Integrate and Assess: Information Literacy as Quality Enhancement of Undergraduate Curriculum

Philip A. Smith, East Tennessee State University

Abstract

This article is an account of how one small liberal arts university undertook a large scale curriculum integration and assessment project under the auspices of a Quality Enhancement Plan (QEP). After a review of relevant literature, the integration and assessment process is outlined, and the assessment data is analyzed and discussed. The integration used a tiered approach, attempting to engage students with significant IL experiences first at the lower general education level, then subsequently at the upper level in their disciplinary context. Assessment tools include widely used standardized tests and surveys as well as locally developed rubrics and surveys. While the plan satisfied the reaccreditation requirements, this is a case study and not a template; many factors would make it difficult to generalize the assessment results. More useful to IL advocates and other institutions may be the overall approach of this QEP, which aimed to be thorough enough to align with regional and national standards yet flexible enough to meet local needs.

Keywords: information literacy; curriculum integration; embedded instruction; assessment; Quality Enhancement Plans; QEP; private college

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Introduction

In most institutions information literacy (IL) has moved from bibliographic instruction and the one-shot to a more central place in the curriculum. As colleges and universities are held more accountable for the content and quality of their core curriculum and general education outcomes, the skills, competencies, learning outcomes, and standards associated with information literacy become part of conversations with faculty and administrators across campus. While the future can never be predicted, one thing seems certain: college graduates need to know how to think fluidly and critically about, with, and through information using continually evolving information technologies. This has always been central to the mission of IL programs, and advocates are ideally placed to connect faculty to the considerable research and practical applications developed by the IL community (first around the ACRL Information Literacy Standards, more recently the Framework for Information Literacy). Faculty desire IL savvy students and administrators are keen to show accreditors how information literacy instruction improves student learning. IL advocates can satisfy these demands and produce both curriculum integration and assessment strategies that positively affect the information literacy of their students.

This article relates one institution's large scale curriculum integration and assessment project under the auspices of a Quality Enhancement Plan (QEP). A QEP "focuses on learning outcomes and/or the environment supporting student learning and accomplishing the mission of the institution" (SACS, p.7). Institutions develop their own QEP topics and IL has been viewed by many as a timely and suitable topic (Harris, 2013). Lincoln Memorial University (LMU) is a small (about 4,000 FTE), private, liberal-arts and professional program university located in rural East Tennessee. LMU is accredited by the Southern Association of Colleges and Schools (SACS), which requires a QEP for reaccreditation. In 2009, LMU began a QEP focusing on improving student IL competency. While the plan satisfied the reaccreditation requirements, this description and assessment of this QEP related here is a case study and not a template; many factors would make it difficult to generalize the results. More useful to IL advocates and other institutions may be the overall

approach of this QEP, which aimed to be thorough enough to align with regional and national standards yet flexible enough to meet local needs.

Literature Review

Curriculum integration

The curriculum integrated approach to information literacy programming is a trending theme in the IL literature. In 2011, Saunders published a book length study on how institutions address information literacy as an outcome. By looking at self-study reports submitted to accrediting bodies, Saunders distinguished between course-level outcomes, program-level outcomes, and institutional-level outcomes for IL programming and noted that most institutions do not get beyond course-level outcomes. McGuinness (2007) made a similar point, noting that while working with individuals within an institution can be effective, it does little to embed IL as a core value when individuals leave and programs shift. McGuinness argued the best way to systematically integrate IL into the overall undergraduate curriculum is to take a top down approach and align IL with institutional goals and strategic plans. In a dissertation length study on IL curricular integration, Wang (2010) noted that both the American Library Association (ALA) and the Australian and New Zealand Institute of Information Literacy (ANZIIL) recommend just such a comprehensive integrated approach for IL. Wang also showed that while the literature is full of practical examples of integrating IL into individual courses, there is little on systematic integration at broader levels. Wang proposed a model for integrating IL in terms of what, who, and how (p. 20). *What* involves an operational definition of IL, which the ACRL standards provide or the ACRL Framework, as well as a rationale for the reasons it is important. *Who* involves the participation and collaboration of multiple stakeholders from administrators and deans, to faculty and librarians, to support staff and students. *How* is the actual plan for integrating: the curriculum design and assessment methods, as well as the presence of IL in institutional planning and accreditation documents. The QEP program described in this study addresses each of these criteria. A study by Derakhshan and Singh (2010), which synthesized the results of seven other studies on academic faculty's perception of integrating IL into the curriculum, identified four common themes: collaboration, IL pedagogy, IL skills, and knowledge. These themes roughly map onto Wang's criteria noted above: Integration must be a collaborative effort of faculty and librarians; there needs to be a clear definition of IL with concrete learning outcomes; and there must be a plan for curriculum integration at multiple levels. Derakhshan and Signh's study, however, limits

itself to a literature review of academic faculty's perceptions, and it contains no original research or documentation of curriculum integrated programs.

Information literacy as a QEP topic

There is also an emerging literature documenting IL as a topic for, or at least component of QEPs. Harris (2013) reported that between 2004 and 2011, 18 SACS-accredited universities focused on IL for their QEPs, and over 100 institutions developed topics that included IL learning outcomes (p. 3). Several publications have documented the inclusion of IL into QEPs. Millet, Donald, and Wilson (2009) described the implementation process, assessment plan, and some examples of curriculum integration for their IL-based QEP at Trinity College. They used a tiered approach to curriculum integration, moving from the lower to the upper levels of their undergraduate programs. Since Millet, Donald, and Wilson's article was published half way through their QEP process, it did not include a description of the assessment results in detail. Beile (2007) outlined the role of IL as a component in the University of South Florida's information fluency QEP, and focused in part on assessment; however, this work was also published while that QEP was still in process. Other publications mentioning IL as part of QEP-based efforts include Salinero and Beardsley (2009), Simons (2009), and Tunon (2003). To date, no study has been published on the overall effect of a completed IL-focused QEP. As Harris (2013) concluded, "the relationship between accreditation standards and information literacy goals requires further exploration in practice and in the scholarly and professional communications of information literacy advocates" (p.7). The present study joins the scholarly conversation on this topic.

Tiered IL integration

There is general consensus in the literature that the curriculum integrated approach should be tiered. This means students should receive explicit IL instruction sequentially throughout their undergraduate programs: at least once during the first two years of study, and again in the more advanced stages of their undergraduate programs (VanScoy & Oakleaf, 2008). While most authors of the tiered approach do not present a rigorous method for determining which IL skills are lower and which are higher, they acknowledge this is as an intuitive and logical starting point for a tiered IL program. Wong & Cmor (2011) compared grade point averages of students who had different amounts of exposure to library instruction and found a positive correlation for students who had at least three IL sessions. However, they acknowledged that these sessions were optional and not truly integrated into

the curriculum. Holliday and Fagerheim (2006) detailed a sequence of IL integrations into two levels of general education English courses and reported favorable results in raising the quality of student research and writing. However, this study was limited to the lower general education tier; it did not investigate the impact on students in higher tier disciplinary courses. The author of this paper found no studies in the literature that detail a tiered integrated curriculum from basic level general education through the discipline-specific upper level.

IL Assessment

In a review of the literature up to 2007, Matthews identified three general categories of IL assessment: surveys, tests, and "actual information-seeking behavior" (p. 75). Beile (2008) also recommended multiple methods of IL assessment including "objective" standardized tests or surveys and "interpretive" methods such as rubrics. One such standardized instrument is the National Survey of Student Engagement (NSSE); Mark & Boruff-Jones (2003) showed there is some overlap between NSSE questions and categories and IL standards, outcomes, and indicators. Another standardized test is the Information Literacy Test (ILT) developed at James Madison University. Cameron, Wise, and Lottridge (2007) found the ILT to be a statistically validated instrument for measuring student IL proficiency.

Knight (2006) distinguished between "traditional" and "authentic" assessment. Traditional assessment may take the form of multiple choice or short answer quizzes, which the author acknowledged as having some merit, although they are limited in their usefulness. Knight described authentic assessment as "measures [of] not only what students learn through library instruction, but also how the learning is subsequently incorporated into their academic work" (p. 45). This can take many forms, but the most familiar and easy to employ is rubrics. Rockman (2002) expanded on this notion:

> [A]lthough these measures (e.g., multiple choice, true/false) can be used to establish benchmarks of knowledge or to provide a snapshot of performance at a certain point in a student's academic career, they are not necessarily linked to performance objectives, and do not demonstrate how well a student has actually learned to navigate through a search strategy process to find, evaluate, use, and apply information to meet a specific need, (p. 193)

In another article relating to Trinity's IL related QEP, Oakleaf, Millet, and Kraus (2011), discussed their process of developing rubrics to assess student IL. They also claimed there is

little or no literature on collaborative assessment of IL. The present study partially addresses this by having the faculty use the locally developed SEWS rubric (Appendix A) to assess student IL. In developing an assessment plan for an IL based QEP, the literature is clear that it is important to include multiple methods of assessment: direct and indirect, traditional and authentic. Each has a strength that helps compensate for weaknesses in the other.

QEP Timeline and Curriculum Integration

The QEP was developed by a multidisciplinary committee that mandated all undergraduate departments include information literacy-related learning outcomes in their programs. To support these learning outcomes, the QEP adopted a tiered curriculum integrated approach. At the lower tier, basic IL content was integrated and assessed in the general education core composition courses. At the higher tier, all disciplines required a source-based research project to be supported by integrated IL instruction and assessed using a locally developed rubric.

The QEP rolled out the curriculum integration of IL over the course of four years. The first two years focused on the lower tier general education core composition courses ENGL 110 and ENGL 210. In these courses, students are introduced to basic IL concepts and skills tied to the ACRL Standards (2000). Instruction was provided by librarians working in close collaboration with the course instructors. Instruction content included lessons, lectures, and learning activities on the value and types of information, finding and evaluating information, and the research process.

Prior to beginning the QEP in the fall of 2009, faculty and librarians met for a two-day workshop to discuss and plan the IL integration into ENGL110. The result was an integration sequence much more involved than a typical one-shot visit from a librarian. A shared reading for all sections was selected on the topic of academic integrity. Themes from this reading were discussed in-class and in online discussion boards; this set the tone for the subsequent integrations. Librarians were involved in these class discussions, and they were invited to participate in three class sessions throughout the semester: one on source types and the differences between popular and scholarly literature; one on online source evaluation; and one on basic database searching and citing. Faculty were also involved with the integration, weaving in concepts and themes from the shared reading and the ACRL Standards. The final assignment for ENGL110 was a paper requiring use of one or two outside sources on a topic related to the impact of information technology and information

overload; this was assessed by a rubric with IL criteria tied to the ACRL Standards. As the QEP progressed, different readings and IL-based themes were explored by faculty and librarians. Readings included chapters from *Freakonomics: A Rogue Economist Explores the Hidden Side of Everything* by Steven Levitt and Stephen Dubner, *The Shallows: What the Internet is Doing to Our Brains* by Nicholas Carr, and *Glut: Mastering Information Through the Ages* by Alex Wright.

There was much discussion between the librarians and teaching faculty at the summer workshops and beyond about the order in which to present IL content across the general education courses. The ACRL Standards do not provide guidance on determining lower and higher level IL skills. VanScoy and Oakleaf (2008) discussed this problem and found little in the literature to address the issue. In the end, the QEP committee decided to introduce content related to all the learning outcomes over the course of the first two years in ENGL110 and ENGL210, and then to reinforce it in the upper levels.

The second year saw integration into ENGL210. The focus was on reinforcing the content introduced in ENGL110 and applying it to a more substantial research paper. The ENGL210 research paper required more sources and more in-depth engagement with them. ENGL210 is a world literature course, so topics ranged broadly. The librarian-led sessions introduced students to more databases and advanced search strategies. Librarians collaborated with faculty to tailor the instruction sessions to the readings and course content. Students completed annotated bibliographies in preparation for their final research papers. Librarians helped to assess these and used them to gauge whether students were using tools and strategies covered in the instructional sessions, and to remediate with students as necessary. Final research papers were assessed using the same rubric used for upper level courses; this allowed some comparison of IL proficiencies between the sophomore and junior/senior levels.

The next two years were focused on the higher tier of curriculum integration, which involved instruction in targeted classes in the upper levels of all undergraduate programs. Prior to the QEP, LMU had already instituted a program intended to enhance and assess the academic writing skills of students called SEWS: Sequential Enhancement of Writing Skills. The SEWS program provided an ideal and convenient integration point for IL. The QEP mandated that SEWS papers must be source-based, and that students must be able to effectively access, evaluate, ethically engage with and use the disciplinary literature of their fields. IL instruction in this upper tier focused on the research process as appropriate to the

discipline. Collaboration between faculty and librarians continued through workshops, meetings, and online resources and support.

Integrating IL into upper level courses presented new challenges. Whereas ENGL110 and ENGL210 had some variation in readings and instructor teaching styles, the course content was basically the same across all sections. However, upper level SEWS courses varied widely as a result of disciplinary specialization. Some programs were already doing much of what the QEP mandated, and others needed to make changes. The lower level integrations involved just a few faculty and instructional librarians; the upper level integrations involved faculty from all departments and their librarian liaisons. Not all students enrolled in SEWS courses took ENGL110 and ENGL210 at LMU; some were exempted, and others transferred in from other schools. Meeting these challenges required working with each department on a case by case basis and determining their students' status and needs. The librarian-led instruction sessions were tailored in collaboration with faculty and involved in-depth discussion and exploration of the scholarly disciplinary literature and the development of annotated bibliographies to help prepare students for the SEWS paper. Though transfer students lacked the benefit of foundational IL instruction provided in ENGL110 and ENGL210, they had access to the material through online tutorials, or they could get additional help by faculty referrals to librarians or to the IL tutor program developed as part of the QEP. Every attempt was made to apply the same basic standards and learning outcomes across all disciplines.

Assessment Strategy

Since the main focus of a QEP was on improving student learning, clearly-focused learning outcomes related to IL were essential. The ACRL Standards (2000) provided thorough and easily adaptable outcomes, which LMU mapped to their own. Another advantage of using the ACRL Standards was the availability of standardized assessment tests and surveys such as SAILS and ILT.

The QEP team aimed to create a robust assessment strategy. In order to encompass multiple viewpoints and data points on the QEP's progress, the team employed a variety of assessments: direct and indirect, traditional and authentic. This could be visualized in a matrix as in Table 1.

Table 1 – Assessment Types

	Direct	Indirect
Traditional	Standardized Assessment Tests: SAILS, ILT	Surveys: NSSE, faculty survey
Authentic	SEWS Rubric	Student Focus Group

Assessment was built into the QEP from the initial planning stages. Data were gathered from student and faculty surveys and from rubrics-based analysis of student papers. These data were then available as a baseline against which progress in the QEP could be measured. Since the QEP involved all classes and students, an experimental method involving a control group was not possible. Instead, measurements were taken before, during, and at the conclusion of the IL curriculum integration. This approach borrowed from the single case design (SCD) method. According to Kratchowill et al. (2010), SCDs are useful in applied and clinical fields when researchers need to measure the effect of an intervention without a control by repeatedly measuring "within and across different conditions or levels of the independent variable. These different conditions are referred to as phases (e.g., baseline phase, intervention phase)" and "the case provides its own control for purposes of comparison" (p.2). The "case" was that part of the student body of LMU that received some IL instruction as a result of the QEP. The independent variable was the intervention of curriculum integrated IL instruction, and the dependent variable was student IL competency. The effect of the intervention was measured by establishing a baseline, and then comparing this with measurements taken during and after the intervention.

IL competencies, especially those involving the more elusive higher order thinking skills, were difficult to directly measure and assess. The difficulties were only compounded when assessment was attempted longitudinally. Since there was no control group and factors other than the curriculum integration intervention may have influenced the results, the impact of the IL curriculum integration could only be inferred.

Assessment Tools and Participant Selection

Two standardized IL assessment tools were identified as relevant and valid measures for the QEP. The Standardized Assessment of Information Literacy Skills (SAILS) is a widely used, commercially available instrument appropriate for students leaving high school and entering college. SAILS is based on the ACRL Standards (excluding Standard 4) and presents results to participating institutions as comparative benchmarks. SAILS was

administered to incoming freshmen during their orientation process for each year of the QEP, 2009-2014. SAILS was also administered to graduating seniors in 2013 and 2014. Though it would have been ideal, these seniors did not all take SAILS as freshmen in 2009 or 2010. Small monetary incentive was offered for seniors to take SAILS.

The second standardized test instrument used in this program implementation was the Information Literacy Test (ILT). As described, the ILT is a statistically validated instrument for measuring IL proficiency as defined by outcomes tied to the ACRL Standards. Unlike SAILS, ILT results include more granular data on each participant, allowing researchers to track which questions students answer correctly or incorrectly. The ILT was administered to all students who took the ENGL110 course from 2009 to 2014. An ILT cohort was thereby created for students in each year: e.g. students who took ENGL110 during the 2009-2010 academic year were cohort one, students who took the course during 2010-2011 academic year were cohort two, and so on. The ILT was re-administered to the cohorts in the spring of each subsequent academic year. Accordingly, students in cohort one were required to take the ILT again in Spring 2011, then again in Spring 2012, Spring 2013, and Spring 2014. A small monetary incentive was offered for some iterations of the test.

As detailed above, SEWS classes were a central point of IL integration; the SEWS rubric (Appendix A) was created by a multidisciplinary committee in the early phases of the QEP. The rubric was applied to source-based papers in each discipline and addressed all five ACRL Standards. The SEWS rubric was applied to all SEWS papers from fall 2011 (year 3) until the conclusion of the QEP in spring 2014. It was applied to the ENGL210 paper and to the 300 and 400 level SEWS paper in the students' majors.

Two surveys and a focus group were used as indirect assessment measures. The National Survey of Student Engagement (NSSE) is a standardized survey used by many institutions across the U.S. Some of the survey items can be mapped to IL standards and competencies (Appendix B). It is administered anonymously to freshmen and seniors who self-select to take it. The faculty survey was a locally created survey and was made available to all faculty in 2007 and again in 2014. No incentive was offered to take the survey.

Assessment Results

Baseline data for student IL competency was established using standardized IL assessment tests, a locally conducted survey of SEWS papers from before the QEP, and survey

questions. One of the standardized tests, the ILT, was repeatedly administered during the QEP. The other was repeated after the QEP. The SEWS rubric was deployed during the second phase of the QEP when IL integration into the upper tier began. SEWS rubric results along with results from the surveys and a focus group conducted at the end of the QEP were analyzed and compared with the baseline data.

Standardized assessment tests

Table 2 shows the SAILS test results of incoming freshmen. This particular instrument benchmarks institutions against each other, so "worse than," "about the same," and "better than" indicate LMU freshmen as compared to the same cohort at other benchmarked institutions. Results are grouped by ACRL IL standards 1, 2, 3, and 5. Unfortunately, there were not enough participants in either 2013 or 2014 to make any significant comparison with the freshmen groups. SAILS results are presented here only for the freshmen cohorts, and they serve as a baseline for IL competency of incoming freshmen.

Table 2 – SAILS Results for Incoming Freshmen, 2009-2013 as compared to peer-institution benchmarks

	2009-2010 (n=186)	2010-2011 (n= 234)	2011-2012 (n= 236)	2012-2013 (n= 141)	2013-2014 (n= 138)
S1 Need	Worse than	About the same	Worse than	Worse than	About the same
S2 Access	Worse than	Worse than	Worse than	Worse than	Worse than
S3 Evaluate	About the same	About the same	Worse than	About the same	About the same
S5 Ethics	Worse than	Worse than	Worse than	Worse than	Worse than

The ILT was used more extensively than SAILS. Yearly cohorts were created with the intention of sampling progress over time. Tables 3 and 4 show ILT results of the yearly cohorts first established in ENGL 110. Results were reported by mean score per standard and overall mean. Sample sizes decreased each year due to retention and other extraneous factors. In an attempt to mitigate the retention problem, the QEP team created sub-groups consisting of students who were able to take the ILT on each iteration. For this reason, results of the entire cohort (top percentage) and just those students who took the ILT each year (bottom percentage) are both reported. Although the ILT was administered each of the five years of the QEP, only the first two cohorts (from 2009-2013 and 2010-2014) took the ILT each year.

For each cohort, a paired sample *t* test was conducted to determine if the increase from the first to last administration of the test was statistically significant for both the overall test

results and for each IL standard. Overall results for each cohort show statistically significant improvement while there were statistically significant gains in some but not all of the individual standards.

Table 3—ILT Cohort 1 (2009-2012)

	2009-10, Test 1 (n=127)† (n=22)‡	2010-11, Test 2 (n=59) † (n=22) ‡	2011-12, Test 3 (n=45) † (n=22) ‡	2012-13, Test 4 (n=22) ‡
S1 Need	70% 77%	76% 80%	80% 83%	84%***
S2 Access	41% 45%	51% 53%	54% 54%	56% **
S3 Evaluate	62% 64%	68% 67%	67% 67%	68% ns
S5 Ethics	57% 58%	64% 66%	67% 69%	73% ***
Total	57% 59%	62% 65%	63% 67%	69% ***

Note. † denotes the total number of students assessed for that year; ‡ denotes the results of the students who participated in all administrations of the test.
ns = P > 0.05 * = P ≤ 0.05 ** = P ≤ 0.01 *** = P ≤ 0.001

For cohort one, there was a significant mean difference from the first test ($M = 58.68$, $SD = 11.69$, $N = 22$) to the fourth and final last test ($M = 68.50$, $SD = 10.27$, $N = 22$); $t(21) = 6.01$, $p = .000$. In terms of the ACRL Standards, there was a significant mean difference for standard one between the first test ($M = 76.05$, $SD = 11.80$) and the final one ($M = 83.73$, $SD = 11.41$); $t(21) = 2.93$, $p = .008$. For standard two, there was a significant difference between the first test ($M = 44.73$, $SD = 13.15$) and the final one ($M = 55.72$, $SD = 14.92$); $t(21) = 4.12$, $p = .000$. There was no significant mean difference for standard three. For standard five there was a significant difference between the first test ($M = 57.27$, $SD = 17.78$) and the final one ($M = 73.18$, $SD = 16.15$); $t(21) = 3.66$, $p = .001$.

Table 4 – ILT Cohort 2 (2010-2013)

	2010-11, Test 1 (n=119) † (n=12) ‡	2011-12, Test 2 (n=62) † (n=12) ‡	2012-13, Test 3 (n=46) † (n=12) ‡	2013-14, Test 4 (n=12) ‡
S1 Need	74% 78%	75% 75%	79% 82%	91%***
S2 Access	45% 48%	52% 54%	53% 57%	72%***
S3 Evaluate	66% 73%	69% 74%	68% 76%	79% ns
S5 Ethics	66% 71%	69% 72%	71% 75%	84% ns
Total	55% 66%	65% 68%	66% 71%	80%***

Note. † denotes the total number of students assessed for that year; ‡ denotes the results of the students who participated in all administrations of the test.
ns = P > 0.05 * = P ≤ 0.05 ** = P ≤ 0.01 *** = P ≤ 0.001

For cohort two, there was a significant mean difference from the first test ($M = 65.67$, $SD = 10.24$, $N = 12$) to the fourth ($M = 80.33$, $SD = 6.34$); $t(11) = 6.56$, $p = .000$. In terms of the ACRL Standards, there was a significant mean difference for standard one from the first test ($M = 77.50$, $SD = 10.51$) to the fourth ($M = 91.08$, $SD = 7.59$); $t(11) = 5.25$, $p = .000$. For standard two there was a significant mean difference from the first test ($M = 48.67$, $SD = 13.94$) to the fourth ($M = 72.33$, $SD = 10.47$). There was not a significant mean difference for cohort two, standards three or five.

SEWS Rubric Results

The SEWS rubric was applied to student papers at second tier of IL integration in ENGL 210 once next stage of this project began. The rubric was applied by the faculty who assigned, reviewed, and graded the papers. A similar rubric, measuring the ACRL Standards was used prior to the implementation of the QEP to establish student IL competency in a sample of papers. These papers were read and rated by a multidisciplinary committee, including librarians. The intention of this pre-QEP rubric was to gather data establishing the need for an IL-based QEP. These data served as a baseline for "before" treatment to be compared with subsequent progress. Rubric categories are tied to the ACRL Standards and reported as averages in table 5. The rubric uses a five-point scale from 1 (unacceptable) to 5 (excellent).

Table 5 – SEWS Rubric Results by ACRL Standard

ACRL IL Standard	Pre-QEP (n=171)	ENGL 210 Average (n=462)	300 SEWS Average (n=711)	400 SEWS Average (n=403)
S1 Need	2.7	3.4	4.1	4.3***
S2 Access	3.5	3.9	4.2	4.4***
S3 Evaluate	2.9	3.6	4.0	4.2***
S4 Use	2.9	3.7	4.1	4.3***
S5 Ethics	2.3	4.0	4.0	4.3***
	2.9 (58%)	**3.7 (74%)**	**4.1 (82%)**	**4.3 (86%)*** **

ns = P > 0.05 * = P ≤ 0.05 ** = P ≤ 0.01 *** = P ≤ 0.001

For SEWS rubric results, a one-way ANOVA was conducted to compare the results of the four levels of student papers: Pre-QEP, ENGL 210, 300 SEWS, and 400 SEWS. There was a significant improvement of all five IL standards from Pre-QEP to 400 SEWS: for standard one the improvement at the $p < .05$ level for the four levels was [$F(1763, 3) = 141.27$, $p = .000$]; for standard two it was [$F(1756, 3) = 46.31$, $p = .000$]; for standard three, [$F(1764, 3) = 122.28$, $p = .000$]; for standard four, [$F(1760, 3) = 217.34$, $p = .000$]; and for standard five, [$F(1758, 3) = 119.964$, $p = .000$]. A Tukey post-hoc test reveals statistically significant differences ($p < .05$) between all levels for all standards except for standard two between the 300 and 400 SEWS levels ($p = .010$). These results are positive from the point of view of the QEP's intended goal of improving student IL proficiency. Not only did students improve in all standards, but they did so significantly between almost all levels.

Table 6 shows the extent of the curriculum integration of SEWS rubric results by undergraduate school. Results are averages by IL standard of both 300 and 400 level SEWS papers.

Table 6 – SEWS Rubric Results by Undergraduate School

ACRL IL Standard	Allied Health (n=90)	Arts & Humanities (n=220)	Business (n=231)	Education (n=150)	Math & Science (n=129)	Nursing (n=318)
S1 Need	3.8	3.9	4.2	4.2	4.4	4.3
S2 Access	3.9	4.3	4.0	4.5	4.5	4.4
S3 Evaluate	3.7	4.1	3.9	4.1	4.3	4.3
S4 Use	3.8	4.1	4.1	4.2	4.5	4.3
S5 Ethics	3.8	4.2	4.1	4.2	4.6	4.1
Totals	**3.8**	**4.1**	**4.1**	**4.2**	**4.5**	**4.3**

NSSE Survey Results

The National Survey of Student Engagement (NSSE) is administered every academic year to LMU freshmen and seniors. As shown by Mark and Boruff-Jones (2003), some NSSE questions can be mapped onto the ACRL Standards (see Appendix B for the mapping procedure used) Table 7 shows results for incoming freshmen early in the QEP (2010) and seniors graduating toward the end of the QEP (2013, 2014). The final column shows results of a special IL topical module that only became available to LMU in the last year of the QEP, 2014. This module asked questions directly related to IL which are correlated to the ACRL Standards.

Table 7 – NSSE and IL

IL Standard	2010 Freshmen (n=82)	2013 Seniors (n=113)	2014 Seniors (n=98)	2014 Seniors IL Topical Module (n=97)
S1 Need	42%	54%	54%	62%
S2 Access	53%	54%	54%	64%
S3 Evaluate	61%	63%	62%	64%
S4 Use	64%	65%	64%	86%
S5 Ethics	49%	64%	68%	82%*

Percentages denote the number of responses that are either 3 or 4 on scales that vary from 1=very little to 4=very much, 1=never to 4=very often
ns = $P > 0.05$ * = $P \leq 0.05$ ** = $P \leq 0.01$ *** = $P \leq 0.001$

A one-way ANOVA was also conducted on the NSSE results. Significance was found only for standard five at the $p < .05$ level [$F(3, 7) = 7.350$, $p = .014$]. A Tukey post-hoc test revealed this significance held only between the Freshmen 2010 and Senior 2014 IL Module levels ($p = .012$). These results showed little improvement in IL proficiency. However, NSSE is an indirect measure IL and when the topical module for IL was developed and implemented, the results were more positive.

Faculty Perception of Undergraduate IL Skills Survey

A locally developed survey on faculty perceptions of undergraduate IL skills was administered via an online survey in 2007 (Appendix C). The same survey was administered again in 2014. Results are collated and reported by ACRL Standards.

Table 8 – Faculty perception survey results averaged by IL standard

IL Standard	2007 Survey (n=17)	2014 Survey (n=45)
S1 Need	3.27	2.83
S2 Access	2.83	2.52
S3 Evaluate	3.21	2.79
S4 Use	3.13	2.65
S5 Ethics	3.12	2.64

Scale: 1=Strongly Agree; 2=Agree; 3=Neither; 4=Disagree; 5=Strongly Disagree

The 2014 survey asked faculty if they believed undergraduate's IL skills had improved since implementing the QEP. Eighty percent (12 of 15 respondents) responded positively. The survey also allowed for comments to this question, as exemplified below:

> "Much more aware of 'primary literature' value and validity. Students aware of information literacy across the curriculum, Gen Ed and Major, rather than a check-off requirement for capstone class."
>
> "Students have gotten much better on how to identify appropriate sources, evaluate them, and synthesize their meaning in research papers."
>
> "A guarded yes. Seems to vary class to class."

Student Focus Group

Six students were invited to participate in a conversation about IL and their experiences with the efforts initiated by the QEP in April 2014. Permission to survey and report was obtained from the university's Institutional Review Board. The students were selected from a variety of majors, and all were at least at junior level. Each student was aware of IL, associating it with research, writing, the University writing requirements (the SEWS program), and evaluating sources for authenticity. The students discussed visiting the library for IL instruction and working with librarians on research. There was agreement that their research and writing skills improved over the course of their studies.

While still struggling with some IL skills, most participants had developed new strategies and skills for doing research and felt more confident in their skills as information searchers, consumers, and producers. The students all felt that IL skills were important, should be integral to the college experience, and that their time at LMU had helped them improve these skills.

Discussion

All of the assessment measures described in this study indicated higher levels of student IL proficiency by the end of the curriculum integration. The results varied by ACRL Standard and cohort; there was statistically significantly improvement in some IL competencies and small improvement in others. Baseline assessment data indicated that students entered LMU with average or below average IL skills. SAILS results for incoming freshmen consistently showed those students scoring "worse than" or "about the same" as students at benchmark institutions. ILT results for freshmen also indicated low IL proficiency. The average for the pre-QEP survey of SEWS papers was 58% which also suggested below average IL proficiency. NSSE survey results for 2010 freshmen indicated that by the end of their freshman year, students were still developing their IL skills. The faculty perceptions survey supported this claim; faculty were more likely to disagree that students have well developed IL skills. Note, however, that the faculty perception survey of applied to undergraduates in general, not just freshmen. The likely conclusion to be drawn is that LMU is on par with most institutions with regard to IL skills of incoming freshmen, which is to say they struggle with finding and interpreting scholarly resources and academic research in general (Head, 2013).

Assessment conducted during the QEP suggested slow but steady growth of student IL proficiency. This is consistent with Matthew's (2007) finding that "[a] number of academic libraries have administered the test [referring to SAILS] and, in general, the findings suggest that students' information literacy seems to improve throughout their academic careers due to their participation in an information literacy class" (p. 76).

ILT scores consistently rose for all ACRL Standards, though standard two remained the lowest for each testing of all cohorts. Freshmen SAILS scores for standard two were "worse than" for each year. Though all the ILT cohorts showed statistically significant improvement in this standard, it was also the standard with the lowest mean score throughout the entire range of the testing period. These results suggested the competencies involved with accessing information were among the most difficult, but also the ones at which students most improved. In contrast to SAILS and ILT results, standard two was consistently rated the highest of all standards on the SEWS rubric. This may have revealed a difference in emphasis between these instruments. SAILS and ILT are multiple choice tests that ask direct questions about information access skills such as search strategies, Boolean terms, and subject vocabulary (Swain, Sundre, & Clarke 2014). They emphasize some of the

technical aspects involved in the process of searching. The SEWS rubric only has one category aligned to standard two: appropriateness of sources for a scholarly paper. This measures whether the student ended up selecting an appropriate source for the SEWS paper, but not *how* they went about finding it. The SEWS rubric emphases the end product of the search process. This may suggest competencies dealing with the complexities of the information search process are and remain a problem for LMU students.

There was a similar discrepancy between ILT and SEWS results for standard three. Neither ILT cohort one or two showed significant improvement in this standard (cohort one ranges from 64% to 68%; cohort two 73% to 79%), but SEWS rubric results for standard three did significantly improve (58% to 84%). Here too, the discrepancy may be due to different emphasis of the assessment measures. The ILT items on evaluating information assess "evaluating the credibility and reliability of a source, extracting information from data presented in a table, evaluating a source's claims, awareness of the purpose of a source (e.g., persuasion vs. factual), the ability to identify the author a source [sic], the ability to draw the appropriate conclusion from information provided from a source, the ability to identify the type of source that will best answer a provided question" (Swain, Sundre, & Clarke 2014, p. 6). Competency in such skills is important, but they are assessed in the abstract, whereas the SEWS rubric items on evaluating information assess the evaluation and use of information in the context of the student's research ("Use of critical thinking to integrate evidence to support thesis", "use of sources to enrich thesis; original conclusions or divergent opinions are drawn from sources"). The ILT and SEWS data suggested students did not much improve on detecting bias on a website, but they did improve on applying what they learned from sources to the context of their own research.

In sum, comparing results from all assessment measures at the end of the QEP with the baseline data showed some measurable improvements. Overall SEWS rubric results (table 7) increased from 58% (pre-QEP) to 74% (ENGL 210) to 82% (300SEWS average) to 86% (400SEWS average), with each ACRL Standard showing significant increases as well. The positive results of this direct assessment are tempered by the inconclusive results of the indirect measure provided by the NSSE survey, which only shows statistically significant improvement in standard five. However, as evidenced by the positive remarks on the survey and focus group, faculty and student perceptions of the QEP were favorable.

Limitations

Though the quantitative data presented here is generally favorable to the hypothesis that a tiered curriculum integration of IL leads to enhanced IL proficiency, there are a number of limitations which limit this interpretation. Not all students whose papers were rated at the upper levels took their lower level general education courses (specifically, ENGL 110 and ENGL 210 at LMU). Many students transferred in or test out of these lower level courses and so may or may not have had the benefit of IL training at that level. Additionally, not all students who took ENGL 110 and ENGL 210 went on to upper level classes at LMU. Inter-rater reliability in scoring the SEWS rubric may be another threat to the internal validity of the results. Though workshops and training on using the SEWS rubric were held, not all faculty interpreted and used the rubric in the same. Furthermore, not all faculty embrace IL or work to incorporate it into their courses or assignments.

Administering a standardized test such as the ILT presents may challenges to a researcher. The first administration was given in-class in ENGL 110, but every subsequent testing involved tracking down the students individually and providing incentives for them to take it again and again. In some cases, proctoring of the test was less than ideal and students often did not take it seriously; their results had to be removed from the cohort data. Although some NSSE items can be mapped to IL standards, the survey is an indirect measure at best. The locally developed faculty survey was created in part to more directly address IL, but this involved faculty, not students.

The faculty survey was also limited in that the 2007 version did not specify whether the surveyed faculty taught mostly lower or upper level classes. As a result, some responses may have been in reference to freshmen and others to seniors (whose IL skills presumably differ). The focus group elicited almost total student support and buy-in for the QEP, but was small and students may have not have felt comfortable criticizing it in such a setting.

This plan was tailored and tweaked for the needs of one small, private, rural, liberal arts university and the results may not generalize to other institutions. Similar institutions would probably benefit from the type of plan outlined here. Due to the inclusive nature of the QEP program, a control group for comparison of students not receiving IL-integrated instruction was not possible. Other variables may have influenced the increase in IL skills such as greater familiarity with the assessment instruments and the natural process of intellectual maturation.

Conclusion

As shown, information literacy can be successfully integrated into all levels of the undergraduate curriculum. Multiple assessment measures can be used to establish baseline IL proficiency, track progress over time, and inform where changes may need to be made. Accreditation-related efforts such as QEPs can be useful opportunities for IL-related curriculum enhancements. Faculty, librarians, and administrators all have key roles in the integration process, which must be thoroughly planned and organized before implementation and remain flexible during implementation to accommodate unforeseen changes and developments. Though not without limitations, the assessment results of this IL focused QEP show gradual, but significant improvement in most IL learning outcomes as students move from lower level general education to upper level courses in their disciplines of study.

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Appendix A – SEWS Rubric

Writing Criteria

	Excellent	Good	Meets Requirements	Needs Substantial Improvement	Unacceptable*
Thesis / Hypothesis	Sophisticated, well developed thesis/hypothesis that is clearly stated	Good, competent thesis/hypothesis that is clearly stated	Adequate thesis/hypothesis that is clearly stated	Weak or unclearly stated thesis/hypothesis	No Thesis/Hypothesis
Analysis	Sophisticated use of critical thinking to integrate evidence and to support thesis/hypothesis	Good, competent use of critical thinking to integrate evidence and to support thesis/hypothesis	Adequate use of critical thinking to integrate evidence and to support thesis/hypothesis	Weak use of critical thinking so that evidence is not sufficiently integrated and thesis/hypothesis is poorly supported	No analysis applied to support the thesis or to demonstrate understanding of sources/evidence
Presentation	Meets professional presentation standards for the discipline and ***all*** directions for the assignment are followed	Generally meets professional presentation standards for the discipline but may contain ***a few*** careless errors; directions for the assignment are followed	Meets minimal professional presentation standards for the discipline but may contain ***some*** errors that show inconsistency; directions for the assignment are followed	Professional presentation standards for the discipline not met due to ***many*** formatting errors; not all directions for the assignment are followed	☐ Is not formatted correctly ☐ Does not follow directions ☐ Has no title
Grammar / Mechanics	Free from errors in ☐ Grammar ☐ Usage ☐ Capitalization ☐ Punctuation ☐ Spelling	Occasional errors in ☐ Grammar ☐ Usage ☐ Capitalization ☐ Punctuation ☐ Spelling	Several errors in ☐ Grammar ☐ Usage ☐ Capitalization ☐ Punctuation ☐ Spelling	Many errors in ☐ Grammar ☐ Usage ☐ Capitalization ☐ Punctuation ☐ Spelling	Too many errors in ☐ Grammar ☐ Usage ☐ Capitalization ☐ Punctuation ☐ Spelling
Organization	Sophisticated logical organization with a clear line of reasoning	Good, competent logical organization with a clear line of reasoning	Adequate logical organization with a clear line of reasoning	Weak logical organization with a clear line of reasoning	Writing not logically organized. Frequently ideas fail to make sense. Reader cannot identify a line of reasoning.

Information Literacy Criteria

	Excellent	Good	Meets Requirements	Needs Substantial Improvement	Unacceptable*
Appropriateness of Sources for a Scholarly Paper	Excellent choice of sources for a scholarly paper	Good choice of sources for a scholarly paper	Adequate choice of sources for a scholarly paper	Poor choice of sources for a scholarly paper	No evidence of sources
Use of Sources to Support the Argument	Sophisticated use of sources to enrich thesis/hypothesis; original conclusions or divergent opinions are drawn from sources	Good, competent use of sources to enrich thesis/hypothesis; sources are fairly represented	Adequate use of sources to extend thesis/hypothesis	Poor use of sources: ☐ Arbitrary source usage ☐ Over-use of single source ☐ Excessive quoting, paraphrasing, or summarizing	Notable discrepancies between References / Works Cited / Bibliography and in-text citations (i.e. sources used in paper without full bibliographic info provided)
Correctness According to Style of References / Bibliography / Works Cited Page	All elements of citations present and all sources are cited and formatted perfectly according to style	All elements of citations present, but some formatting errors	Most elements of citations present but with some formatting errors	Major elements of citations are missing along with consistent formatting errors	There is no References / Works Cited / Bibliography page
Correctness According to Style of In-Text Citations	All quotes, paraphrases, and summaries follow in-text citation rules perfectly according to style.	Some minor errors (i.e., punctuation) with in-text citation	Several major errors in following in-text citation rules	☐ Consistent major errors in following in-text citation rules ☐ Unclear attribution of ideas in paraphrase or summary	☐ In-text citations missing ☐ Quotes, paraphrases, or summaries not represented correctly
Academic Integrity / Plagiarism	Exemplary use of sources so that no plagiarism occurs, all sources are represented fairly, and a spirit of academic integrity is exhibited in the writing of the paper and the completion of the assignment	Good, competent use of sources so that no plagiarism occurs	An isolated incident of unintentional plagiarism due to carelessness	Repeated incidents of unintentional plagiarism due to misunderstanding of a single concept	☐ Cheating ☐ Consistent incidents of unintentional plagiarism that show little understanding of academic integrity

*A single check in the far right-hand column – for any criterion -- should result in a failing grade for the SEWS paper.

Appendix B – NSSE to IL Mapping Chart

* NSSE released an updated version in 2012. Some questions were added, some deleted, some changed (either minimal or significant change). See http://nsse.iub.edu/html/survey_instruments.cfm for more information.

Information Literacy Standard 1			
NSSE 1.0* Used for 2010 Freshmen		NSSE 2.0 Used for 2013 and 2014 Seniors	
7.d	Work on a research project with a faculty member outside of course or program requirements	11.e	Work with a faculty member on a research project
7.h	Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, etc.)	11.f	Complete a culminating senior experience (capstone course, senior project or thesis, comprehensive exam, portfolio, etc.)
11.m	Solving complex real-world problems	17.i	Solving complex real-world problems

Information Literacy Standard 2			
NSSE 1.0* Used for 2010 Freshmen		NSSE 2.0 Used for 2013 and 2014 Seniors	
7.d	Work on a research project with a faculty member outside of course or program requirements	11.e	Work with a faculty member on a research project
7.h	Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, etc.)	11.f	Complete a culminating senior experience (capstone course, senior project or thesis, comprehensive exam, portfolio, etc.)
11.g	Using computing and information technology	Deleted	
11.m	Solving complex real-world problems	17.i	Solving complex real-world problems

Information Literacy Standard 3			
NSSE 1.0* Used for 2010 Freshmen		NSSE 2.0 Used for 2013 and 2014 Seniors	
1.d	Worked on a paper or project that required integrating ideas or information from various sources	Deleted	
1.e	Included diverse perspectives (different races, religions, genders, political beliefs, etc.) in class discussions or writing assignments	2.c	Included diverse perspectives (political, religious, racial/ethnic, gender, etc.) in course discussions or assignments
1.i	Put together ideas or concepts from different courses when completing assignments or during class discussions	2.a	Combined ideas from different courses when completing assignments
1.l	Used an electronic medium (listserv, chat group, Internet, instant messaging, etc.) to discuss or complete an assignment	Deleted	
1.m	Used e-mail to communicate with an instructor	Deleted	
1.p	Discussed ideas from your readings or classes with faculty members outside of class	3.c	Discussed course topics, ideas, or concepts with a faculty member outside of class
2.b	Coursework emphasizes: Analyzing the basic elements of an idea, experience, or theory	4.c	Analyzing an idea, experience, or line of reasoning in depth by examining its parts
2.c	Coursework emphasizes: Synthesizing and organizing ideas, information, or experiences	4.e	Forming a new idea or understanding from various pieces of information
2.d	Coursework emphasizes: Making judgments about the value of information, arguments, or methods	4.d	Evaluating a point of view, decision, or information source
7.d	Work on a research project with a faculty member outside of course or program requirements	11.e	Work with a faculty member on a research project
7.h	Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, etc.)	11.f	Complete a culminating senior experience (capstone course, senior project or thesis,

			comprehensive exam, portfolio, etc.)
11.e	Thinking critically and analytically	17.c	Thinking critically and analytically
11.f	Analyzing quantitative problems	17.d	Analyzing numerical and statistical information
11.g	Using computing and information technology	Deleted	
11.h	Working effectively with others	17.f	Working effectively with others
11.m	Solving complex real-world problems	17.i	Solving complex real-world problems

Information Literacy Standard 4			
NSSE 1.0* Used for 2010 Freshmen		NSSE 2.0 Used for 2013 and 2014 Seniors	
1.c	Prepared two or more drafts of a paper or assignment before turning it in Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, etc.)	1.b	Attended an art exhibit, play or other arts performance (dance, music, etc.)
2.e	Coursework emphasizes: Applying theories or concepts to practical problems or in new situations	4.b	Applying facts, theories, or methods to practical problems or new situations
7.h	Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, etc.)	11.f	Complete a culminating senior experience (capstone course, senior project or thesis, comprehensive exam, portfolio, etc.)
11.c	Writing clearly and effectively	17.a	Writing clearly and effectively
11.d	Speaking clearly and effectively	17.b	Analyzing numerical and statistical information
11.m	Solving complex real-world problems	17.i	Solving complex real-world problems

Information Literacy Standard 5			
NSSE 1.0* Used for 2010 Freshmen		NSSE 2.0 Used for 2013 and 2014 Seniors	
7.h	Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, etc.)	11.f	Complete a culminating senior experience (capstone course, senior project or thesis, comprehensive exam, portfolio, etc.)
11.m	Solving complex real-world problems	17.i	Solving complex real-world problems

Appendix C – Faculty Survey

Information Literacy Standard 1

- My undergraduate students have the ability to develop a focused argument for a research paper.

Information Literacy Standard 2

- My undergraduate students have the ability to use the library's catalog to find a book on a specific subject.
- My undergraduate students have the ability to gather background information in books and reference sources.
- My undergraduate students have the ability to identify relevant keywords and controlled vocabulary (subject terms) for searching a topic.
- My undergraduate students have the ability to conduct a search in an interdisciplinary database such as Academic Search Elite.
- My undergraduate students have the ability to determine local availability of resources and use interlibrary loan if needed.
- My undergraduate students have the ability to revise the topic if search results are unsatisfactory.
- My undergraduate students have the ability to revise the strategy if search results are unsatisfactory.

Information Literacy Standard 3

- My undergraduate students have the ability to evaluate the authority, currency, and relevance of information gathered.
- My undergraduate students have the ability to understand and differentiate between primary vs. secondary resources.
- My undergraduate students have the ability to understand and differentiate between popular vs. scholarly resources.

Information Literacy Standard 4

- My undergraduate students have the ability to summarize, organize, and synthesize information found.

Information Literacy Standard 5

- My undergraduate students have the ability to observe copyright guidelines; legally obtain, store, and use text and data.
- My undergraduate students have the ability to cite information sources accurately, according to standard formatting style.