IV**
In-class library research instruction		X	X	X
Library resources and services		X	X	X
Research strategies		X	X	X
Database demonstrations		X	X	X
Citation techniques		X	X	X
Research planning			X	X
Business information literacy principles			X	X
Interactive activities			X	X
Exposure to resources				X
Hands-on training				X
Class research (web) guide		X	X	X
Research consultations		X	X	X
Individual consultations		X	X	X
Team consultations			X	X

To evaluate the incremental impact of our training package in Stage II and in later stages of our field-study (compared to the control stage), we used an information literacy grading scale based on citation analysis and a content review of term-papers (see Exhibit 2). At the end of each term, the term-papers were analyzed to determine the types of information used and the variety of resources consulted. We also examined the quality of the bibliographic citations and the students' ability to properly utilize gathered information. Each paper was given an information literacy grade based on a weighting-scheme that reflected the relative importance of different attributes.

Exhibit 2. Information Literacy Grading Scale

Quality of Resources	**30%**
Teams received points depending on how well they selected information resources appropriate for their paper, took advantage of the resources available through the library, and utilized information-rich sources such as journal articles, trade magazines, and company and industry reports.	1 2 3 4 5
Variety of Resources	**20%**
Points were allocated on the basis of the diversity and quantity of resources utilized. A selection of resources that provide diverse perspectives were graded higher than papers which used sources that only provided one perspective on the company. Points were also based on whether the students used enough sources to provide a comprehensive overview given the focus of the paper.	1 2 3 4 5
Citation Format	**10%**
Citation format judged how well the team followed a consistent format, preferably from a writing style guide, which enabled the reader to easily locate the materials utilized in the paper.	1 2 3 4 5
Utilization of Information	**40%**
Students who were able to analyze and synthesize the gathered data into their own words and properly acknowledge the ideas and works of others were graded higher than those who poorly paraphrased or plagiarized the works of others.	1 2 3 4 5

Student papers were judged on each of these four attributes using a five point scale, one being the lowest and five being the highest. Student papers which were plagiarized received a

zero on all attributes.[4] The scores on each attribute were multiplied by the weight given to the attribute to calculate a weighted average information literacy score. For every graduate and undergraduate class, we calculated an information literacy grade averaged across all student teams. Thus, we were able to compare changes in the information-seeking behavior of the students across the different stages of the field-study. The information literacy grade was used to measure the impact of information literacy training on information-seeking behavior. Until Stage IV, this grading process was used only for benchmarking information literacy and was not part of the grade student teams received for the term paper.

Though our grading scale is unique in that it assigns different weights to the four attributes measured, it is reflective of similar tools used in previous studies. Several studies have used analysis of the end product produced to determine the effectiveness of the training session or to gain insight into how students search and utilize resources. Davis (2002), Davis & Cohen (2001), Hovde (2000), and Malone and Videon (1997), each conducted studies of student papers to determine the types of resources used. Kohl and Wilson (1986) focused on evaluating students' ability to select quality resources. In evaluating undergraduate papers in science courses at Earlham College, Kirk (1971) included the appropriateness of the material cited, variety of materials cited and citation format as part of the evaluation criteria.

In outlining guidelines for developing citation analysis tools, Hovde (2000), Young and Ackerson (1995), and Gratch (1985), each encourage the use of more than one person in evaluating the papers. Due to the extensiveness of our analysis and the number of papers involved in the study, we checked the reliability of our rubric by using a randomly drawn sample (stratified across different stages of the field-study) of 14 papers out of the 71 papers analyzed by

[4] The incidence of plagiarism was low. Of the 71 papers we analyzed across all stages of the field-study, such a penalty had to be imposed only in the case of 2 papers in Stage II.

the librarian co-author, for independent cross-validation by the faculty co-author of the paper. The reliability of the rubric was well established by the fairly high correlations between the evaluations of the two co-authors. In the randomly drawn sample of 14 papers, the correlations were as follows: Quality of resources, 0.87; Variety of resources, 0.93; Citation format, 0.81; and, Utilization of information, 0.95. The overall weighted correlation of 0.91 indicates good reliability of the rubric across researchers.

Unlike many citation analysis studies, we paid particular attention to the way teams used information within their papers. As noted by Gratch (1985), an examination of research bibliographies to determine the impact of information literacy training on student skills is incomplete without looking at how students used the information obtained. Among the 71 papers analyzed, we found one paper that was actually written by an academic and in large part used by the students and we found another in which all of the resources cited in the bibliography of the paper were never used in the paper. Had we judged these papers based only on citations and citation format the results would not have correctly represented how well students used the information or if the information was used at all.

4. STAGE ANALYSIS AND OUTCOME ASSESSMENT

Student Teams

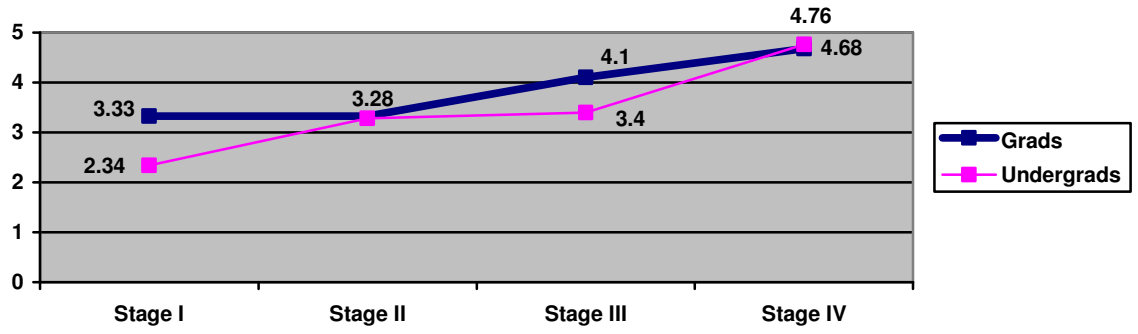
In this field-study, it was important that the student teams across different stages of our field-study were comparable in terms of their academic proficiency. In other words, it was necessary to ensure that student teams in one stage of the field-study were not academically more proficient than those in another stage. Statistically, we needed to test whether the sampled student teams came from populations with equal means and, perhaps, with equal variances. We accordingly conducted t-tests for equality of means and the Levene's test for equality of

variances (using SPSS) on the GPA scores of the student teams.[5] Tests were conducted across different stages of the field-study, taking teams across two stages at a time. The tests were conducted separately for graduate and undergraduate classes. The resulting nine sets of t-tests and Levene's tests are reported in Table 1. In all of the t-tests and Levene's tests, we could not reject the hypothesis that the student teams were sampled from populations with equal means and equal variances respectively. Thus, student teams across the different stages of the field-study were comparable in terms of their academic proficiency.

Information Literacy Grades

A comparison of the average information literacy grades across different stages of the field-study shows that the teaching methods we introduced impacted information-seeking behavior and quality of papers significantly. The average undergraduate information literacy grades rose from 2.34 to 3.28 (out of a maximum score of 5.0) between Stage I and Stage II. At the graduate-level, the information literacy grades rose from 3.33 in Stage I to 4.1 in Stage III.

Exhibit 3. Changes in Information Literacy Grades



Note: Graduates were only evaluated in Stage I, Stage III, and Stage IV, because the graduate course was not taught by the instructor during Stage II (Summer 2003).

[5] This was implemented by comparing the average of the GPA scores attained by members in student teams during one semester, with the average of the GPA scores attained by members in student teams in a different semester.

Information Literacy and Information-Seeking Behavior

The chart below illustrates the substantive changes in the information literacy skills exhibited in the students' papers. Changes in each of the attributes of information seeking behavior evaluated steadily increased over the course of the field-study, suggesting that undergraduate and graduate students benefit from information literacy skills training and produce superior results when the training-package is tailored to the specific needs of the student teams. The research consultation sessions proved especially valuable in getting feedback from the students at each stage and in tailoring information literacy skills training to the specific needs of the students.

Exhibit 4. Undergraduate Competencies and Information-Seeking behavior

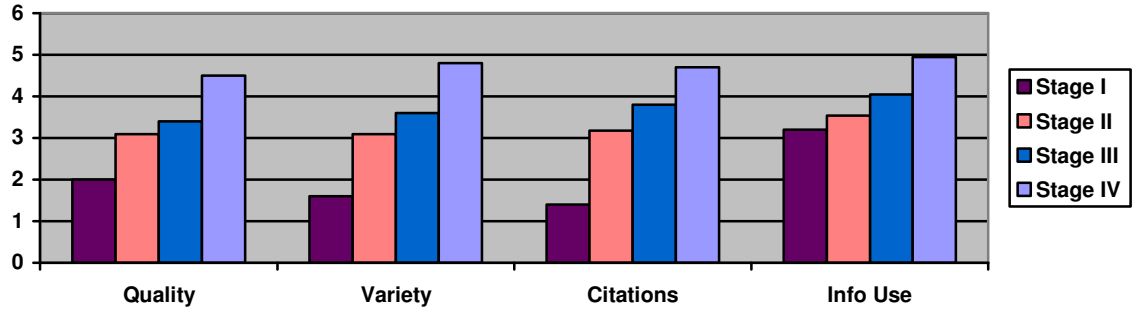
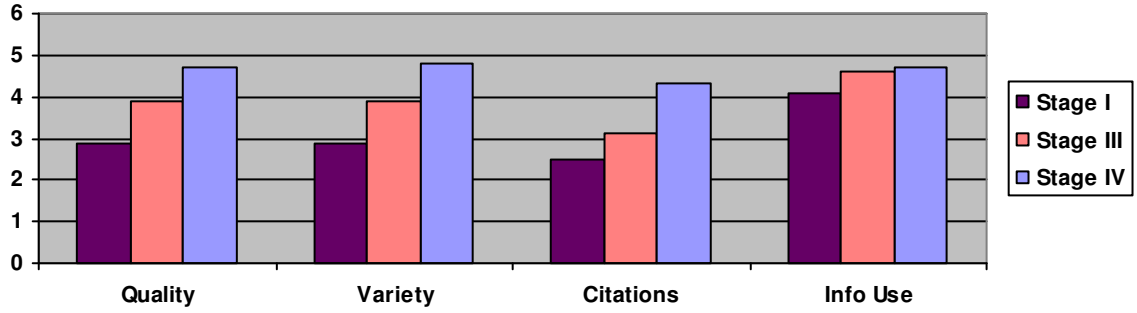


Exhibit 5. Graduate Competencies and Information-Seeking behavior



Research Consultations

In Stages II and III, we identified the student-teams that initiated research consultations. In Stage II, teams initiating research consultations were more likely to have higher information literacy scores. In Stage III, however, with a larger number of research consultation initiations, research consultations and student performance seemed uncorrelated.

Research consultation participation was significant in Stage III with 70% of undergraduate teams and 50% of graduate teams seeking individual and team research consultations. Team consultations introduced in this stage (see Exhibit 1) resulted in high participation rates. In Stage IV, research consultation participation dropped to 33% for undergraduate and 20% for graduate students. Though fewer teams participated in research consultations during Stage IV, the overall information literacy scores improved. We attribute this continued improvement in performance to the class research (web) guide; integration of hands-on resource training during the in-class sessions; and stronger understanding of the assignment expectations due to refinements in teaching techniques.

Differences between Graduates and Undergraduates

The information literacy skills and information-seeking behavior of graduates and undergraduates differed markedly. Graduate students were more likely to possess information literacy skills than undergraduate students. Graduate students also were more aware of the quality of information dimension and more interested in learning about research tools. Questions from the graduate students during consultations and in-class instruction sessions revolved around identifying and learning how to use appropriate resources for the type of data they needed.

Undergraduate students appeared less enthusiastic about the entire process, but responded positively to the more interactive in-class instruction sessions. Undergraduate students were

more likely than graduate students to put off the assignment until the end of the semester. However, undergraduates were also more likely to set up research consultations. During the research consultations, the undergraduate students appeared less interested in learning about the resources and more interested in just finding the information needed for the project. In addition to using the research consultations as an opportunity to receive help locating information, many undergraduate student teams and individual undergraduate students used the research consultations as an opportunity to obtain assistance in organizing their ideas. This confirms a point made by Stein and Lamb (1998) that new researchers are often overwhelmed by projects that require them to adopt a creative approach. Our research consultations enabled students overwhelmed by the need for creativity to work with an expert to sound out their ideas.

5. SIGNIFICANT FINDINGS

Improving Undergraduate Information-Seeking Behavior

As seen in the graphs in the previous section, improvements in undergraduate information-seeking behavior between Stages I and II were encouraging with quality and variety of resources improving by 54.5% and 93.13% respectively (Exhibit 4). We found that students still utilized the web, but incorporated more quality sources such as journal articles, market research company reports or trade magazine articles. Students also pulled information from a wider variety of sources and relied less on the information provided by the company through the company website, annual report and press releases. Between Stages II and III, the quality and variety of resources continued to improve by 10.03% and 16.51% respectively and between Stages III and IV, by 32.35% and 33.33%, respectively.

The most encouraging improvement (127%) between Stages I and II was on the citation format attribute. In the library instruction session, students were given a guide to citing business information sources using the MLA style. Examples clearly laid out how the students should cite websites and library databases. This transformed the way in which students cited resources and made it easier for the reader to identify the sources used. Between Stages II and III, citation formats further improved by 19.5%, and between Stages III and IV, by 23.68% respectively.

Improvement in the utilization of information attribute was marginal (10.63%). Utilization of information refers to how students translated the information they gathered through research into ideas within their paper. The grading scale identifies the degree to which students misused information within the document either by plagiarizing or poorly paraphrasing the ideas of others. We identified utilization of information as a weak link after Stage II. Students in Stage II used information taken from the company website and company documents without changing the words except for pronouns. We therefore focused attention during instruction and team consultation sessions in Stage III on helping students use information appropriately for good report-writing. As a result, utilization of information improved by 14.41% between Stages II and III and by 22.22% between Stages III and IV respectively.

Overall, gains from information literacy instruction for the undergraduates were 40.17% between Stages I and II, 14.02% between Stages II and III, and 27.27% between Stages III and IV, respectively (All these results appear in summary form in Exhibit 6).

Improving Graduate Information-Seeking Behavior

As graphs in the previous section demonstrate (Exhibit 5), even though pre-instruction information literacy levels for the graduates were higher than undergraduates, they did benefit from the information literacy instruction on all four attributes between Stages I and IV. Quality

and variety of resources improved by an impressive 62.07% and 65.52% respectively. In the graduate papers we found many teams fully utilizing the research tools available through the library and relying less on personal investment sites such as Yahoo! Finance and MSN Money. Graduate students benefited by an encouraging 72% on the citation format attribute. Many of the graduate papers utilized more internal citation techniques, such as endnotes or footnotes. Graduate students were at a high level of 4.1 in the pre-instruction *control* stage on the utilization of information attribute. Even so, they benefited by no less than 14.63% on this attribute as a result of the information literacy instruction. Overall, gains from information literacy instruction for the graduates were 23.13% between Stages I and III and 40.54% between Stages III and IV (To see these results in a summary form, see Exhibit 6).

Overall Information Literacy Results

A multivariate analysis of variance test was used to confirm a statistically significant difference between the students' performance across subsequent semesters beyond the reference stage. The results of the analysis [Quality of resources: F = 11.202, p-stat = 0.000; Variety of resources: F = 16.779, p-stat = 0.000; Citation analysis: F = 16.043, p-stat = 0.000; Utilization of information: F = 4.831, p-stat = 0.016;] indicated statistically significant positive differences in the level of student performance across semesters. Exhibit 6 illustrates the changes through all four stages of this field-study for undergraduate and graduate students, and also indicates the number of graduate and undergraduate student teams in each stage of the field-study.

Exhibit 6. Information Literacy Field Study Results

	Number of Teams	**QR** Quality of Resources	**VR** Variety of Resources	**CF** Citation Format	**UI** Utilization of Information	**Overall** Outcome
Stage IV						
G	8	4.7 (20.51%)	4.8 (23.07%)	4.3 (38.71%)	4.7 (2.17%)	4.68 (14.15%)
U	10	4.5 (32.35%)	4.8 (33.33%)	4.7 (23.68%)	4.95 (22.22%)	4.76 (27.27%)
Stage III						
G	8	3.9 (34.5%)	3.9 (34.48%)	3.1 (24%)	4.6 (12.20%)	4.1 (23.13%)
U	11	3.4 (10.03%)	3.6 (16.51%)	3.8 (19.5%)	4.05 (14.41%)	3.74 (14.02%)
Stage II						
U	11	3.09 (54.5%)	3.09 (93.13%)	3.18 (127%)	3.54 (10.63%)	3.28 (40.17%)
Stage I						
G	18	2.9	2.9	2.5	4.1	3.33
U	5	2	1.6	1.4	3.2	2.34

The multivariate analysis of variance (MANOVA) test that indicated statistically significant improvement in student team performance across different stages of the field-study was conducted using a large enough sample. In each cell, the number of student teams used exceeded the number of dependent variables, thus conforming with the threshold prescribed for MANOVA. The student teams in the different stages were independent observations and randomly formed by students in the class.[6] Thus the dependent measures for each respondent group were totally uncorrelated with responses from other respondent groups within and across stages of the field-study.

It is possible that the results of our study were influenced by the fact that information literacy training is offered in other business classes. However, based on the scores of the student teams in Stage I it is evident that extensive training tailored to the needs of the class was needed. The training offered to undergraduates and graduates in International Finance is more extensive than the training offered in any other course except a core marketing research class which was

[6] The independence of student teams across semesters, and randomly formed student teams (with no cognizance of each other's academic performance among team members) ruled out autocorrelation.

not concurrently taken by the students. In addition, there were few changes to the type of information literacy training offered in other business classes during the semesters covered by this field study. Thus, we can conclude that the changes in student performance across semesters are solely due to the impact of improvements made to the information literacy training provided within this class.

Skill changes were also appropriately captured using student teams with similar academic proficiency across different stages of the field-study. Plagiarism penalties imposed did not affect our overall results in the field-study in any significant way since only two groups out of a total of 71 groups we analyzed, were penalized significantly. It is possible that both undergraduate and graduate students experienced information overload due to intensive training in just one semester. This suggests that students would benefit from greater exposure to information literacy training suitably integrated into their overall degree program.

6. CONCLUSIONS

With the advent of novel ways of disseminating and acquiring information, such as the Internet, there is need for a critical appreciation of what constitutes high-quality, reliable, and accurate information. In this study we traveled the course of how formal information literacy instruction in the business school classroom at the graduate and undergraduate level impacts information-seeking behavior of the students. Based on the differences noted in Stage I and Stage II for the undergraduate students and Stage I and Stage III for the graduate students, it is clear that information literacy training positively impacts student team performance. The additional improvements in performance observed in Stage III and Stage IV for the undergraduate students and Stage IV for the graduate students illustrates the benefits of actively

using feedback received from the students for improving the package of teaching methods over multiple semesters. A valuable lesson for the future is that sustained information literacy training and assessment is more likely to be successful in creating lifelong research skills among students than a one-shot input on information literacy training based on a generic model developed outside of the class for which the training is intended.

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Table 1: Comparable Student Groups

Graduate Classes

Groups			Levene's Test for Equality of Variances		t-test for Equality of Means			
			F	Sig	t	df	Sig (2-tailed)	Mean Difference
1&2	GPA	Equal variances assumed	4.119	0.063	0.187	13	0.854	0.0259
1&4	GPA	Equal variances assumed	1.417	0.251	-0.89	16	0.387	-0.1022
2&4	GPA	Equal variances assumed	0.678	0.423	-0.875	15	0.396	-0.1281

Undergraduate Classes

Groups			Levene's Test for Equality of Variances		t-test for Equality of Means			
			F	Sig	t	df	Sig (2-tailed)	Mean Difference
1&2	GPA	Equal variances assumed	0.233	0.636	-0.123	16	0.904	-0.0156
1&3	GPA	Equal variances assumed	0.301	0.591	-1.881	16	0.078	-0.2856
1&4	GPA	Equal variances assumed	0.875	0.365	-0.576	14	0.573	-0.1003
2&3	GPA	Equal variances assumed	1.204	0.289	-1.935	16	0.071	-0.2700
2&4	GPA	Equal variances assumed	1.204	0.289	-1.935	16	0.071	-0.2700
3&4	GPA	Equal variances assumed	0.186	0.673	0.993	14	0.338	0.1852

Key:

Graduate classes – 1 is Spring 03, 2 is Fall 03, and 4 is Spring 04.
Undergraduate classes – 1 is Spring 03, 2 is Summer 03, 3 is Fall 03, and 4 is Spring 04.