2017

Information Literacy and Institutional Effectiveness: A Longitudinal Analysis of Performance Indicators of Student Success

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Abstract

This article reports on an analysis of data that tracks close to 2000 students in an urban public community college over a five year period to gather baseline data on the potential impact of information literacy instruction on standard indicators of student success—retention, graduation rates, pass rates on required proficiency exams in math, reading, and writing, GPA and credits earned. The data show a statistically significant trend that favors the students who have taken information literacy workshops, showing a higher rate of success in every category than students who did not participate in our information literacy program.

KEYWORDS: Information Literacy instruction, IL, Institutional effectiveness, Longitudinal analysis, Performance indicators, Student success, College, Community College, Retention rates, Graduation rates, Pass rate, GPA, Credits earned.

Introduction

Academic librarians know that information literacy skills are key to student success. Knowing it is one thing. Having the empirical evidence to demonstrate it to academic administrators and accreditation agencies is quite another. As information literacy has taken a visible position in the national conversation on general education competencies and the assessment of student learning outcomes, academic librarians have responded with a range of articles, studies, and best practices throughout the literature. Much of our focus has been on defining and identifying specific competencies, outcomes and performance indicators that will demonstrate that our students are learning what we intend for them to learn. The literature reflects, as well, a multitude of reports on assessment measures and means of assessing information literacy programs, skills, approaches and outcomes. But what is the impact of student information literacy competencies on student success in higher education? And should colleges consider expanding the information literacy instruction to give more students the opportunity to

develop these skills? This article reports on an analysis of data that tracks nearly 2000 students over a five year period to examine the possible impact of information literacy instruction on standard indicators of student success—retention rates, graduation rates, pass rates on required proficiency exams in math, reading, and writing, GPA and credits earned. The results from our analysis show promise for demonstrating that dedicated information literacy instruction leads to improved student success The data show that students who have taken information literacy workshops, have significantly higher outcome measures for every indicator we looked at than do students who did not participate in our information literacy program. While this was not a research project by design, we did not randomly assign students to treatment and control groups, nor did we attempt to control for student background characteristics when comparing outcomes, results from this large-scale study tracking students over a five year period indicate that direct instruction in information literacy has a strong association with student success measures, and as such, our findings suggest a promising line of research for academic libraries moving forward.

Background

Eugenio María de Hostos Community College, of the City University of New York (Hostos, CUNY) lies in the heart of the South Bronx, one of the poorest congressional districts in the nation, with a predominantly Hispanic population. More than fifty percent of the student body's first language is Spanish and the Hostos mission addresses the needs of a bilingual population. Hostos students – like those at many community colleges across the U.S. – often need to take developmental writing, reading and/or math courses before they are eligible to take or are prepared to succeed in college credit courses. Hostos' Mission Statement (n.d.) reflects the college's focus: "… to provide access to higher education…" to those "who historically have been excluded from higher education…" and "to offer higher education leading to intellectual growth and socio-economic mobility…to students from diverse backgrounds, particularly Hispanics and African Americans."

The Hostos library is dedicated to the mission of our institution and we have designed all of our programs and initiatives around helping our college meet its institutional and community goals. In this regard, both the Library and our Information Literacy program mission statements bolster its commitment to supporting Hostos students in the acquisition of English and critical academic literacy skills that will serve to both break down the barriers that have contributed to the exclusion of our community from higher education in the past and bolster student success. Thus, several years ago the library department made a strategic decision to make the library a visible and critical partner in the college's teaching and learning mission. We did this by identifying the most important initiatives on our campus and worked to demonstrate how the library department supports those initiatives. In our case, these priorities were student retention, pass rates on required basic skills proficiency exams, assessment of student learning, and general education competencies. Library faculty developed a teaching agenda that supports the programs and priorities of the institution and took a proactive approach to presenting the library's programmatic offerings, rather than a more traditional, reactive approach -- waiting to be asked to give a tour or teach a workshop. We sought to position ourselves as valuable teaching partners with unique expertise in the information technologies and critical thinking skills that are so crucial to the success of our students and faculty. The library markets and promotes our curriculum to demonstrate how we use our information technology and literacy expertise, pedagogic skills and enthusiasm for collaboration to contribute significantly to the Hostos mission.

Although our information literacy initiative is the driving force behind our vision as a teaching library, we also want our students to gain an understanding of, and experience with, all the services that the Library provides and to understand the role of libraries in general in a democracy. In addition to our instruction program, we have moved forward with innovations such as an incentive-based laptop loan program tied to our IL program and the transformation of the reference area into an Information Learning Commons (ILC). The ILC provides an interactive learning space that enhances student

learning and fosters integration, collaboration, and a sense of community while encouraging independent and critical thinking in an active learning environment. In addition to all of the library's resources and services, our ILC provides students with access to MS Office applications, the Adobe creative suite, and point-of-use technology tutors. Further, the space features numerous group study areas for collaborative learning, comfortable seating, and assistive technology workstations, integrating research support services, technology, and content in one physical space.

Our Information Literacy Curriculum and Program

When we initiated the Library's Information Literacy (IL) program in 2001, we designed a curriculum and framework for workshops that we hoped would strongly support Hostos' mission and institutional goals, including student retention and success, academic integrity and improved pass rates on basic skills proficiency exams. One of the publications that most influenced our approach to teaching IL and information technology (IT) skills was Shapiro and Hughes' 1996 essay, "Information Literacy as a Liberal Art." The Hostos IL model focuses on critical competencies, student learning outcomes and a broader understanding of information as a way of interacting with our world today. Information literacy in this context becomes more of a liberal art "that extends from knowing how to use computers and access information to critical reflection on the nature of information itself, its technical infrastructure, and its social, cultural and even philosophical context and impact.…(Shapiro & Hughes, para. 13)". The Middle States Commission on Higher Education, Hostos' accrediting body, identifies information literacy as a vital component of educational offerings and as an essential skill of a general education curriculum, noting that IL is "vital to all disciplines and to effective teaching and learning" (2002, p. 32). And, like many other colleges, Hostos has incorporated IL and IT into its core curriculum and general education learning objectives.

With all this in mind, library faculty worked to create a variety of paths to integrating IL into the curriculum and across the disciplines, with the ultimate goal of reaching all Hostos students. We also

created a variety of student learning outcomes assessment tools to continuously evaluate what students are learning and how IL instructors are doing in order to inform the pedagogical practices of our IL instructors. We created pre- and post-semester surveys to administer to students in selected English course sections early and late in the semester, and rubrics that library faculty used to evaluate the effectiveness of selected course-related workshops each semester. Of central importance to this article, we created a method to collect longitudinal data on all the students who take our IL workshops. We used a portion of the workshop evaluation form to find out which professors required the IL workshop, how many workshops each student had taken, and what kinds of computer and software technologies the students were using. More importantly, the survey included a unique identifier for each student, which is used to automatically enroll students who have completed at least two IL workshops in the Laptop Loan program. This same unique identifier allowed us to link the survey information to institutional data we could then analyze to determine if there exists any statistically significant relationship between taking IL open workshops and important student success measures such as cumulative GPA, CUNY Assessment Test scores (standardized basic skills proficiency exams needed to exit from remedial/developmental courses), and retention rates. Currently, the Hostos Library IL program includes six open workshops (i.e., students sign up to take these workshops on their own time), but the program started out in 2001 with three foundational IL workshops. In 2002, Hostos redesigned its Liberal Arts core curriculum. A set of distinct core General Education competencies were identified and agreed upon as fundamental skills Hostos students need to master by the time they graduate. By successfully integrating IL into the Freshman Orientation course in 2001, we, in effect, managed to insert IL into the new Liberal Arts core curriculum through inclusion in the required College Orientation course. Since fall 2003, all Liberal Arts majors have been required to take at least two IL open workshops as part of the college's General Education requirements.

Beginning in spring 2005, the English department required all students enrolled in English 111 (the second semester mandatory freshman literature course) to take two IL workshops; and in fall 2007, they expanded their IL workshop requirements to include all students in their developmental English and English 110, Freshman Composition sections. Other departments have begun working more intensively with the Library's IL program, integrating IL instruction in their Writing Intensive courses, particularly the Natural Sciences and Behavioral and Social Sciences departments. Library department faculty liaisons all teach course-related research workshops upon request, which are created in collaboration with departmental faculty.

The Library's instruction program is based on an intentional curriculum, incrementally building research skills through our six interlocking IL open workshops. Each workshop lasts 75 minutes and includes students' use of our wireless laptops to follow the instructor and complete hands-on exercises. The curriculum addresses the five Information Literacy Competency Standards as designated and described in the Association of College and Research Libraries' *Information Literacy Competency Standards for Higher Education* (2000). Our focus is on teaching lasting and transferable skills: how to decide what kind of information one needs in any particular instance, how to use language to create search strategies, how to critically evaluate information and its sources, how to decode digital records and citations, and how to use information legally and ethically. The curriculum for each IL open workshop was designed to include specific learning outcomes with clear objectives for each session. Each session includes hands-on exercises designed to engage the students in demonstrating that they have met the learning goals. For example, our "Finding Articles" workshop has a defined structure that all library instructors follow. It includes a proscribed agenda of engagement – slides, demonstration, handouts, in-class exercises-- and it is designed to address specific learning outcomes, which are practiced and assessed in the in-class exercises.

The Library faculty believe that their approach to IL instruction is unique in several ways: first, students are assigned by disciplinary faculty to attend workshops outside of scheduled class time, so that workshop attendance does not interfere with their course schedules or take valuable class time away from faculty. The Library faculty who teach the sessions sign *Attendance Verification Forms* the students then turn in to their course instructors to demonstrate that they have completed the assignment. Second, we offer course-related workshops by request, with the requirement that before a course-related workshop can be scheduled, the faculty member must first assign and require the students to attend a minimum of one open workshop prior to the tailored session. In this way, students get a basic foundation in IL skills before work begins on their targeted research. Hostos disciplinary faculty have become big supporters of this approach because they know their students are learning foundational skills such as topic development, Boolean search techniques, critical evaluation of resources, and the fundamentals of academic integrity and plagiarism as a part of their courses, but without the necessity of using classroom time. And faculty who do schedule a course-related research session are pleased that they do not have to use valuable class time teaching the students basic IL skills, since the students have already taken two open workshops on their own time, as part of the assigned course work. All together, we teach approximately 100 workshops per semester, about one-fourth of which are course-related research workshops.

Context and Literature Review

The literature of the past twenty-five years and more offers a plethora of publications confirming the importance of teaching information literacy (IL) and the central role that library faculty play. Faculty, librarians and administrators have not only acknowledged the importance of IL instruction and its place in disciplinary curricula, but have also linked IL to critical thinking, the writing process, and other academic literacies. In her 2002 article summarizing the strategies being used by various institutes

of higher education to integrate information literacy into general education programs, Ilene F. Rockman is worth quoting at some length:

> With internal and external public pressures for students to graduate with skills commensurate with the academic rigor of a comprehensive program of study, universities … have sought to restructure their curricular offerings to bring them more in line with current societal needs, to attract and retain students, and to help students progress toward graduation with critical reading, writing, thinking, and speaking well developed. Such restructuring would … emphasize information literacy as an active learning process; inspire intellectual desire in students; promote the importance of continuous lifelong learning; and document to accreditation agencies, professional associations, legislative bodies, and other entities that undergraduate students are graduating with skills, knowledge, and abilities viewed as valuable assets in the workplace, in graduate school, and in society at large…. In addition, as the enabler for continuous learning in a technologically rich and globally diverse society, information literacy has been viewed by some universities as the foundation piece of this restructuring effort (2002, p.187).

Today there are few, if any, who would argue that IL is not an important component of a higher education (Oakleaf, 2010; Elmborg, 2003; Leckie, 1996; Laskin, 2002; Middle States Commission, 2003).

Partly in response to regional accrediting bodies' mandates for teaching IL across the curriculum, methodologies for assessing student learning outcomes became an important focus for library faculty. Since the 1990s, librarians have used a wide variety of assessment tools and methods. There are now an abundance of publications describing the results of assessment studies related to IL (Stewart, 2011; Dunn, 2002; Kapoun, 2004; Kuh & Gonyea, 2003). Much of this literature is of practical importance, focusing, for example, on IL and the first year experience (Samson & Granath, 2004; Hardesty, 2007) or assessment using e-portfolios (Diller & Phelps, 2008) while other publications provide reviews and evaluations of IL assessment tools and techniques (Vance, Kirk, & Gardner, 2012; Maughan, 2001). Still other published literature analyzes the role of libraries and IL instruction in student learning (Smith, 2001; Bodi, 1988; Laskin, 2009; Kuh & Gonyea).

Information Literacy and Student Success – What do we know?

Despite the usefulness of published studies and descriptions of approaches to teaching IL and assessing student learning outcomes, there is an approach to assessing the usefulness of IL on an institutional level that is not as heavily documented but which is nevertheless necessary to research and document. Is there any reliable evidence to support a relationship between the acquisition of information literacy skills, and the role of academic libraries in general, and an institution's ability to address its mission and goals? How can it be shown that information literacy instruction positively affects student success?

In her 1998 article, "Defining and Measuring the Library's Impact on Campuswide Outcomes," Bonnie Gratch Lindauer asserts that "the assessment of library performance should be defined and shaped by its connections and contributions to institutional goals and desired educational outcomes (p. 547)." Lindauer comments that more than four decades of publication on the importance of libraries to student learning outcomes has not fully addressed "performance indicators that demonstrate the academic library's impact on desired educational outcomes and methods to measure them (p. 548)." She notes that though few in number, there have been some exceptions among the published literature: "The types of impacts discussed in these works are measures of academic library use and library skills instruction correlated to lower attrition rates, higher grades, higher GRE scores, student persistence, and savings in faculty time (p. 548)." Longitudinal studies that convincingly demonstrate the impact of IL and libraries on student success at the institutional level are still needed. In their 2011 "The Academic Library Impact on Student Persistence," Emmons and Wilkinson note: "The library literature offers very few studies that examine the relationship between the academic library and retention or graduation. Most impact studies attempt to measure library outcomes other than retention and graduation, among others, points out the necessity for more longitudinal research and data collection that connect IL instruction programs with student success indicators at the institutional, rather than the course or program level" (p. 129). (see also O'Connor, Radcliff & Gedeon, 2001; Rushing & Poole, 2002.)

The literature on student success indicators at the institutional level published by educators and administrators includes these most frequently noted: passing rates of students in developmental courses; GPA's, exit exams (for developmental courses and exams such as CUNY's Proficiency Exam), retention rates, course completion rates, certificate completions and the number of transfers to B.A. programs for community college students (Alfred, Schultz & Seybert, 2007; Doucette & Hughes, 1990; Frye, 1999).

One reason the literature is still lacking on how IL affects student success rates at the institutional level may be that gathering the kind of data needed in order to track student retention and other success indicators necessitates a method that works to track individual students, and a substantial amount of time to follow students through their college studies and analyze the data. There have, in fact, been a few articles and reports on the results of longitudinal studies of IL and student success (Hardesty, Lovrich. & Mannon, 1982; Selegean, Thomas & Richman, 1983; Smalley, 2004). However, because of the methodology of data collection or the size of the student samples, these studies, while pointing at higher student success or retention rates, or both, have not yielded statistically valid results. Deborah Moore and others at Glendale Community College (California) published the results of a two-year project in which they:

> …studied the impact of library classes and workshops on student success in other classes. For the library classes, student success was defined as GPA in the following semester, as compared with that of a matched group of students. While the data did show a positive correlation between the library course and grade point averages of the students, the data were too small to be significant.... For the library workshops, student success was defined as a passing grade in the English or English as a Second Language (ESL) course from which they had been assigned to take the library workshops, as compared with the performance of all students who did not take the workshops. Here the study showed statistically significant findings of up to a 35 per cent higher pass rate in English and ESL composition classes for students who took the workshops (pp. 301-302).

Glendale Community College faculty continued this research and in 2008 made a draft report available at their web site. "Statistical Evaluation of Information Competency Program: Student Outcomes Spring 2000 to Spring 2005," goes into more detail on the effects of library courses and IL

workshops on retention and student success rates. The report concludes that the IL instruction was "associated with positive short-term and long-term student success (p.1)." Indicators were semester GPAs and semester units completed (comparing students who took a library course or workshops with students who did not take any). The Glendale report notes, however, "it is not possible to conclude that these information competency interventions caused positive outcomes because of the self-selection problem. Students choose whether to complete Library workshops and to take Library courses; presumably, more motivated and academically skilled students were more likely to choose these activities (p. 14)". The results presented below represent one of the few larger scale, long term tracking studies of the potential impact that IL instruction has on student success.

Data Collection Process

We began collecting IL workshop evaluation data from students in 2001 when we started our Information Literacy program, but it wasn't until 2002-03 that we were able to design an evaluation form that would allow us to track the students taking our IL workshops over time. The key to tracking students was to create a unique identifier by a student ID number with last name on the evaluation form. Using this identifier, the Institutional Research office was able to identify and track the students in CUNY's student information system, containing complete academic records for all students who have attended Hostos.

We limited the students in both the treatment (IL workshops) and control (no IL workshops) groups to those who entered Hostos between Fall 2002 to Fall 2005. We identified 1,808 students who participated in our IL program, 68.9% of whom took two or more IL workshops (the average number of workshops taken was 2.3). The remaining students – those who were *not* in our database of IL workshop participants – formed the control group, a total of 5,197 students.

Working with the college's office of Institutional Research, we created a student-level data set that contained some basic student demographic variables and variables to allow us to compute the

following important student success indicators for all of the students in the treatment and control groups: pass rates on the CUNY Assessment Tests in math, reading, and writing; pass rates on the CUNY Proficiency Exam (CPE), an exam administered to CUNY community college students prior to graduation; mean cumulative GPA; graduation rates; average number of semesters attended; average credit accumulation; and retention rates. The focus of the data analysis was to determine whether there were differences in the outcomes for IL participants compared to the non-IL group, and if so, whether those differences were statistically significant. Our intent was to do an initial analysis of the institutional data we routinely collect for analysis to lay the foundation for a more methodologically rigorous study in the future.

It should be noted that beyond comparing the two groups with respect to basic demographic characteristics and some indicators of academic preparation, we made no attempt to control for other factors that might explain any differences we find between the two groups. That is, we do not attempt to control for the possibility that more motivated or otherwise academically stronger students choose to participate in the IL workshops compared to the students who do not participate in the workshops. Although self-selection could certainly be a factor as it was an issue of concern in the Glendale study noted earlier, we believe that the differences reported below cannot completely be explained by selection. Hostos students take our workshops because they are required to (and to show their signed *Attendance Verification* forms from the workshop instructors) by their course instructors across the disciplines in the college. This information is corroborated by students' responses to our workshop evaluation form. Students indicate whether they are taking the workshop because it is required for a course or because they are doing so on their own. If the student checks off "required," they are prompted to indicate the name of the instructor and the course section in which they are enrolled.

Findings

Table 1 shows the demographic characteristics and academic preparation for the treatment (IL students) and control (non-IL students) groups. As Table 1 shows, both groups are very similar in terms of their gender and ethnic composition. In addition, the proportion of students in each group who had taken an English as a Second Language class (ESL) is fairly similar: 23.2% of the IL students and 20.6% of the Non-IL comparison group. There was a marked difference, however, in the percentage of students that had taken an English developmental course: 47.1% of the IL students, had taken at least one developmental English course, compared to only 29.7% of the Non-IL students, indicating that students who took the IL workshops, in general, were less prepared to do college-level work. One might hypothesize, that all else being equal, students in the IL group would have lower student success than those in the non-IL group because more of them need remediation (developmental English).

Table 1
Demographic Characteristics and Academic Preparation

	IL Students (N=1,808)	Non-IL Students (N=5,197)
	%	%
Gender		
Female	72.7	71.2
Male	27.3	28.8
Ethnicity		
Hispanic	56.8	49.4
Black	32.2	35.3
Asian	3.7	4.8
Other	7.3	10.0
ESL Students	23.2	20.6
Developmental English	47.1	29.7

Table 2 displays the average students' success measures for the treatment (IL) and control (non-IL) groups. On every measure we looked at the students in the IL group outperformed those in the non-IL group. IL students had a higher graduation rate- as of spring 2008, 35.3% of the IL students had graduated, compared to only 9.8% of the non-IL group. The IL students had accumulated a mean of 46.1 credits as of spring 2008, compared to 23.6 earned credits in the non-IL group. The IL students have attended an average of 6.0 semesters compared to an average of 4.3 semesters for the non-IL group. These data indicate that, on average, students who participated in our IL program have higher rates of success in college.

Table 2
Student Success Indicators

	IL Students (N=1,808)	Non-IL Students (N=5,197)
Graduation Rate	35.3%	9.8%
Avg. Cum GPA	2.65	2.44
Avg. Cum Earned Credits	46.11	23.68
Avg. Semesters Attended	6.01	4.3
Avg. Age	27.19	29.06

Table 3 displays pass rates on the standardized and required tests for both the IL and non-IL groups. The table shows that, as of spring 2008, 67.7% of the IL students had passed the CUNY Assessment Test in Math compared to only 42.6% of the non-IL students. A similar pattern exists for pass rates for basic skills proficiency tests in both the reading and writing: as of spring 2008, 78.5% of the IL students had passed the CUNY Assessment Test in Reading, compared to 57.6% of the non-IL students; 73.5% of the IL students had passed the CUNY Assessment Test in writing, compared to 47.2% of the non-IL students. Further, by spring 2008 46.3% of the IL students had taken and passed the CPE exam, while only 12.6% of the non-IL group had taken and passed the CPE.

Table 3
Pass Rates on Basic Skills Tests and the CUNY Proficiency Exams

	IL Students (N=1808)		Non-IL Students (N=5197)	
	N	%	N	%
Reading	1,419	78.5	2,996	57.6
Writing	1,329	73.5	2,453	47.2
Math	1,212	67.7	2,400	46.2
CPE	838	46.3	654	12.6

We did not run tests to determine whether differences in test past rates are statistically significant. However, given the large sample size and the substantially higher pass rates of the IL students compared to the control group, especially in light of the fact that the IL students were more likely to need English remediation, suggests that the skills taught in the IL workshop may have contributed to students' ability to pass basic skills and the CUNY proficiency exam.

To determine whether differences in measures of student progress and success between the two groups are significant or not, we ran a t-test for each comparison. The results of the analyses are shown in Table 4.

Table 4
Statistical Test of Student Outcomes

	IL Students			Non-IL Students			T-Test		
Indicator	N	Mean	SD	N	Mean	SD	t-value*	DF	Sig.
Cumulative GPA	1,805	2.7	0.79	4,272	2.4	0.96	8.61	4,078	p<.01
Cumulative Credits Earned	1,808	46.1	24.07	5,197	23.7	21.40	35.09	2,862	p<.01
Semesters Attended	1,808	6.0	2.58	4,459	3.9	2.65	28.81	3,423	p<.01

*For each comparison, the difference between the IL Students and the non-IL students is statistically significant at p<.01.

The differences between the two groups on each of the four outcomes compared were greater than would be expected by chance. Note that for the t-test calculation the N for the non-IL students changed slightly because of missing data due to students dropping out. Such differences suggest that participation in the IL workshops has a positive effect on the student success measures, including cumulative GPA, cumulative credits earned, and the number of semesters attended**.** Of course, this isn't conclusive and merely indicates the possibility of a positive effect on student outcomes. We are aware that other factors could have influenced the results; however, as noted, the observed differences were greater than expected by chance and were remarkably consistent across all indicators. Such findings strongly suggest that IL workshops are effective at improving student outcomes and, at the very least, that further study as to their impact should be pursued.

Discussion and Implications for Future Practice and Research

In terms of providing appropriate and convincing data on how information literacy instruction contributes to institutional missions and goals, Lindauer puts the primary challenges to academic librarians succinctly:

> Generally, academic librarians face two problems when trying to describe the impact of their services and resources on desired institutional outcomes and goals. First, they are not sufficiently strategic or externally focused when determining which measures to use as evidence of how the library affects educational outcomes. Second, they often do not organize their data and other supporting documentation in ways that are accessible or meaningful to academic administrators and accreditation teams, nor do they use language that reflects what is used in campus wide planning documents (p. 546).

As discussed in the Lindauer article and others, academic librarians have been using a variety of methods to assess how information literacy instruction has made a difference in the way students approach research, and whether they have learned lifelong, transferable skills by the time they graduate. Have they learned how to decide what kind of information they need in any particular instance? How to use language to create search strategies? How to critically evaluate information and its sources? How to use information legally and ethically?

The challenge is also in finding ways to measure and convey the positive effects of information literacy instruction that will mesh with, and be meaningful to, our institutions' administrators and accrediting bodies. We firmly support assessing student learning outcomes at the course and program levels, and academic library professionals have done a good job of sharing tools such as rubrics, long-term surveys, questionnaires and the like so that we can continue to find assessment methods that work well for our particular situations. But as we believe we have seen at Hostos Community College, if we can collect data that track students over a period of years that indicate that information literacy instruction significantly helps with student retention, increases pass rates on standardized exit exams and increases GPAs and graduation rates, then academic librarians will have begun to demonstrate to our institutions that information literacy is not simply a set of skills that helps students do better on research assignments. Of course, these skills are important in and of themselves. It is clear that the new information environment is complex and challenging for students and for citizens who need to be engaged with information resources at work and at home and who want to fulfill their roles in society of being well-informed and capable of making thoughtful decisions – whether in the private or public sphere.

The promising results of our data collection and findings are due in part, we believe, to the design of our instruction program. The implications of our experience for future practice, is that to be truly effective, information literacy instruction programs need to be carefully thought out; they should provide an incremental set of learning experiences through an intentional curriculum, with clear objectives for each workshop and explicitly stated learning outcomes. There is often more than one instructor for an IL workshop, and workshop content and pacing needs to remain flexible to allow instructors to use their own approaches to the material. It is critical that regardless of who may teach a specific workshop, the learning outcomes are the

same. Library faculties are not at liberty to teach what they want, which is often the case in workshop style instruction programs. We have a curriculum and we follow it.

We are not necessarily suggesting that others should duplicate the IL program presented here, but we do believe, based on our experience, that an effective IL program should not solely offer research workshops at individual faculty members' requests. Course-related workshops are very useful and again, we do not think that they should be abandoned. But at our institution, as described previously, we believe that a mix is most efficient and pedagogically effective: open workshops, each offering a specific set of learning objectives and building skills and abilities incrementally, with each workshop instructor covering the same content and assessing student learning as part of the process as matter of practice; and, the next step, the ability to follow up on the open workshops by offering course-related workshops that focus on specific research projects at a professor's request. This type of program is a more efficient use of librarians' time. The Hostos Library department is small, with only eight full time faculty members and several adjunct librarians. We serve a population of over 6,000 students and our goal has always been to provide IL instruction for all. We offer four to six open workshops per week, during the fall and spring semesters at different hours of the day and evening, and disciplinary faculty typically request an additional twelve to fifteen tailored course-related research workshops per semester. Most all of our students take our open workshops because they are required to by their professors. Most students take between two and three open workshops per semester, and we reach around 2000 students each year through these sessions. We are also aware that in some of our career programs, most notably Allied Health, faculty may be less inclined to require and assign IL workshops because their curriculum is more proscribed. Nevertheless, library faculty continue to work with these faculty members to encourage them to have their students participate in the IL workshops.

The implications for research of our work at Hostos is that not only does IL instruction help students with research skills, critical thinking, language skills and higher-cognition abilities such as evaluation and analysis, but more generally, the findings suggest that our instruction program may help students stay in school, accumulate more credits and graduate with better GPAs. The challenge for library faculty interested in tracking student success outside of the library classroom over a period of several semesters is to identify a way to track individual students so that information about the future impact of the IL workshops can be captured. We hope that the work we have described in this paper will inspire others in our profession to find a way that works for them, to make use of their routine and ongoing usage and assessment data to track students who have participated in information literacy instruction programs and to be able to make ongoing analysis of the impact of information literacy on indicators of student success.

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