How Information Literate Are They?

A SAILS Study of (Mostly) First-Year Students at the U of L

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Introduction

In today's new normal of incessant, immersive, "instant" information, to what extent do students navigate their academic studies in information literate ways? Since information literacy (IL) is a core concern of librarianship, gauging the effectiveness of our IL teaching efforts is of perennial interest to librarians and educators. In our study we set out to measure U of L students' IL skill levels before and after receiving IL instruction to see if our teaching seems to make a difference. With the goal of informing our teaching practices, we conducted a pre- and post-test study of mainly first year students' IL abilities. We hoped to identify areas of strength that they likely possessed on entering university, as well as areas that may be ripe for focused IL instruction intended to help students expand and hone these essential, life-enriching skills and abilities.

IL is one of those elusive concepts in education. As with "liberal education," almost everything about IL is contested, including what to properly call it, its meaning, validity, scope, and its worthiness as a stand-alone discipline. But most educators and librarians interested in IL would agree that it is a foundational set of interdependent, habitually exercised abilities and informed understandings that:

a) enable someone to find, evaluate, and successfully apply information to address particular goals or needs, and

b) guide ethical use of information in the creation of new knowledge.

Sixteen years ago, the U.S.-based Association of College and Research Libraries (ACRL) adopted a document entitled *Information Literacy Competency Standards for Higher Education* providing "a framework for assessing the information literate individual" (2000, p. 5). The competencies comprise five standards and 22 performance indicators requiring both lower order and higher order thinking skills. The ACRL standards are now widely used to guide information literacy programming, instruction, and assessment.

Over the past few years there has been a movement to evolve conceptions of IL from specific competencies that students need to acquire and perform to a more nuanced perspective. The resulting document, *Framework for Information Literacy for Higher Education,* was adopted by the ACRL in January 2015. It focuses on six frames, or threshold concepts, through which students must pass in order to become information literate. It views IL as a metaliteracy dependent on learners' "behavioral, affective, cognitive, and metacognitive engagement with the information ecosystem" (2015, p. 2).

In the new framework, IL instruction focuses less on skill acquisition and more on helping students develop understandings of underlying knowledge practices and dispositions that, in turn, foster information literate abilities and thinking processes. But both the older competency standards and the new framework encompass the idea that IL requires lower-order and higher-order thinking, with a greater emphasis on the latter in the new framework.

SAILS Standardized Test

SAILS stands for Standardized Assessment of Information Literacy Skills. It is a widely recognized validated information literacy test that consists of 45 multiple-choice questions that evaluate students' IL competencies in eight skill set areas of the ACRL standards. SAILS is currently available in two basic forms: individual testing and cohort testing (Project SAILS, 2016).

Just by chance, one of the researchers in our group won a door prize at a library conference that consisted of a free administration of SAILS for up to 5,000 students. The free testing started us on the path to this research project. We decided on a pre-test/post-test project, and applied for a Teaching Centre Teaching Development Fund grant to pay for the second administration (the post-test) of SAILS. We are very grateful to have been awarded the grant, which enabled us to carry out our research during the Fall 2015 semester.

If we had actually set out to choose a standardized IL test for our project, would we have chosen SAILS? Perhaps not, but the available choices are relatively few. In terms of reliable, validated instruments mapped in some fashion to ACRL's IL competency standards, we know of only a handful of other tests. All were developed in the U.S. and therefore likely reflect U.S.-centric test questions. In contrast, SAILS was developed with participation

from six Canadian academic libraries, and the cohort test became available worldwide in an international version in June 2014.

As two of the researchers were deeply involved in teaching IL components in U of L's first-year, multi-disciplinary courses Liberal Education 1000 and Writing 1000, and most of the instructors of these courses agreed to participate in the study, we decided to use the SAILS test with these groups of students.

Testing in Liberal Education and Academic Writing Classes

Each of the instructors participating in our study gave one of the researchers access to the online component of their class in Moodle, so that we could insert the consent forms, test links, and related information, and communicate directly with their students. They encouraged, but did not require, their students to participate in the tests.

We ran two sessions, a pre-test and post-test, at the beginning and end of the Fall 2015 semester. For each participating course section, we placed a letter in Moodle inviting students to participate in our study. Interested students could follow a link taking them to a consent page located on the Library server. From there, they clicked through a unique URL to the SAILS server, where they completed the test. Anonymity and confidentiality were maintained as no identifying information is requested or tracked on the SAILS test server. We were greatly assisted by Jake Cameron in Library systems support, who created custom-coded Web pages to manage the consent process and assignment of SAILS ID numbers.

Student test scores remained completely inaccessible to us throughout the study. We only knew which students had completed each test (but not how they scored), in order to award them their incentives for participation.

The incentive for the students, apart from knowing that they were contributing to research, was a chance to win a draw for one of two $100 gift certificates from the U of L Bookstore. The Liberal Education students were also given a 3% bonus for completing both tests. This worked especially well, as we saw a very good participation rate among the students in this class – 61 out of 87 students completing the pre-test were from LBED 1000, and 61 out of 84 students completing the post-test were from LBED 1000. The draw alone did not seem to be sufficient incentive, as out of 10 participating sections of Writing 1000 (potentially 250 students), only 26 students completed the pre- test, and 22 the post-test.

The intervention, in the form of IL instruction, was somewhat different for each course. The Writing 1000 students had an online, five-module library course in Moodle to complete, in addition to one in-class session with a librarian. As is standard for the library component of Writing 1000, several different librarians were involved in the in-class sessions. Between the online and face-to-face components, Writing 1000 students received about two hours of instruction in total. The Liberal Education students had a series of four in-class lab sessions taught by a librarian, including some online videos to view in advance of the classes, for a total of about four hours of instruction.

Each pre- and post-test consisted of 45 multiple-choice questions, drawn randomly from a question bank of 162. The SAILS international cohort test covers seven IL skill sets:

- Developing a research strategy
- selecting finding tools
- Searching
- Using finding tool features
- Retrieving sources
- Evaluating sources
- Documenting sources

The SAILS Cohort

The SAILS international cohort test evaluates students' IL competency levels within the seven broad skill sets listed above, and reports on the results by groups. For example, for a given skill set, you can see how well the students at your institution performed in comparison to students at the rest of the institutions (grouped together), in terms of the extent to which their average scores are above or below the average scores of the entire cohort.

Test scores themselves are not reported, so you can only see how your students did in comparison to the cohort benchmark, rather than whether their actual scores were high or low. The results compare your institution to other similar institutions—in our case, doctorate institutions—who have taken the test in the past three years, and against all other institutions who have taken the SAILS cohort test.

In Fall 2015, a total of 6,370 students from 14 different institutions took

the SAILS cohort test. The cohort benchmark, however, included SAILS test results from the period spanning 2013 to 2015 (55,191 student tests). The cohort comprised 69 institutions: 11 doctorate-granting (including the U of L), 23 masters' level, 23 baccalaureate, and 12 associate or two-year degree institutions. We were the only Canadian institution to participate. Some institutions participated several times during the 2013 to 2015 cohort period, so are heavily represented in the benchmark (e.g., general baccalaureate Ashford University had 13 test sessions in the cohort, representing 33% of the total benchmark). This could throw off the results, with one school having a disproportionate impact on the benchmark.

Of the 10 other institutions in our doctoral cohort, the majority of students tested were in either first or fourth year, and the most common majors self-identified by test takers were Sciences, Management, Health Sciences, Engineering/Computer Science, Social Sciences, and Other. The majority of U of L test takers were first-year students, and the most commonly reported majors were Sciences, Education, and Social Sciences (see Figures 1 and 2). Thus, our results may not be completely comparable.

Figure 1

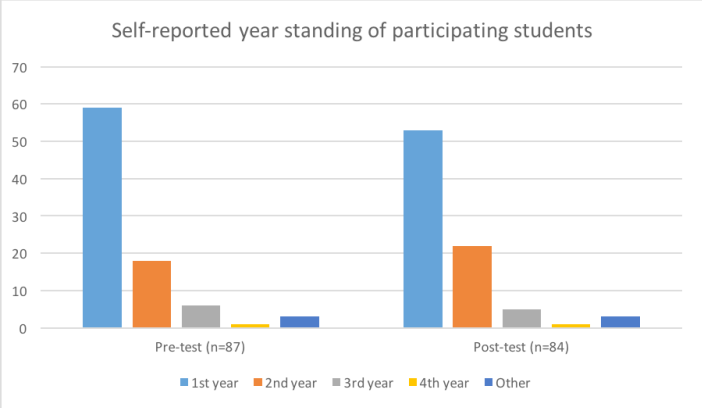
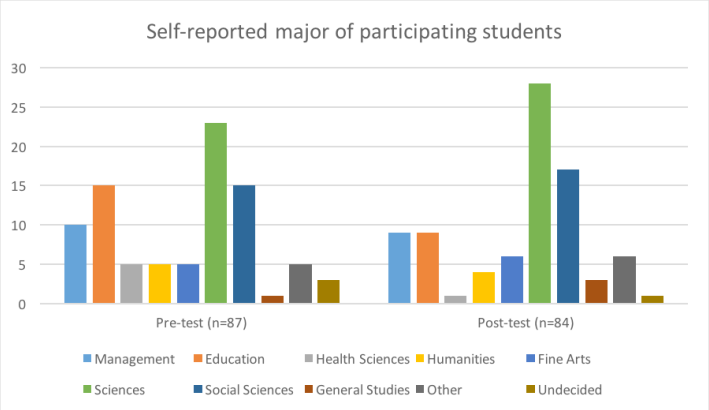


Figure 2



Results

Due to the limitations of both our small sample size and the cohort test model, we can only make a few tentative observations about our results. Because the majority (68%) of the students said they were in first year, most of our observations relate to first-year students. Overall, the test shows that our students seem to have good skills in Developing a Research Strategy and Searching. U of L students performed better than the institution-type benchmark on both of these skills in both the pre- and post-tests, so it may be the case that at least some of our students enter university with better than average skill levels in these areas.

However, while in the pre-test U of L students also scored better than the benchmark on Retrieving Sources and Evaluating Sources, their post-test scores in these skill set areas were no better than other institutions. Although this seems counterintuitive, not all students who took the pre-test also took the post-test and vice versa. And because each SAILS cohort test was comprised of a set of 45 randomly selected questions, the pre- and post-tests themselves were not identical. Therefore we cannot conclude that students did "worse" on the post-test than the pre-test.

Table 1

U of L Cohort Comparison With Doctoral Institutions Benchmark		
	Pre-test	**Post-test**
Above Benchmark	Retrieving Sources Evaluating Sources Developing a Research Strategy Searching	Developing a Research Strategy Searching
At Benchmark	Selecting Finding Tools Documenting Sources Using Finding Tool Features	Documenting Sources Retrieving Sources Using Finding Tool Features Evaluating Sources
Below Benchmark		Selecting Finding Tools

As illustrated in Table 1, the pre-test results indicate that U of L students performed at about the same skill level as the doctoral institution benchmark for Selecting Finding Tools, Using Finding Tool Features, and Documenting Sources. In the pre-test there were no skill sets in which our students performed worse than the benchmark. In the post-test, however, U of L students as a group scored below the benchmark for Selecting Finding Tools and were at par with the benchmark for Documenting Sources and Using Finding Tool Features. In the pre-test, our students tested the best on Retrieving Sources and the worst on Using Finding Tool Features. In the post-test, they performed best on Using Finding Tool Features and worst on Evaluating Sources.

The pre-test demographic profiles of the test-takers also differed from the post-test profiles in notable ways. For example, for the skill set Developing a Research Strategy, Management and Education students performed better than the benchmark and Sciences and Social Sciences students performed at the benchmark in the pre-test. But in the post-test, only Sciences and Social Sciences students performed better than the benchmark. Again, these results may seem inconsistent but perhaps say more about the drawbacks of the cohort test than about students' IL skill levels.

Given the limitations of the cohort test and our small sample size, among the few tentative conclusions we can draw about our study participants is that, on average, they performed fairly well against the cohort institutions as a whole, and in terms of other doctorate institutions. The only area in which they performed worse than the benchmark was Selecting Finding Tools (post-test only), so this may reveal a need to spend more time on this skill set during instruction. Because they consistently performed better than the benchmark on both Developing a Research Strategy and Searching, we

can perhaps put less emphasis on these skills to make room for greater focus on other areas.

Interpretation of the Results

We have some theories about why some of our results seem incongruous. The group of students who completed the pre-test is not exactly the same group who completed the post-test. We know that roughly 80% of the students were the same, but that leaves 20% who only did one or the other test. This can skew the results.

Another variable is the questions themselves. By design, the cohort test did not permit us to choose which questions students would be given. All questions were randomly generated by SAILS from its 162-question database. The students received different questions on the pre- and post-tests, and it is likely that at least some questions related to content that was not taught in the course modules, labs, or classes.

Finally, there is the timing of the tests. Perhaps students were more eager, enthusiastic, and energetic at the beginning of the term, when they were given the opportunity to do the pre-test. By the time the post-test was open to them in November it seems entirely possible that students were feeling overworked, stressed, and fatigued. As other deadlines loomed, they may not have put in the same quality of effort in taking the post-test as they did in the pre-test.

Lessons Learned

The SAILS cohort test compares test results from all participating institutions across North America. In the Fall 2015 semester, because we are a non-U.S. institution, it was the only option available to us. The benefit of a cohort test is that individual students are not identified, and you can broadly compare your own institution's results to those of other institutions who have taken the cohort test. These results are broken down by skill set, major, and class standing, so you can see if your institution does better, worse, or about the same as other institutions in that category.

However, a drawback of the cohort test is the lack of individuality. It is not possible to know whether the same students did well on all skills, or if one student did very well on one skill while doing poorly on another. We can't even be certain how many of the students who did the pre-test also did the post-test. We can make some general assumptions based on response rate, but exact details remain unknown. Thus, the cohort test gave us some broad, general indications, but not enough data to come to any solid conclusions about the IL skill levels students had already attained upon entering university, what they learned in the seven skill set areas during Fall 2015, and if they did better in the post-test.

Another weakness of the SAILS cohort test is that it ended up comparing our students to themselves. Because we did both a pre-and post-test with the same students, and both groups were included in the cohort, in effect we were compared against ourselves as part of the cohort in the SAILS-generated statistical report. Looking at the other institutions in the cohort, it would appear that none of them did a pre- and post-test in 2015; most only administered the test once. So perhaps a pre- and post-test design is used infrequently in SAILS testing, which may be why SAILS has not accounted for this oddity.

It was clear that a grade incentive is key to students' voluntary participation in this type of research study. Overall, Liberal Education students participated at a much higher rate than Writing 1000 students, accounting for 71.3% of all completed tests. Liberal Education students were entered in the Bookstore gift-certificate draw and received a bonus 3% for completing both tests, while Writing 1000 students had only the draw to incentivize them. It appears that a draw wasn't enough of a draw!

Our experiences gave rise to definite ideas on what we would do differently in subsequent studies. We successfully reapplied for the Teaching Centre's Teaching Development Fund to pay for two more administrations of the SAILS test for Fall 2016. But this time, we will use the Build Your Own Test (BYOT), which became available worldwide in January 2016. As it allows us to choose all test questions, we anticipate the BYOT will provide a more meaningful post-test, as we can ensure the students are given questions for which most of the concepts have actually been taught. While maintaining anonymity, it will also allow us to compare individual students' pre- and post-test results to explore whether their information literacy skill levels appear to improve after library instruction.

The second change we plan to make is to include two courses that focus specifically on library research and information literacy concepts, Library Science 2000 and Library Science 0520, both of which are taught by a U of L librarian. The course instructor has agreed to provide class time in which to complete the pre- and post-tests, which we hope will result in a very high participation rate. We have also obtained the agreement of the Liberal Education 1000 instructor to participate once again in our follow-up study. All students who participate in our Fall 2016 study will be offered the incentive of a gift certificate draw and bonus marks for test completions.

While the results of our initial test seemed largely inconclusive, we were reassured that U of L students performed well in comparison to the cohort, particularly in the areas of Developing a Research Strategy and Searching. Participating in the SAILS cohort test was an interesting experience, but it did not give us the concrete evidence we had hoped for in terms of students' knowledge of information literacy concepts before and after receiving instruction from a librarian. We look forward to learning more about the abilities of students both before and after information literacy instruction in another round of SAILS testing, this time using the new BYOT version of the test. We anticipate that the next round of tests will give us more data to help inform IL instructional programming, a key part of the post-secondary teaching agenda.

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