Uncovering the Information Literacy Skills of First-Generation and Provisionally Admitted Students

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Abstract

Librarians have experimented with a variety of instructional models, from one-shots to tutorials to semester-long information literacy courses, to increase the impact of information literacy instruction. This study assessed the information literacy gains of students who participated in the pilot of a new instructional model, in which librarians developed and taught a first-year composition course aimed at first-generation, provisionally-admitted college students. This project demonstrated that this model improved students' performance on a standardized information literacy assessment in comparison with students who received instruction in the form of a one-shot instruction session. The study also explored the information literacy knowledge and skills of students targeted by this approach, including first-year students, first-generation students, and provisionally-admitted students.

Introduction

Higher education has been increasingly focused on issues of student success such as first-year retention, graduation rates, and achievement disparities for underserved student populations. Librarians have been responding by creating library programs and services that connect to their campus student success initiatives (Soria et al., 2013; Thorpe et al., 2016). Many of these library programs have been based on an assumption that information literacy is a key component to student success (Blake et al., 2017). However, the traditional library one-shot instruction session is limited in its ability to cover information literacy at

any depth as well as being difficult to assess (Bean & Thomas, 2010, p. 241). As libraries cope with increasing demands to provide resources and demonstrate their contributions to student success, they are trying to determine whether their instruction programs are making an impact on the information literacy skills of students. This is particularly true of student populations targeted by their university's student success initiatives.

This study was designed to assess the information literacy competency levels of students enrolled in participating sections of Texas A&M University's first-year composition and rhetoric course, ENGL 104. Students enrolled in this course represent a substantial contingent of the first-and second-year student population. The researchers, who are librarians, were presented with the opportunity to design and teach a pilot information literacy-focused section of the course that enrolled only first-generation, provisionally-admitted students. The librarians were able to teach one section of the course each semester beginning in fall of 2017. A standardized information literacy survey instrument was administered for a full academic year, fall of 2017 and spring of 2018. Librarians compared survey data collected from students in the pilot "library" sections of ENGL 104 to data from students enrolled in traditional sections of ENGL 104. The study assessed the impact of the pilot sections in order to inform future course offerings and to help librarians understand what information literacy skills students have and where additional instruction may be helpful. It was also intended to help determine the impact of library instruction on the information literacy skills of students from target demographic groups.

Research questions included:

- Did the information literacy skills of the first-generation, provisionally-admitted students enrolled in the pilot sections differ from the general population of students enrolled in other sections of an introductory composition course?

- Did the information literacy skills of first-generation students, regardless of section enrollment, differ from the information literacy skills of continuing generation students enrolled in an introductory composition course?
- Did intensive information literacy instruction within a librarian-taught composition course increase information literacy test scores?

Background

Texas A&M University is a very large university located in College Station, Texas. Although the university can be overwhelming, both in its physical size and with a student body that exceeds 60,000 students, there is a great deal of support available on campus to help students succeed, from a robust Extended Orientation program to a proliferation of learning communities. These efforts have resulted in strong retention and graduation rates; over 91% of incoming first time in college students are retained after their first year, and over 80% of those students have graduated after six years (Texas A&M University, "Student Retention and Graduation," 2019). Although these numbers are strong compared to the national averages of 81% first-year retention and 60% graduation rates for 4-year institutions (National Center for Education Statistics, 2019), the university has been striving to improve retention and graduation rates and help more students achieve their academic goals. One strategy the university has used is increasing support for underserved student populations, such as first-generation college students, who are less likely to be retained and to graduate (Texas A&M University Data and Research Services, 2019).

In fall 2016, the Texas A&M Office of the Provost released a call for proposals for development grants to create new support opportunities for first-generation college students. The University Libraries partnered with the Department of English and Transition Academic Programs, the campus department that handles provisionally-admitted students, to propose a pilot program for members of the Texas A&M University TEAM program. The TEAM program is a provisional admission program that co-enrolls students at

Texas A&M and at the nearby community college, Blinn College. TEAM students are permitted to take only a limited number of credits at Texas A&M each semester, and due to the scheduling challenges of taking courses on two campuses, they may have a difficult time enrolling in high-demand courses such as ENGL 104. ENGL 104 is the university's composition and rhetoric course, which many students are required to take. The Libraries, along with English and Transition Academic Programs, were awarded a development grant to create a librarian-taught, information literacy-infused section of ENGL 104 specifically for first-generation TEAM students.

 As part of the project, the researchers designed a robust assessment plan that included test-based skills and an assessment of student learning artifacts. It was important to the researchers to assess the efficacy of the information literacy approach and to better understand if there were differences in the information literacy knowledge and skills of first-generation college students and other student populations. This article shares findings from one facet of the ENGL 104 TEAM project assessment plan, which specifically focused on exploring student information literacy knowledge and skills. This facet of the assessment plan provided insight into the initial information literacy skills of students as they entered the course, an important baseline analysis of different student populations. In addition, the pre/posttest analysis illustrated changes in students' information literacy skills after instruction.

ENGL 104 TEAM Section

Traditional ENGL 104 sections received information literacy instruction in the form of a one-shot instruction session, similar to the type of library instruction commonly provided to first-year composition courses. These one-shots typically focused on foundational information literacy skills such as search strategies, evaluating sources, and citing sources. The ENGL 104 TEAM sections piloted a completely different approach. The researchers, all of whom are librarians and have academic backgrounds in English, opted to serve as instructors of record for the TEAM section. This model afforded librarians the opportunity to more deeply understand the ENGL 104 curriculum and uncover new opportunities to integrate information literacy elements into the existing standard composition course content. The

researchers theorized that this model would provide them with the opportunity to build up and reinforce the information literacy skills typically taught in ENGL 104 one-shots. They also anticipated that the sections would allow them to keep the existing ENGL 104 learning outcomes while also introducing more complex information literacy concepts and skills than are usually covered in a one-shot, such as algorithm bias and intellectual property.

The ENGL 104 TEAM curriculum was based upon the standard curriculum provided to all new ENGL 104 instructors. The researchers reviewed the standard textbook, syllabus, assignment sheets, and rubrics to identify potential areas for insertion of information literacy skills. They identified areas where composition and rhetoric skills overlapped with information literacy skills. For example, the researchers identified the segment of the curriculum on the rhetorical situation and evaluating rhetoric as an ideal location to embed content on source evaluation. They revised the course syllabus to include additional information literacy-related readings and assignments on topics such as algorithm bias, search strategies, and information ethics. Similarly, the researchers revised the assignment sheets and rubrics for the sections' major writing assignments to increase the focus on information literacy. For example, the annotated bibliography assignment sheet and rubric were modified to increase the focus on search strategies and evaluation of source credibility. To maintain close alignment with the ENGL 104 curriculum, the instructors made modifications to the existing instructional materials that originated out of the English department. For that reason, the materials include the intellectual property of others and are not included as appendices to this study. The researchers then taught the 3-credit, semester-length sections using the information literacy-infused syllabus and materials, once in the fall semester and again in the spring semester.

Literature Review

This study brought together two current topics in information literacy education, focusing on first-generation student success and integrating information literacy learning into composition classrooms. The

first element, focusing on first-generation student success, comes from an institutional, but also a national, effort to retain students such that they complete college degrees in a timely fashion. Research suggests that connections between provisionally-admitted students and academic support services effect student persistence (Logan, 2017, pp. 118-119). Some academic libraries have been seeking to find ways to serve first-generation or provisionally-admitted college students better. Such efforts have happened in a variety of ways, from trying to better understand the needs of first-generation students to altering classroom and library practices and policies.

One of the most pressing problems facing those trying to better serve first-generation students has been finding the best method to help them succeed. David Tyckoson (2000) suggested that library educational offerings and practices should be adapted to serve first-generation students by being more mindful of schedules, responsibilities, and cultural conflicts (pp. 100-104). Investigating the everyday information-seeking behaviors of first-generation students, Stacy Brinkman, Katie Gibson, and Jenny Presnell (2013) found that first-generation students felt excluded in their searches for non-academic information about college life and offices, and that sometimes that feeling of exclusion extended to the library (p. 648). Adriana Parker (2017) indicated that at her institution first-generation students had some barriers to using the library, but that being an embedded librarian in a special program for those students helped to lessen those barriers (p. 29). Incorporating information literacy instruction into programs designed for first-generation students could help support their academic development (Arch & Gilman, 2019, p. 1003). While themes of first-generation students working at a deficit appeared in LIS literature on the topic, there were also studies that indicated that first-generation students are capable researchers (Ilett, 2019, p. 187). Rejecting the deficit view of student information abilities is an important aspect of critical information literacy, and it requires that librarians examine how culture influences learning and what strengths varying student populations possess (Tewell, 2020, p. 152; Heinbach et al., 2019).

Two studies from Firouzeh Logan and Elizabeth Pickard suggested that first-generation students had research experience they acquired before coming to college (2012, p. 113), and they developed further

information literacy skills as they moved from their freshman to senior years (2013, p. 411). These studies are helpful to better understand how first-generation students view and develop their own information-seeking skills. It is not clear in the literature, however, if or how the information literacy practices of first-generation students differ from the general student population.

The researchers in this study focused on an introductory composition course because of the willingness of the composition program administrators to collaborate on the project, the large number of students enrolled in the course, and the researchers' own expertise and backgrounds in English and composition. Previous collaborations between writing programs and libraries include those that measured the correlation between information literacy learning and grades or performance on composition assignments (Kim & Dolan, 2017; Shao & Purpur, 2016; Rinto & Cogbill-Seiders, 2015), with studies finding positive correlations. Librarians have also partnered with English professors to incorporate study skills into bridge programs for provisionally-admitted students, with librarians perceiving the need for targeted information literacy instruction for this population (McDermott, 2005).

There have been a wide variety of collaborations between composition programs and libraries. Often librarians have taught one-shot classes for composition courses, but a number of places have played with that model by embedding information literacy into the composition curriculum (Deitering & Jameson, 2008), integrating information literacy and composition courses (Burgoyne & Chuppa-Cornell, 2015), and even creating a common vocabulary that transfers between composition and information literacy (Carter & Aldridge, 2016). However, the researchers in this study had an unusual collaboration with the composition program, in that the librarians (who are library faculty) were the sole instructors of the semester-long composition course sections.

Methodology

As a first step in understanding the information literacy skills of the first-generation students, the researchers decided to seek grant funding to administer a commercially available, standardized information literacy skills test. A standardized test alone does not give a full picture of the information literacy skills of the student populations under consideration. However, the results of the standardized assessment will be combined with rubric-based assessments of student papers, in-class observations, and teacher reflections on pedagogical methods to form a mixed methods analysis during the next phase of assessment. This study presents the results from the first phase, standard information literacy test scores.

The researchers chose Project SAILS (Standardized Assessment of Information Literacy Skills) as a tool in this study because it was expressly designed to measure information literacy skills and norms (Project SAILS, n.d.a). The test was based on the *ACRL Information Literacy Competency Standards for Higher Education* (Project SAILS, n.d.a) and has been used to assess information literacy learning after instruction through pre and posttests (Summey & Cane, 2017, p. 163; Cowan et al., 2016). It has also been employed to measure information literacy skills among differing student populations at a single institution (Tong & Moran, 2017) and among students at differing institutions (Detlor et al., 2011).

At the time in which Project SAILS was selected for this study, the *Standards* were in the process of being sunset by ACRL and the new *Framework for Information Literacy for Higher Education* (Association of College and Research Libraries, 2016) was being adopted as the new professional standard. Even though the *Standards* are no longer the official document that guides the library profession's information literacy efforts, the specific skills that the *Standards* address remain salient in both the *Framework* and in the classroom. In addition, no other comparable test was available at the time this study was designed. The successor to Project SAILS, the Threshold Achievement Test for Information Literacy (TATIL), was still in the process of being validated and all modules were not yet available for testing. Further, Project SAILS provided a level of granularity with the data that was

necessary to analyze individual student responses. Unlike TATIL, which provides only aggregate scores, Project SAILS afforded the researchers the ability to drill down into individual student scores on specific test questions to identify challenges with specific concepts or skill sets.

The individual scores assessment from Project SAILS included 55 multiple-choice questions and provided a mean information literacy score for each individual test taker. Project SAILS defined any mean score over 70% as achieving Proficiency and 85% as Mastery. In addition to the composite mean, test questions were assigned to one of eight skill sets (Project SAILS, n.d.b) as seen in Table 1. Mean test scores for the eight skill sets could be analyzed to provide a more nuanced evaluation of information literacy skills.

Table 1: Project SAILS Skill Sets

SAILS Skill Sets	Example Concepts
Using Finding Tool Features	Understanding operating systems (i.e. database features), including help features, save features, etc.
Developing a Research Strategy	Selecting and narrowing a topic, brainstorming keywords
Searching	Boolean operators, controlled vocabularies, search strategies
Documenting Sources	Understanding format, distinguishing between citations by format
Evaluating Sources	Distinguishing sources by quality
Retrieving Sources	Finding a source online or in print, physically, electronically, or via interlibrary loan
Selecting Finding Tools	Choosing the right source for the information need, understanding free vs. subscription
Understanding Economic, Legal, and Social Issues	Understanding copyright, fair use, plagiarism, licensing, etc.

In order to investigate any change in information literacy skills, the researchers decided to employ a pre/posttest model over one academic year, fall 2017 and spring 2018. Students were enrolled in a one semester course in either the traditionally taught ENGL 104 or the TEAM ENGL 104 sections. Each semester, students were administered a pretest during the first few weeks of the semester and a posttest in the weeks preceding final exams.

There were two versions of the individual scores assessment test from SAILS. Both tests included the same number of questions but validated to different outcomes in the *Information Literacy Competency Standards for Higher Education*. Carrick Enterprises, the company behind Project SAILS, reported a very high correlation (0.98) between the two tests, established through correlation analysis, and that the two tests "are parallel and can be used interchangeably" (Project SAILS, n.d.b). Students were administered the individual scores test version 1 as the pretest and individual scores test version 2 as the posttest. The decision to administer the two different tests was intentional. Though the two tests of Project SAILS are considered interchangeable, each test includes unique questions. By using both test versions, the researchers would be able compare total test scores but also be able to drill down into responses on individual questions to identify specific problem areas. By administering both tests, the researchers could get a more robust picture of the information literacy skills of the students in the study.

After receiving approval from the campus Institutional Review Board, the researchers requested access codes for approximately 630 tests from Carrick Enterprises. Two distinct populations of students were tested: first-generation, provisionally admitted students enrolled in the librarian-taught ENGL 104 TEAM sections and a comparison group of both first-generation and continuing-generation students enrolled in the traditionally taught ENGL 104 sections. Participation in the study was voluntary. Students in the TEAM sections who consented to participate in the study took the test during class time for course credit as a part of their curriculum. Students who were under the age of 18 or who did not consent to participate were not penalized. They received an alternate assignment to complete at the same time as the study was administered for equivalent course credit.

Students in traditional ENGL 104 sections were recruited when the researchers visited their regularly scheduled classes to deliver the invitation to participate. For these sections, participation in the SAILS test was an out-of-class activity for which their instructors could offer extra credit for participation. Many instructors did choose to offer extra credit, though some did not and relied on the incentive of a drawing for gift cards, which was available to all participants. In the traditional ENGL 104 sections, students over the age of 18 who wished to participate were asked to sign a consent form, which recorded student names and emails so participating students could receive extra credit, if applicable, and pre and posttest scores could be matched. This work was done by the researchers, as Project SAILS does not collect identifying information about any student. Once students signed the consent form, they were provided with directions to take the test, including their assigned access code and the website address for the test.

Demographics

The primary goal of the analysis was to compare students from the fall 2017 and spring 2018 semesters in the TEAM sections (47 students enrolled over two semesters) vs. the traditional ENGL 104 sections (approximately 2,435 students enrolled over two semesters). The data had to be significantly culled to reach a valid dataset. In total, 629 signed consent forms were gathered from students in both section types over two semesters. Of those consenting participants, 374 students (54% participation rate) completed either a pretest or posttest or completed both, for a total of 579 completed tests. However, researchers invalidated 35 tests for inadequate time, less than 300 seconds, spent taking the test. Seventeen additional tests were removed for tester error or inconsistent demographic information.

The final data set included 169 valid pre/posttest pairings for analysis, thus 169 unique student participants. Forty of those students were in the TEAM group, the group in which students were both first-generation and provisionally admitted. The remaining 129 pre/posttest students were enrolled in the traditional ENGL 104 sections. The majority of tests returned belonged to freshmen (n=119). The second largest number of tests were returned by sophomores (n=46) and a small number of tests were associated

with juniors (n=4). For the purpose of analysis, sophomores and juniors were combined to create a larger

dataset (n=50). In addition, students were asked to identify the level of educational attainment that best

described their parents/guardians. Their responses were used to code their status as first-generation

students. There was an approximately even split between first-generation and continuing-generation

students in the dataset, at n=86 and n=83 respectively. Table 1 shows the breakdown of class standing and

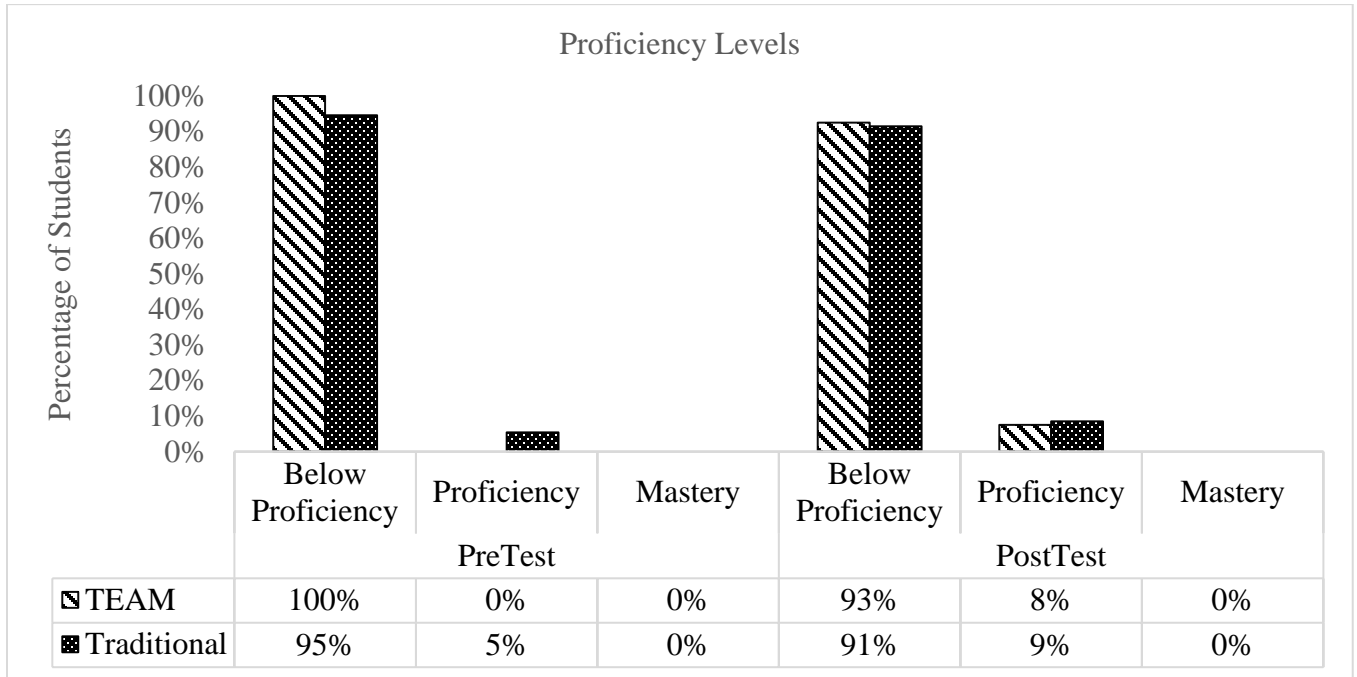first-generation status by enrollment in the TEAM versus traditional ENGL 104 sections.

Figure 1: Demographics
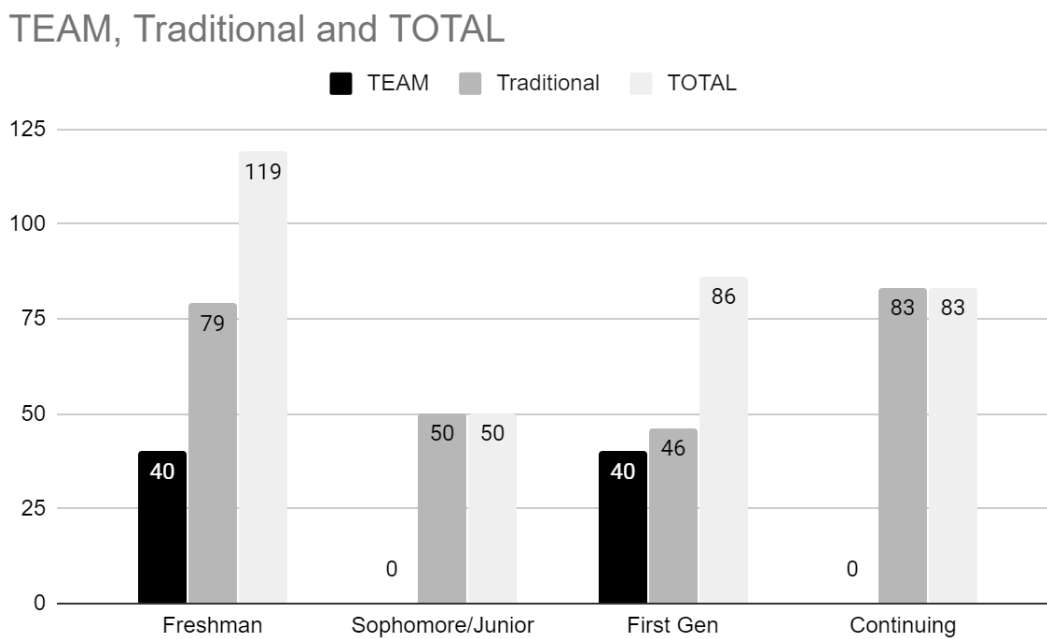
Results

The researchers first wanted to know how many of the students passed the minimum cut score defined by

Project SAILS at Proficiency level (70%) and Mastery level (85%) scores (Figure 2). No student, first

generation or continuing generation, tested at a Mastery level on either the pretest or posttest. Only 21 of

169 individual students (12%) achieved a mean score that qualified as proficient on either the pretest or

posttest.

Figure 2: Proficiency Levels

	Below Proficiency	Proficiency	Mastery	Below Proficiency	Proficiency	Mastery
		PreTest			PostTest	
⬚ TEAM	100%	0%	0%	93%	8%	0%
▦ Traditional	95%	5%	0%	91%	9%	0%

Of the students whose score met the Proficiency threshold, 7 students tested at the Proficiency level during the pretest. All of these students were enrolled in the traditional ENGL 104 sections, and one of these seven students identified as a first-generation college student. In contrast, 18 students tested at the Proficiency level on the posttest. Of the seven students who tested at a Proficiency level on the pretest, four also tested proficient on the posttest while three tested below the Proficiency level. Fourteen students did not test at the Proficiency level on the pretest but reached the Proficiency level on the posttest. Three of these students were from the TEAM sections, and 11 were from the traditional sections. Interestingly, six of the students from traditional sections who achieved Proficiency for the first time on the posttest identified as first-generation college students. The number of students that tested at the Proficiency level was so small (12%) that further statistical analysis as a subgroup was not possible. It is noteworthy that, though a higher percentage of students in the Traditional sections (9% vs. 8% in the TEAM section) scored as proficient on the posttest, the TEAM students showed greater change over time from the beginning to the end of the semester.

Next, the researchers loaded test results into SPSS for analysis. Pretest scores for fall 2017 and spring 2018 semesters were combined because the sample sizes for each semester were too small for analysis. The combined pretest scores represent a dataset for individual scores test 1, assessing students' information literacy skills at the very beginning of their semester. Posttest scores for the fall 2017 and spring 2018 semesters also were combined and represent a dataset for individual scores test 2, indicating students' information literacy skills at the end of their semester in ENGL 104.

Establishing Benchmarks

A one-way analysis of variance (ANOVA) was used to compare mean scores for the datasets against three different student characteristics:

1. if the students were enrolled in the TEAM sections vs. traditional ENGL 104 sections,
2. their class standing as a freshman or sophomore/junior, and
3. their status as first-generation college students.

In addition, a one-way ANOVA was also run on the eight skill sets to discover any statistically significant variance amongst groups. The verbal noun that begins each of the eight skill sets (Using, Developing, Searching, etc.) was used to represent the skill set in the data tables that follow. A *p* value of *p*<0.05 was set for the level of significance for ANOVA tests.

First, the researchers analyzed test scores for the TEAM vs. traditional ENGL 104 sections. As illustrated in Figure 1, the study enrolled first-generation college students both in the TEAM sections (n=40) and in the traditional ENGL 104 sections of the course (n=46). In addition to being first-generation, the TEAM students were also provisionally admitted. In order to assess if the provisionally admitted, first-generation students enrolled in the TEAM sections came into the study with different information literacy skills than students in the traditional ENGL 104 sections, the researchers reviewed the pretests using the one-way ANOVA. While there were small differences in the overall percentage scores, there were no statistically significant differences in pretest scores when comparing students enrolled in the TEAM vs. traditional

sections. Additionally, no statistically significant differences were discovered in the pretest for the eight skill sets when comparing TEAM students and students enrolled in the traditional sections. The researchers then analyzed the posttest scores using the one-way ANOVA and found no statistical differences as well. This finding suggests that TEAM students' first generation, provisional admission status likely did not correspond to lower information literacy skills.

Next, the researchers analyzed the one-way ANOVA that compared test scores based on students' status as either a freshman or upperclassman (sophomore/junior). An assumption could be made that older students may have had more exposure to information literacy instruction and would test at a higher level. However, there were no statistically significant differences when comparing freshmen to sophomore/juniors on either the pretest or the posttest, regardless of section enrollment. This finding suggests that librarians teaching one-shots for ENGL 104 should feel no specific pressure to differentiate instruction for students who are freshmen vs. students who are sophomores or juniors.

However, when running an ANOVA test for first-generation and continuing-generation students, regardless of the section of the course in which they were enrolled, some differences emerged. In the pretest dataset, first-generation students had a mean score for the Selecting Tools skill set which was 7% lower than continuing-generation students, which was statistically significant ($p=.028$). First-generation students also scored 10% lower than continuing-generation students in the mean scores for the Documenting skill set during the posttest ($p=.020$). Tables 1 and 2 illustrate the differences between first-generation and continuing-generation students using a one-way ANOVA.

Table 2: Descriptives ANOVA First Generation Status

	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean	Min.	Max.

					Lower Bound	Upper Bound		
Posttest Documenting	First Gen	86	27.9055	23.35334	2.51826	22.8985	32.9124	0.00	100.00
	Continuing Gen	83	37.3483	28.70248	3.15051	31.0810	43.6157	0.00	100.00
	Total	169	32.5431	26.46624	2.03586	28.5239	36.5623	0.00	100.00
Pretest Selecting	First Gen	86	36.2126	19.06552	2.05589	32.1250	40.3003	0.00	100.00
	Continuing Gen	83	43.0293	20.86888	2.29066	38.4724	47.5861	0.00	85.71
	Total	169	39.5604	20.20305	1.55408	36.4924	42.6285	0.00	100.00

Table 3: ANOVA First-Generation Status

		Sum of Squares	df	Mean Square	F	Sig.
Posttest Documenting	Between Groups	3766.135	1	3766.135	5.521	0.020
	Within Groups	113911.436	167	682.104		
	Total	117677.571	168			
Pretest Selecting	Between Groups	1962.592	1	1962.592	4.921	0.028
	Within Groups	66608.837	167	398.855		
	Total	68571.429	168			

Change Over Time

The one-way ANOVA was useful to analyze variance in the pretest or posttest as unique tests that

represented snapshots of student skills at a particular time in the semester. However, the researchers also

wanted to compare results from the pre and posttest scores to uncover any changes over time. Even

though the pretest and posttest included different questions, the high degree of correlation as reported by

Project SAILS indicated that test means could be compared. A paired-samples *t*-test was used to compare

pre and posttest composite scores for students that took both tests, as well as comparing sub-scores for the

eight skill sets. The level of significance was set at $p<0.05$. The same student populations were used to

analyze the data and are represented in Table 4. The entire dataset is particularly large, so only results that

were statistically significant are represented in Table 4.

Table 4: Paired Sample t-tests for Specific Populations

Population	Skill	Pretest Mean	Posttest Mean	Mean Change	Std. Dev.	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
							Lower	Upper			
TEAM Students		50.63%	54.45%	3.82%	8.15%	1.29%	1.21%	6.42%	2.962	39	0.005
All Traditional Section ENGL 104 Students		50.75%	52.30%	1.56%	14.34%	1.26%	-0.94%	4.05%	1.232	128	0.220
First-Gen Students in Traditional ENGL 104 Sections	Total	49.40%	51.54%	2.14%	13.90%	2.05%	-1.99%	6.27%	1.044	45	0.302
Continuing-Gen Students in Traditional ENGL 104 Sections		51.66%	52.99%	1.23%	14.65%	1.61%	-1.97%	4.43%	0.766	82	0.446

TEAM Students	Documenting	48.12%	28.33%	-19.79%	29.26%	4.63%	-29.15%	-10.43%	-4.278	39	0.000
All Traditional Section ENGL 104 Students		50.68%	33.85%	-16.83%	34.46%	3.03%	-22.83%	-10.83%	-5.547	128	0.000
First-Gen Students in Traditional ENGL 104 Sections		49.73%	27.53%	-22.19%	28.01%	4.13%	-30.51%	-13.87%	-5.373	45	0.000
Continuing-Gen Students in Traditional ENGL 104 Sections		51.32%	36.47%	-13.86%	37.38%	4.10%	-22.02%	-5.69%	-3.377	82	0.001
TEAM Students	Selecting	38.21%	60.50%	22.29%	25.07%	3.96%	14.27%	30.30%	5.622	39	0.000
All Traditional Section ENGL 104 Students		39.98%	62.02%	22.04%	30.05%	2.65%	16.80%	27.27%	8.33	128	0.000

First-Gen Students in Traditional ENGL 104 Sections		34.47%	62.61%	28.14%	31.46%	4.64%	18.79%	37.48%	6.066	45	0.000
Continuing-Gen Students in Traditional ENGL 104 Sections		43.03%	62.12%	18.66%	28.88%	3.17%	12.35%	24.96%	5.886	82	0.000
TEAM Students		45.50%	58.74%	13.25%	26.93%	4.26%	4.64%	21.86%	3.112	39	0.003
All Traditional Section ENGL 104 Students	Retrieving	51.47%	52.45%	0.983%	29.58%	2.60%	-4.17%	6.14%	.377	128	.707
First-Gen Students in Traditional ENGL 104 Sections		50.43%	53.62%	3.19%	31.64%	4.66%	-6.21%	12.59%	0.684	45	0.498
Continuing-Gen Students in Traditional		52.00%	52.35%	0.35%	29.03%	3.15%	-5.91%	6.61%	.112	84	.911

ENGL 104 Sections										
TEAM Students		44.16%	53.12%	8.96%	21.92%	3.47%	1.95%	15.97%	2.585	39	0.014
All Traditional Section ENGL 104 Students		47.29%	48.93%	1.65%	26.97%	2.37%	-3.05%	6.34%	.694	128	.489
First-Gen Students in Traditional ENGL 104 Sections	Understanding	48.91%	49.46%	0.54%	27.39%	4.04%	-7.59%	8.68%	0.135	45	0.894
Continuing-Gen Students in Traditional ENGL 104 Sections		46.47%	49.41%	2.94%	26.97%	2.92%	-2.88%	8.76%	1.005	84	.318

TEAM vs. Traditional

The researchers first investigated the pre/posttest scores for students enrolled in the TEAM sections. Students in the TEAM sections, all of whom were first-year, provisionally-admitted and first-generation students, scored an average of four points higher on the posttest. The change was statistically significant (M=+4%, *p*=.005) when comparing the pretest and posttest totals. In addition to differences in the total scores, TEAM student scores indicated significant differences in several skill sets. Retrieving (M=+13%, *p*=.003), Selecting (M=+22%, *p*=.000) and Understanding (M=+9%, *p*=0.014) all experienced positive gains from the pretest to the posttest. However, Documenting (M=-20%, *p*=.000) saw a significant decline.

Next, the researchers compared pretest and posttest scores with students enrolled in the traditional ENGL sections. Interestingly, the same analysis indicated that students enrolled in the traditional ENGL 104 sections scored an average of 2% higher between their pre/posttest scores, but the change was not statistically significant (M=+2%, *p*=.220). In addition, differences for these students appeared in two of the eight skill sets. Students in traditional ENGL 104 sections showed a positive mean gain in Selecting (M=+22%, *p*=.000), while they showed a mean loss in Documenting (M=-16%, *p*=.000).

First-Generation Status

There were several factors that make the TEAM sections unique. One important factor was that the students in the TEAM sections were all first-generation college students. There was a comparable number of self-reported first-generation students from the traditional ENGL 104 sections (n=46). This was helpful, as it allowed the researchers to compare the test results from the first-generation, provisionally-admitted students enrolled in the TEAM sections with test results from first-generation students enrolled in the traditional ENGL 104 sections.

As discussed earlier, students in the TEAM sections had statistically significant gains (M=+4%, p=.005) when comparing the pre and posttest totals. First-generation college students in the traditional sections of ENGL 104 demonstrated more limited gains. There were no statistically significant changes in their total test scores. However, from the pretest to the posttest, first-generation students in traditional ENGL 104 sections showed improved scores in the skill set Selecting (M =+28%, p=.000) and lower scores in Documenting (M=-22%, p=.000).

The data set also included a substantial number of continuing-generation students in the traditional ENGL 104 sections (n=83). These continuing-generation students had similar results to first-generation students in the traditional ENGL 104 sections; there were no significant differences between their pre/posttest total scores. However, from the pretest to the posttest, continuing-generation students in traditional sections showed improved scores in Selecting (M=+19%, p=.000) and lower scores in Documenting (M=-15%, p=.000).

Interesting patterns emerged in the pre/posttest data analysis. The Documenting skill set showed dramatic declines for all students, regardless of which section they were enrolled in or their first-generation status. Meanwhile, Selecting had a similarly significant increase in test scores for all students. The results in these two skill sets were consistent for TEAM students, first-generation students in traditional sections, and continuing-generation students in traditional sections. Only students in the TEAM sections showed statistically significant gains in overall test scores and in the Retrieving and Understanding skill sets.

Discussion

After reviewing the data from the SAILS scores, several themes emerged from the analysis, largely concerning the information literacy learning levels of first-generation and continuing-generation students. While some of the findings were anticipated, such as increases in some SAILS testing areas in the

librarian-taught sections, others were not predicted, such as the information literacy proficiency levels of the general ENGL 104 student population.

Special Populations

This study was intended to help the researchers better understand the information literacy skills of specific populations commonly found in ENGL 104 sections. The SAILS project revealed that there did not appear to be substantial differences amongst the student populations when looking at only one test administration, either pre or posttests. Indeed, the majority of students in all studied populations tested at the Below Proficiency level in both the pretest and the posttest. This finding supports the generally understood notion that all students need information literacy instruction.

There is one skill set in which the scores of first-generation students, regardless of the section in which they were enrolled, appear to diverge from their continuing-generation counterparts. On the pretest given during the first weeks of the semester, first-generation students' scores were significantly lower in the Selecting category. This skill set concentrates on the knowledge and skills that students need to identify databases, indexes, collections, and tools necessary for a given topic. While all student populations demonstrated significant gains in the Selecting skill set over the course of the semester, first-generation students showed unique gains by closing the gap in this skill set when compared to their continuing-generation peers.

In the posttest results, first-generation students also scored significantly lower in the Documenting category, which measures skills such as citation formatting. While all student populations saw a decline in their mean scores for the Documenting category from the pre to post test, the one-way ANOVA on the posttest indicates that the decline was particularly significant for first-generation students as compared to continuing-generation students. The data does not reveal why first-generation college student scores may have been lower in these particular areas. This is an area for future research, as it could have implications

for librarians providing instruction in courses and learning communities aimed at first-year, first-generation college students.

The goal of this study was to measure a change over time in information literacy skill gains. Though scores in two categories were lower for first-generation students than continuing-generation students, there is not sufficient evidence to suggest any "deficit" in student ability, since there is not a clearly established causal relationship. Indeed, given the uniformly low scores for all student populations, information literacy instruction is necessary for all students. Rather than considering any population to have deficits, this study shows how targeted programming can support groups that are underserved.

Librarian-Taught Instructional Approach

One of the primary purposes of this project was to determine whether their librarian-taught instructional approach to information literacy in a composition course made a measurable difference in student information literacy skills. The researchers anticipated that the additional information literacy instructional opportunities afforded to them in their role as instructors of record would result in information literacy gains for the TEAM students that were not anticipated in traditional ENGL 104 sections, which received information literacy instruction via the one-shot instructional model. The results supported this hypothesis. TEAM students did not score differently than other populations in the pretest, suggesting that students' information literacy skills were comparable at the beginning of the study. This also has the broader implication that librarians should not employ a deficit model when working with first-generation, provisionally admitted students. Posttest results revealed that students enrolled in the TEAM sections outperformed other students in the traditional sections on the posttest and were the only population to show a statistically significant gain in overall pre/posttest scores (M=+4%, *p*=.005). While the gain was small, at a mean of 4%, it was statistically significant and notable for an intervention that lasted only one semester. No other population demonstrated an overall gain from the beginning to the end of the semester. The TEAM students' overall increase in information literacy scores suggests that students

participating in a course which embeds information literacy content into the curriculum do indeed show information literacy gains that exceed those in students that only received a one-shot instruction session. Indeed, the results highlight the limitations of the one-shot instructional method and support the concept that information literacy is a complex set of skills that students must continually practice throughout their curriculum. Should embedded information literacy instruction extend beyond one semester, the researchers posit additional information literacy gains would be possible.

Students enrolled in the TEAM sections also differed from other study populations in the testing of specific information literacy skill sets. All student populations tested, including TEAM and traditional section students, first-generation and continuing-generation students showed a statistically significant difference in their pre/posttest results in two skill sets: a gain in Selecting and a loss in Documenting. However, only the TEAM students demonstrated statistically significant gains in the Retrieving and Understanding categories (see Table 4). The Retrieving category included topics such as accessing print and electronic sources, using call number systems, and understanding interlibrary loan. The Understanding category included topics related to plagiarism, copyright and fair use, and the cost of information. Due to the extremely limited time available in the traditional ENGL 104 instructional environment, these information literacy skill sets are only touched upon in the standard single class, one-shot lesson plan for ENGL 104. However, librarians serving as instructors of record have more of an opportunity to cover these concepts in the semester-long TEAM sections of ENGL 104 by interweaving them in the curriculum. The specific gains for TEAM students in the Retrieving and Understanding categories suggest that having a semester-long composition course taught by librarians does make a difference in student proficiency because it provides extended opportunities for instruction in additional information literacy skills and concepts beyond what is feasible in a one-shot instruction session.

Specific Skills for All Populations

Further analysis of the individual test questions in each skill set could be a powerful way to mine the data for additional information on student learning. For this study, the two skill sets that were of particular interest were Selecting and Documenting. The skill set for Selecting saw double-digit increases in the means for every population studied. In order to understand where students might struggle, the researchers looked at individual questions in the skill set, particularly those in which the mean score for all participants was below 30%. In the pretest, there were two questions that were difficult for students to answer correctly. The first question asked students to identify the best format for background information, specifically selecting a type of reference material. The mean for this question was only 21%. The second question asked students if information at the library and on the internet were both free. The mean score was 25% on the pretest. Students did not experience significant struggles (below 30% mean) with any of the questions from the Selecting skill set on the posttest. This may suggest that there are some common and specific skills gaps that students from all backgrounds bring to the library instruction classroom, and that library instruction can be an effective way to close those gaps.

Unfortunately, some skill sets showed decreases. In particular, Documenting showed a decline for all populations. Of the three test questions assigned to this skill set in the posttest, two of them asked students to look at a citation and identify the format of the object. The first citation was a chapter in an edited book and the other was a book chapter by a singular author. Students did very poorly on both questions, scoring a mean of 25% and 28% respectively. As with the Selecting category, these results may indicate a specific and common skills gap, but one that is not included in the library instruction for ENGL 104. Like many other composition courses, students in ENGL 104 complete a research paper that requires the use of electronic journal articles, and many students do not use books and book chapters. This finding suggests that librarians should consider whether revising the library curriculum for ENGL 104 to include a broader variety of source types might be beneficial to students.

Limitations

This study had several limitations. First, this was a study unique to Texas A&M, and its findings are not generalizable to other institutions. Second, there were limitations in the study's methodological choice of Project SAILS, as discussed in the methodology. Standardized tests also have a limited capacity to assess information literacy knowledge, skills, and capacities given the highly contextual and nuanced nature of information literacy. Multiple choice information literacy tests are limited in their ability to measure the application of information literacy skills. As the next phase of this project, the researchers will be applying a rubric to the assessment of student writing in the TEAM and traditional ENGL 104 sections. Using both the data from Project SAILS and the rubric analysis of student writing, the researchers hope to obtain a rich picture of the information literacy skills of these students.

There were also limitations related to the specific implementation of the Project SAILS assessment. There were inherent differences in some of the student populations studied. While the student demographic data collected included first-generation status, it did not include the type of admission. Students in the traditional ENGL 104 sections were identified only by class standing and first-generation status, but TEAM students were identified by class standing, first-generation status, and provisional admission. It is possible that there could have been provisionally admitted students in the traditional ENGL 104 sections. First-generation student comparisons for traditional ENGL 104 sections included both first-year and upperclassmen. This study also included variations in how the tests were implemented; the TEAM sections took the test in-class, while the students enrolled in the traditional ENGL 104 sections took the test out-of-class. This variation could have affected test scores. In addition, some of the gains measured were quite small. When scores are low in the initial pretest, any change can feel like a victory, but how a student performs on a multiple choice test does not necessarily equate with the information literacy skills they employ during actual research.

The researchers also had limited ability to draw conclusions based on differences in scores from the pre to the posttest because two different tests were implemented. This choice was deliberate, as each test maps to different outcomes and objectives in the *ACRL Standards*. As the primary purpose for this study was programmatic improvement, the researchers wanted to get a baseline assessment of the full scope of the information literacy skills of this population, which could only be achieved by administering both tests. While the tests included randomized questions in each of the eight skill sets, the overall means reflect a generalizable score of information literacy that is comparable. However, measuring gains from one very unique skill, such as how to identify a book chapter citation, from the pretest to the posttest was not possible.

Next Steps

Following this study, the University Libraries has been refining its instruction program. The results of the study informed these efforts in several ways. First, this study served as an advocacy tool for librarians as they talked with stakeholders inside and outside the library. Providing targeted and intensive library instruction, especially at a very large campus, was a significant time commitment, and the researchers needed to justify the continued investment of library resources to these efforts. This study provided that justification. Students enrolled in the TEAM sections showed statistically significant information literacy gains that were not present in their peers in traditional sections by the end of the semester. This suggests that targeted and intensive interventions for first-generation students can be highly impactful, even if limited in duration to a single semester. The researchers use this data in discussions with library and campus administrators to make the case for continued and additional information literacy support for first-generation college students.

Second, the researchers have used the results of this study to advocate for continued investment in the ENGL 104 TEAM sections. The TEAM sections used an innovative instructional model in which librarians were the instructors of record for the TEAM sections of the composition course. This

instructional model is highly time intensive, but it affords librarians abundant opportunities to embed information literacy directly into the composition curriculum. The researchers have used study results, which indicate that students in the TEAM sections demonstrate gains in information literacy skills not seen in other ENGL 104 students, in conversations with administrators in the library, English department, and TEAM program about future iterations of the section.

The findings of this project also have informed the University Libraries' instruction program in other ways. In order to improve the scalability of the ENGL 104 TEAM project, the researchers have shared the lesson plans, activities, and other ancillary materials developed for the TEAM sections with all ENGL 104 instructors, enabling them to see exactly where and how the researchers embedded information literacy into the composition curriculum. This project also led to a new collaboration between the Libraries and the English department to adapt a composition/information literacy Open Educational Resources (OER) textbook.

Finally, this study provided the University Libraries with information that they could share with ENGL 104 stakeholders in order to advocate for increased instruction opportunities. Student overconfidence is a topic that has been discussed recently in the literature (Angell & Kose, 2015; Mahmood, 2016; Molteni & Chan, 2015; Gross & Latham, 2012; Gustavson & Nall, 2011; Gross & Latham, 2007). However, the overconfidence of instructors in their students' information literacy knowledge and skills has been less discussed. The university where this study was conducted has a reputation as a selective public research university. Students are very proud to be admitted to the university, and many of the undergraduate students are in the top 10% percent of their graduating high school class, owing to Texas House Bill 588, which states that the top 10% of graduating seniors in Texas are automatically admitted to the state-funded school of their choosing (Texas House Bill 588, 2007). Instructors of ENGL 104 occasionally remark on the strong skills and abilities of the students here at the university. Despite this general perception of student proficiency, only 12% of the Project SAILS test scores in this study, including both the pre and posttests, passed the cut score of 70% for information literacy proficiency. As the first

standardized information literacy test administered on our campus, this study has been useful in helping librarians address the false idea that our admitted students no longer need information literacy instruction because they were high achieving in high school. The researchers have used the results of this study to discuss student information literacy skills and advocate for embedding library instruction into all sections of ENGL 104.

Conclusion

Information literacy is a cornerstone of academic librarianship. As conversations in higher education continue to push libraries to consider the value of our work, assessing the impact of information literacy instruction is a necessity that librarians cannot ignore. Furthermore, understanding how information literacy instruction affects students from different populations and backgrounds will help guide librarians' efforts in the classroom and in collaboration with campus initiatives. This study was the first phase of a mixed-methods assessment project to understand the information literacy skills of our university's first-year composition students, paying particular attention to any differences for first-generation and provisionally-admitted students.

This initial study suggests that most ENGL 104 students, regardless of first-generation status, test well below a proficient score for information literacy skills. The data collected also indicates that the instructional method matters. While one-shots remain a common element of information literacy instruction, this study supports the common finding in the literature that a more robust and integrated method of information literacy instruction leads to increased gains. Having librarians develop and teach semester-long disciplinary courses leads to a curriculum that positively impacts students' information literacy skills. The first-year composition curriculum has many places to embed information literacy concepts alongside rhetoric and composition concepts, and librarians should continue to advocate for richer instructional opportunities in this space.

Finally, this study has provided our library with valuable insight and data on how information literacy programming may aid in the academic success of underserved student populations. First-generation college students are an underserved population on many college campuses, including at Texas A&M, where they are a key focus of our campus student success initiative. This study suggests that additional research is needed in the information literacy skills of first-generation college students. In the meantime, libraries should consider whether their information literacy instruction programs are supporting these populations and helping them to reach their maximum potential.

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