Time Enough?: Experimental Findings on Embedded Librarianship

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Abstract

We often assume first-year composition (FYC) involves outside research and that information literacy (IL) is a necessary component of a college education. Yet scholarship routinely shows that students struggle with college-level research, writing instructors struggle to teach it, and librarians struggle to connect with curriculum and students. What can be done? This article reports on a semester-long controlled study measuring the effect embedded librarianship had on FYC students' basic IL skills, library attitudes, and source synthesis. Across three measures, embedded librarianship failed to demonstrate significant improvement in comparison to the controls. Our results provide further evidence that one-shot sessions are insufficient means of reaching IL objectives set by professional organizations. We conclude by overviewing four possible alternative approaches to structuring information literacy education.

Introduction

What does good information literacy instruction look like? As a WPA and a librarian teaching in the same first-year composition program, we found this question critical to pose and challenging to answer. Like many universities, our campus lacks courses dedicated to IL or basic research methods. Instead, our required general education curriculum assigned research skills to English 101 and 102, 14-week courses that deliver research instruction through a librarian-led single class period on library resources—a "one-shot" session. This solution fit our time constraints and matched common practice but meant that students had approximately one hundred minutes to master IL objectives. Unsurprisingly, this approach failed to meet required course outcomes.

The term one-shot names its trouble. Artman et al. argue it "describe[s] and convey[s] the futility of these sessions" (94). We further worried one-shot sessions could hinder students' IL development. One-shots can misrepresent research as a single database foray, realized in the product of a found source—any source that seems to work. This contradicts the Association of College and Research Libraries' (ACRL) *Framework for IL*, which emphasizes recursivity and practice, how compositionists define research as a process (Perl; Brent "The Research Paper"; Fister), and how professionals and lay people acquire information (Haglund and Olsson; Jamali and Asadi; Haines et al.; Nuti et al.; Stevens; Hightower and Caldwell; Sennyey et al.; Rowlands et al.).

Recognizing one-shots as pedagogically unsound, our FYC/library faculty team sought alternatives. While composition studies has called for new ways to teach research, library science has proposed an improvement—the embedded librarianship model. The model is not without issues. First, it demands time and personnel from departments often lacking both. It increases librarians' classroom contact hours and necessitates planning sessions and regular communication with faculty. The model requires writing instructors to emphasize research skills without necessarily reducing other curricular expectations. Such rearrangements of staff time and class hours call for careful deliberation and well-grounded hope. Grounded hope speaks to the second issue: embedded librarianship research often relies on small case studies, making it difficult to generalize positive results.

Our team thus not only developed an embedded librarian–based curriculum but also ran the pilot as a controlled experiment, intending to collect robust, generalizable data. Over a semester, we tested the effects of embedded librarianship against those of a traditional one-shot instruction model. We hypothesized that embedded librarianship would prove a worthy investment of class time, as we thought its effects would extend beyond basic IL skills. Extra time spent working with librarians, we speculated, would help model academic research as an iterative process arising from responsive and responsible inquiry. We thought the model would improve the timing of research activities in our curriculum and provide students more time to search, to analyze sources, and to integrate those sources into their arguments.

Ultimately we found both the control and experimental groups demonstrated minor improvement in IL, but the general improvements fell far short of our objectives and there was no significant difference between students in the one-shot model and students in the embedded librarian model. Our findings add to the growing concerns about the one-shot model of IL instruction; they also raise questions about the efficacy of embedded librar-

ianship. We offer details in our conclusion, where we concentrate on the timing of IL education. Our results suggest more time in itself may not significantly improve students' research skills. This opens the question of how much time research deserves in FYC classrooms, and how we balance that allocation with other commitments.

What's Past: A Review of IL Studies

How have previous programs taught research skills and fostered IL? The field of composition studies acknowledges the importance of IL while illustrating deficits in its instruction. Students are argued to lack general IL skills (Calkins and Kelley; Haller), the higher-level research skills college demands (Purdy and Walker; McClure and Clink; McClure "Examining"), and the motivation to invest in research (Brent "The Research Paper"). But such misery has not sought company. Perelman points out that librarians are stakeholders and willing collaborators in IL discussions (193), yet few compositionists publish on joint efforts (Birmingham et al.). Journals mostly offer case studies on specific assignments (Vetter; Rosinski and Peeples; McClure et al.; Kadavy and Chuppa-Cornell). Brady et al. do provide an overview of a joint library/FYC program, but offer as evidence only positive student feedback while noting the publication dearth of such collaborations (see also Rabinowitz). Anecdote suggests FYC programs and libraries cooperate, but such work remains within campus walls.

Instead of library collaborations, composition scholars often propose revising curricula. In a trend that spans decades, a number of articles offer intriguing ways to teach research-based argument but provide little detail about what the associated library activities entail (Birmingham et.al). For example, Petersen and Burkland provide detail on generating effective research questions but state students "research it" without elaborating how (239). Capossela outlines an inquiry-based, conversation model, claiming "This logical, need-based way of approaching the library is more reasonable and psychologically realistic than the traditional prompt for research papers" (78). Her model, however, offers no insight into the library research component beyond select student praise. More recently, Davis and Shandle's plea for reimagined research assignments gives multiple approaches but never mentions librarians as a resource (see also Coon; Mueller; Keast; Sura; Foster; Sánchez et al.). Corbett even rejects the need for librarian presence in his FYC courses. The siloed effect persists at the national level; Addison and McGee's review of the NSSE questionnaire shows twelve questions about writing assignments, none of which even suggests a library interaction.

Academic librarianship, in contrast, has produced robust work on teaching IL, one of which as recently as 2013 suggests writing studies to be "blissfully unaware" (Brent, "The Research Paper" 43). A review of the field finds strong consensus against one-shot models (Kvenild and Calkins; Walker and Pearce; Kesselman and Watstein). As far back as 1988, Engeldinger acknowledged one-shots were "universally lamented by instruction librarians." Now librarians increasingly promote the embedded librarianship model.

Embedded librarianship in general means that "the librarian becomes a member of the customer's community rather than a service provider standing apart" (Si et al.). Within this approach, Si et al. summarize the literature by defining two continua of embedded programs: micro to macro and physical to online. Micro-embedding involves library intervention at the course or program level. Macro-embedded models integrate librarians within a department, so much so that librarians may even "permanently reside in the department" (Si et al.). This approach somewhat differs from traditional library liaison programs by formally placing librarians within other departments. One of our project's librarians, for example, was the English department's library liaison, but she operated from within the library and did not have dedicated requirements in place for instruction or research assistance outside of delivering one-shot sessions. Physical-embedding enhances the librarian's presence by increasing the frequency of visitations or by expanding availability (e.g., office hours). Online embedding typically occurs within the university's learning management software (Daly; Matthew and Schroeder).

In the past decade, many librarians implemented embedded librarianship. Some report generalizable results (see Sapp et al.), but most draw on case studies (Helms and Whitesell; Hall; Kim and Shumaker). So while we saw great promise in the theory of embedded librarianship, we recognized a need to examine embedded librarianship's efficacy in a wide-scale, rigorous study. This is especially true given embedded librarianship's demands on all parties involved. Such "costs" require careful study before wholesale adoption, and we wanted to implement programmatic and interdepartmental changes only with sufficient empirical evidence, advice we offer any WPA.

To test the effects of embedded librarianship, we piloted a micro-level, physical model, as we worked with a particular course rather than an entire department. We also used the physical method as it was most familiar and appealing to our librarians.

Semester of Change: Study Design And Participants

In spring 2015, we conducted our experiment at University of Massachusetts Dartmouth. Students were drawn from eighteen sections of ENL 102, the second course in the required FYC sequence (N = 248). Half the sections received the project's intervention and the rest served as controls. Of those 248 participants, 150 students completed both the IL pretests and posttests and 146 completed both the attitudinal survey pretests and posttests. All participating ENL 102 sections shared curriculum as well as major writing assignments. Five instructors taught all of the project's sections. Each instructor taught an equal number of control and experimental sections. The two participating librarians handled the library instruction for all sections involved. Prior to the semester, we divided sections among the instructors and librarians. Following an IRB-approved protocol, we requested participation from all students in each of the eighteen sections on the first week of classes. There was no incentive for student participation.

Control sections received a one-shot instruction session taught by a team librarian. Experimental sections received the same one-shot session as controls as well as an additional three lessons all run by their embedded librarian. The additional lessons included a dedicated introductory session, further training in database navigation and source evaluation, and practice with selecting objects of analysis for the final essay. The team's two librarians coordinated lessons so all classes received similar material.

To measure IL skills and attitudes, we analyzed three forms of student data.

1. Pretests and Posttests

We based our test format on Hufford's published work. Both the pretest and posttest assessed the same content and took the same form, differing only in question order and detail (e.g., the pretest used climatology while the posttest used astrophysics). Test content included general IL skills, skills covered by the one-shot sessions, and skills to be re-emphasized during the extra "Library Connection" sessions. The pretest was distributed in the first two weeks of classes, the posttest during the penultimate (13th) week of the semester. Each test had 15 multiple choice questions.

2. Attitudinal Surveys

Just as composition scholars note the disjunction between high school and college English classes (Applebee and Langer), the literature of library science shows that many first-year students fail to comprehend university libraries: they frequently come from high schools with one librarian and feel

unprepared for comparatively massive university libraries (Head). The university landscape—with subject-specialist librarians and discipline-specific discourse communities—confuses many first-year students. Thus library sessions often aim to familiarize students with university librarians; Markgraf et al. argue, for instance, that "having a librarian come to a class for an instruction session can reduce library anxiety" (15).

We also created a six-question survey about students' comfort level with using online research skills and campus library services. Four of the questions were Likert-type items and two were yes/no. This attitudinal survey was administered twice, once with the pretest and once with posttest.

3. Student Essays

We collected and analyzed final papers—an argumentative essay meant to contribute to a class's themed "conversation." As every section taught the same assignment sequence, all essays responded to essentially an identical writing assignment.

Over the summer and fall of 2015, we analyzed the project's data. We first, however, omitted five questions from the pretests and posttests that failed to capture what both the one-shot session and additional library instruction lessons covered. After a norming session, the team coded for and graded 130 student essays (with controls and experimentals distributed evenly), having disregarded work from sections whose instructors altered assignment requirements (e.g., some instructors did not require their students to acquire scholarly sources).

Statistical analyses were conducted with IBM's SPSS software. In all cases, we followed convention by setting an alpha of 0.05 to determine statistical significance.

Our Moment of Truth: Review of Results

1. IL Pre- and Posttests

While many students completed at least one pretest or posttest (n = 248), we examined only completed pairs of pre- and posttests (n = 150), leading to 82 controls and 68 experimentals respectively. The data show the experimental sections scored higher than the control sections on the posttest, but pretest means varied widely (table 1). Thus, comparing posttest means would not inform us about changes brought on by the intervention because the experimentals began with a considerable "head start." We analyzed the data with a repeated measures analysis of variance (ANOVA), a useful

method to compare improvement between groups. We did not find significant differences between groups, $F(1, 148) = 1.20$, $p = .275$.

Table 1
Mean Results for Pre- and Posttests

	Control (*SD*)	Experimental (*SD*)
n	82	68
Pretest Mean	47.0 (20.3)	55.1 (21.90)
Posttest Mean	63.9 (21.7)	67.8 (19.0)

2. Attitudinal Surveys

146 students completed both attitudinal surveys. Students improved in most categories (table 2). To determine the influence of the intervention on these gains, we ran a repeated measures ANOVA on each item. Some controversy exists with using parametric tests on ordinal, Likert-type data, but Norman and Murray find that such tests are appropriate. Question 6 alone demonstrated significance ($p = .003$).

3. Student Essays

The final assignment called for students to synthesize one outside, scholarly source into an academic camp/perspective. We found this the one area where some instructors diverged from the pre-established curriculum; we removed divergent classes from the dataset and then rounded to the closest even number ($n = 130$, split evenly for controls/experimentals). Coding identified what kind of source, if any, a student used beyond the required readings, i.e. "Outside Source Present" and "Scholarly Source Present." For all categories other than "Outside Source Present," we coded only those students who had included an outside source, $n = 110$, 54 controls and 56 experimentals (table 3).

Table 2
Results for Attitudinal Surveys

	Control		Experimental		
	Pre-Survey Mean (*SD*)	Post-Survey Mean (*SD*)	Pre-Survey Mean (*SD*)	Post-Survey Mean (*SD*)	ANOVA Results
Q1. I can find information in databases.	3.82 (.86)*	4.17 (.83)	3.60 (.83)	4.15 (.72)	F =1.855 p = .175
Q2. I feel comfortable evaluating credibility.	3.59 (.90)*	4.08 (.86)	3.47 (.87)	4.03 (.77)	F =.186 p = .667
Q3. I feel comfortable asking librarians for help.	3.87 (1.07)*	3.85 (1.00)	3.72 (1.20)	3.94 (1.00)	F =2.031 p = .156
Q4. I can integrate sources into my writing.	3.86 (.89)*	4.28 (.68)	3.84 (.87)	4.22 (.750)	F =.075 p = .784
Q5. I go to a librarian for help with research.	1.27 (.45)†	1.22 (.42)	1.28 (.45)	1.34 (.48)	F = 1.689 p = .196
Q6. I use the library's resources for my research.	1.87 (.34)†	1.81 (.40)	1.76 (.42)	1.91 (.29)	F = 9.253 p = .003

* Scale: 0–3
† Yes = 2, No = 1

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Within this subset, coders scored Synthesis Effectiveness from 0 to 3. When a student used multiple sources in a paper, the coders scored the source which appeared to facilitate the best synthesis. A paper which made no discernible synthesis received a 0, e.g. explaining a source in isolation or using a source as evidence for a student's individual claim. A score of 1, the most common score given, made a superficial connection between the outside source and the synthesis camp, e.g.: "Like Adichie, Marco Caracciolo contributes an argument that proves authors have a personal impact on readers." This level of synthesizing names a connection but leaves it undeveloped.

A score of 2 demonstrated a more specific connection among authors. For example:

> This camp believes that writers are not writing about anything important. Currey argues that emails taking over letters is hindering the quality of writing because writers don't think about what they're saying. Nehring presents the lack of reading by people today being due to writers not talking about important subjects that would be worth reading. Prato also complains that the largest problem facing the news industry is sloppy writing by reporters that no one wants to read.

While a 2 score reflects a vague connection which requires the reader to connect the pieces, a 3 shows a specifically named and fully supported connection:

> This Creative Camp, instead of paying attention to audience, sees writing as a way to create ideas and be creative. Mason Currey argues how writing is an outlet which gives the writer the ability to create new ideas without any limitations. Currey views letter writing as a way of "easing in and out of a state of mind" which permits the writer to create more meaningful and "in depth work" (Currey). The idea is that letter writing is what writing should be. Similarly, Flower and Hayes argue that authors should free write, and in so doing, build on previous ideas through creation: "this act of creating ideas, not finding them, is at the heart of significant writing" (22). A similar stance is found in Lou LaBrant's work, who believes that good writing allows the writer to focus on expression, writing without any limits. In all of these authors, writers should not be restricted by any rules, and are truly able to convey the thoughts that they have—writing is basically a way to create and to solve problems, not so much to reach an audience.

This excerpt connects the outside source to the synthesized perspective and then gives this set of authors a concrete description of shared values.

To test for significance, we ran an ANOVA on each of the categories, finding no significant differences between groups.

Table 3
Mean Results for Student Essay Synthesis Coding (0–3 Scale)

	Control	Experimental	Significance
Outside Source Present (n = 130)	84.6%	86.2%	F = .061 p = .806
Scholarly Source Present (n = 110)	78%	84%	F = .665 p = .417
Synthesis Effectiveness Score Outside Source (n = 110)	0.50	0.64	F = .203 p = .275

Time to Reflect: Discussion of Results

After analysis and review, two key findings emerge. First, both groups improved their basic IL skills. Gains from the IL pretest to the posttest were significant ($p < .001$) and responses of "I don't know" declined by almost half (320 to 161). We recognize too many extra-classroom factors to claim responsibility for the students' gains: we acknowledge, for example, the presence of a "maturation effect" as well as corroboration (other courses covering IL skills). These factors, and more, may have caused such improvement. Still, these results show that FYC students improve in basic IL skills, even without focused training. Such findings might temper the widespread concern that college, and FYC in particular, does not improve students' IL. Yet these slight gains fail to represent either our program's objectives or expectations set by the CWPA or ACRL.

This foreshadows our second, more pressing conclusion: the data show no significant differences between our experimental and control groups. Absent any discernible effects from our embedded librarianship project, we cannot claim that the intervention improved students' IL skills and attitudes. The findings provide further evidence that one-shot sessions are insufficient means of reaching IL objectives set by professional

organizations. They also complicate the current optimism for embedded librarianship.

Our survey results also illustrate the difficulty in improving students' library attitudes. We assume that a large majority of students coming into our experiment received library instruction, since most ENL 101 classes included a one-shot. But just 27% of pre-intervention students claimed to ask librarians for research assistance, and 27% post-intervention students made the same claim. Similarly, students did not feel comfortable working with librarians at the project's end relative to other scores; the posttest result of 3.81 barely increased and remained the lowest score on the same scale. Our hypothesis that additional librarian visits would improve students' comfort of the library and its librarians, unfortunately, did not prove true.

We did find notable improvement on one question: students in the embedded librarian sections reported a statistically significant increase in using library resources. Such results call for further exploration through corroboration (e.g., tracking library visitations). But overall the attitudinal surveys show, at most, that the embedded librarianship model slightly increased the number of students who report using the library's resources. In our targeted areas of improving comfort and contact with librarians, the embedded librarianship model cannot be considered an improvement over the one-shot model, and neither model demonstrates much efficacy.

The student essay results, which examined synthesis skills, also raised concerns. Source selection is a common IL assessment measure within library studies, and one in which embedded librarianship has shown improvement (Sapp et al.). We hypothesized that embedded librarianship would result in more students finding appropriate outside sources during class and/or be more likely to consult librarians. We predicted the experimental sections would use more outside sources that matched the assignment criteria (peer-reviewed, scholarly articles), yet we found no differences between groups.

We had also speculated our intervention's early work identifying "outside sources" might give students more time to unpack these difficult texts and thus improve their ability to integrate outside research. But all students struggled to synthesize outside material. Most students could retrieve scholarly sources (81%), but few could effectively integrate these found sources into larger discussions. In contrast, students were more able to synthesize class readings, identifying and analyzing connections among authors (scoring 1.27 out of 3.00, over a 200% improvement from synthesizing outside sources). We thus suggest that the low synthesis scores reflect not an inability to synthesize but rather a difficulty engaging independently with scholarly work. This echoes Doug Brent's experiences, where his students

"learned how to find information in the library and how to document it . . . But their research papers, by and large, remained hollow imitations of research, collections of information gleaned from sources with little synthesis, evaluation, or original thought" (*Reading* 3). These conclusions also complement The Citation Project's finding that students pick up a source's individual sentences rather than engage with its entire argument (Howard et al.).

We find our results surprising and disappointing, especially when similar programs reported success with embedded librarianship. We postulate several hypotheses for this difference in findings. First, we may not have "embedded" librarians enough. The experimental classes received three times more exposure and interaction with librarians—a serious investment of class time and curricular focus. However, three days comprise little of the semester's 40-some sessions and do not offer much reinforcement or guided practice. Unfortunately, this is where the resource-intensiveness of embedded librarianship factors in: a practical look at staff resources and curricular demands finds our model already strains campus capacity. More library sessions would be infeasible.

We also considered that our test instrumentation failed to capture the intervention's effects. We acknowledge the difficulty inherent in measuring literacy growth. Pre- and posttests are the norm for library science research (Helms and Whitesell), but they might not fully capture student development. However, we argue that our data collection—tests, surveys, and student writing—is too robust to dismiss solely in terms of erroneous assessment measures.

Instead we wonder if our study's design affected results. We were able to work within a semester-long timeframe; previous work did not often probe "long lasting" effects. Gandhi, reporting on an often-cited successful embedded librarianship project, administered IL pretests on week two, reviewed them with experimental sections in week three, and then administered posttests on week four. If we wish to measure gains in IL, then considering a full semester seems to us the basic unit of time; advanced study would consider transfer across semesters and even beyond college.

We could also control many variables among the 18 involved sections, another feature not always possible in previous work. Mery et al. found that students receiving online embedded instruction performed much better on posttests than students receiving traditional instruction. Yet they acknowledge that for "students [receiving online instruction], both the pre- and posttests had points toward the final grade associated with them. However, students in the other groups did not have this grade incentive" (375). Connecting student grades to test performance for one group will confound

results. Archambault's multi-year assessment of first-year student learning admits a "major limitation of [her] research study is its methodology . . . seven different librarians taught the face-to-face segments, and while standardization was attempted, there may have been some inconsistencies in delivery . . . No control group was used . . . there was no pre-test, and so it is unknown whether the students in each year started from different baselines of knowledge" (100).

However, our results do concord with some previous research. One-shot models have been shown ineffective at meeting IL learning outcomes (Mery and Newby; Artman et al.). Furthermore, Hufford's study of a library-run research course found that, while students improved from beginning to end, they could not satisfy the course's objectives. Thus while previous studies of intensive embedded models have reported some success, even IL-centered, library-run courses report problems teaching this complex topic successfully.

In summary, while students show minor improved basic IL skills and attitudes over the semester, we find no meaningful difference between students receiving one-shot or embedded instruction. Furthermore, there is no evidence of advanced IL improvement as defined by students' ability to successfully synthesize "outside sources" into their arguments. Thus neither the one-shot nor the embedded librarianship model helped students achieve the course's IL learning outcomes.

The Future Tense: Alternative Approaches to Teaching IL

A writing program's best approach to IL must balance generalizable research with local needs, resources, and constraints. But because our findings suggest the embedded model is itself insufficient for improving student literacy, and the model is particularly resource-heavy, we caution against its adoption. Yet we also recognize the need to move beyond one-shot models. What, then, might be done? The literature provides several alternatives. They all reimagine what good IL education looks like; each may also create strain within and between stakeholders. We recommend reviewing all of these models before planning pilot interventions; each offers a different arrangement of costs and benefits.

Moving Embedding Online

For programs interested in extending time spent on IL and with librarians, embedding online might offer a feasible and efficacious model. Physical embedding is limited by staff availability whereas online librarians can simultaneously assist many classrooms. While studies of online embedded

are few, they show potential. Heathcock, for instance, found no significant differences in student performances when they received "limited-duration [online] embedded librarians" or "full-semester embedded librarians," although with a limited sample (n = 22).

The online embedded model, however, often takes a one-on-one approach. This can shift a librarian's perceived role from teacher to tutor, possibly challenging professional identity and training. An ACRL report finds librarians often fail to include interactive tutoring sessions in descriptions of valuable work (Oakleaf 134). While ACRL defends the importance of such online support, the shift requires more than a change in role definition. Studies find classroom-based instructional strategies do not effectively transfer to tutoring (Eldredge; Waite; Gannon-Leary and Carr), so successful online embedding can require new skills. We see a need for more research in online embedded librarianship's effects, especially controlled studies comparing one-shot and physically embedded models to online forms and what works for training staff and designing curriculum.

Adopting a Train-the-Trainer Model

For programs prepared to rearrange instructional responsibilities, another possibility is adopting the "train-the-trainer" model. This approach shifts IL teaching entirely to the FYC faculty. Librarians, in turn, instruct faculty on how to best teach IL. White-Farnham and Gardner report their successes with faculty and librarians co-developing online course-content and then having faculty integrate it in their courses. Their study speaks to the larger research agenda in library science called "train-the-trainer" (for parallel quantitative arguments, see Samson and Millet; Wolfe). At its best, this model increases teaching adaptability while also efficiently allocating time. The librarians concentrate on supporting the writing faculty who in turn meet their classes' unique needs with well-trained methods. But train-the-trainer undercuts an important goal of many FYC/library collaborations—increasing students' comfort and engagement with librarians to create thereby transferable, cross-campus connections. Its paired potential and risk call for more research.

Developing Macro-Embedded Librarian Positions

Micro-level, physical embedded librarianship might be the most resource-heavy of current IL instruction models. Macro-level embedding, with its program/department-level dedicated librarian, could require fewer long-term resources. When working on the micro-level, library-based instruction staff must juggle university-wide commitments, coordinate schedules, stan-

dardize instruction, and collaborate with all interested faculty. A macro-embedded librarian can concentrate on developing expertise and connections within a smaller, stable sphere. The cost of such positions is upfront and serious. Yet after establishment, these positions abound with time to create and implement IL education throughout a program or major.

Such dramatic role realignments and institutional change require buy-in from various stakeholders and cannot be easily implemented. For most universities, macro-librarianship cannot be the short-term or even mid-range solution to IL education's issues. What WPAs could do, however, is advocate for these kinds of positions in their institutions and their professional organizations.

Remapping IL Outcomes

Turning to the inward logic of the above solutions, however, we note these approaches all raise the question why FYC should include IL or research objectives at all. The assumption FYC advances IL through outside research is thoroughly embedded, though its efficacy has been questioned for decades (Larson). The current WPA outcomes statement expects students to locate, evaluate, and integrate sources, and ACLR's *Framework* more fully depicts college-level IL's complexity. Mazziotti and Grettano argue that previous incarnations of these documents demonstrate cross-field consensus points—foundations for cooperative IL teaching efforts. Their work illustrates a collaboration-based perspective to IL, one seemingly premised on many hands make light work.

Yet is teaching IL an issue of coordinating multidisciplinary hands? Meeting the IL portion of CWPA outcomes, let alone the ACRL *Framework*, seems to require at least its own class, a conclusion reached by some librarians (Cook; Eland). Perhaps effective teaching requires us not to make light work of IL (and perhaps unintentionally make light of it), but rather to shift focus from collaborative planning to curriculum timing. What if both fields turned their attention to redesigning IL education, making time for it throughout an entire college education and/or developing research skills within concentrated classes?

With such a change, FYC could devote more time to teaching students how to unpack complex readings and then integrate them meaningfully into argument. Adler-Kassner and Estrem, with many others, have called for a renewed FYC focus on reading (Bunn; Rhodes; Howard et al.), and Keller concludes his book-length study of the issue arguing "As literacies accumulate composition must position and reposition itself amidst receding, merging, and emerging literacies, as well as in respect to its purposes

and responsibilities" (157). We wonder what would happen if FYC repositioned its contribution to IL as that of increasing reading and writing skills and teaching students to understand and respond to arguments. Later courses could assume the responsibility of teaching discipline-based IL and research skills.

As the college-wide ACRL standards acknowledge, FYC cannot be the sole provider of IL; it might not even be a good provider. WAC, WID, or even major-based classes in research offer more contextualized, dedicated, and extended time for research skills training. But alike to macro-embedded librarianship, this dramatic a change extends beyond the power of a WPA or even an FYC/library collaboration. Such work might begin, though, with FYC/library advocacy against one-shot instruction and one-class mastery. And both composition studies and library science can shape research and policy agendas that support substantial IL education.

Now is not the time to be coy about teaching IL; its importance deserves our best efforts. But IL is a long-term project and an FYC semester is short. How to balance FYC's sometimes iron-wrought time constraints requires individual, programmatic, and cross-field study. However, we acknowledge the wide consensus that one-shot sessions show little success. Similarly, our findings suggest "micro-level" embedded librarianship will not necessarily improve student learning. For WPAs intrigued by embedded librarianship models, we recommend careful study of their efficacy, especially before moving whole programs to such a resource-intensive approach. We also suggest considering the wider set of options currently under study, from online embedding to campus-wide curriculum remapping. Overall, we join voices from both composition and library science calling to develop further, empirical studies of IL interventions.

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Works Cited

Addison, Joanne, and Sharon James McGee. "Writing in High School/Writing in College: Research Trends and Future Directions." *College Composition and Communication*, vol. 62, no. 1, 2010, pp. 147–79.

Adler-Kassner, Linda, and Heidi Estrem. "Reading Practices in the Writing Classroom." *WPA: Writing Program Administration*, vol. 31, nos. 1–2, 2007, pp. 35–47.

Applebee, Arthur N., and Judith Langer. "What Is Happening in the Teaching of Writing?" *English Journal,* vol. 98, no. 5, 2009, pp. 18–28.

Archambault, Susan Gardner. "Library Instruction for Freshman English: A Multi-Year Assessment of Student Learning." *Evidence Based Library and Information Practice*, vol. 6, no. 4, 2011, pp. 88–106.

Artman, Margaret, et al. "Not Just One Shot: Extending the Dialogue about Information Literacy in Composition Classes." *Composition Studies*, vol. 38, no. 2, 2010, pp. 93–110.

Association of College and Research Libraries. *Framework for Information Literacy for Higher Education*. American Library Association, 2015, ala.org.

Birmingham, Elizabeth Joy, Luc Chinwongs, Molly Flaspohler, Carly Hearn, Danielle Kvanvig, and Ronda Portmann. "First-Year Writing Teachers, Perceptions of Students' Information Literacy Competencies, and a Call for a Collaborative Approach." *Communications in Information Literacy*, vol. 2, no. 1, 2008, pp. 6–24.

Brady, Laura, et al. "A Collaborative Approach to Information Literacy: First-Year Composition, Writing Center, and Library Partnerships at West Virginia University." *Composition Forum*, vol. 19, 2009.

Brent, Doug. *Reading as Rhetorical Invention: Knowledge, Persuasion, and the Teaching of Research-Based Writing*, NCTE, 1992.

—. "The Research Paper, and Why We Should Still Care." *WPA: Writing Program Administration*, vol. 37, 2013, pp. 33–53.

Bunn, Michael. "Motivation and Connection: Teaching Reading (and Writing) in the Composition Classroom." *College Composition and Communication*, vol. 64, no. 3, 2013, pp. 496–516.

Calkins, Susanna, and Matthew R. Kelley. "Evaluating Internet and Scholarly Sources Across the Disciplines: Two Case Studies." *College Teaching*, vol. 55, no. 4, 2007, pp. 151–56.

Capossela, Toni-Lee. "Students as Sociolinguists: Getting Real Research from Freshman Writers." *College Composition and Communication*, vol. 42, no. 1, 1991, pp. 75–79.

Cook, Jean M. "A Library Credit Course And Student Success Rates: A Longitudinal Study." *College and Research Libraries*, vol. 75, no. 1, 2014, pp. 272–83.

Coon, Anne C. "Using Ethical Questions to Develop Autonomy in Student Researchers." *College Composition and Communication*, vol. 40, no. 1, 1989, pp. 85–89.

Corbett, Patrick. "What About the 'Google Effect'?: Improving the Library Research Habits of First-Year Composition Students." *Teaching English in the Two-Year College*, vol. 37, no. 3, 2010, p. 265.

Davis, Robert, and Mark Shadle. "'Building a Mystery': Alternative Research Writing and the Academic Act of Seeking." *College Composition and Communication*, vol. 51, no. 3, 2000, pp. 417–46.

Daly, Emily. "Embedding Library Resources into Learning Management Systems: A Way to Reach Duke Undergrads at Their Points of Need." *College and Research Libraries News,* vol. 71, no. 4, 2010, p. 208.

Eland, Tom. "A Curriculum-Integrated Approach to Information Literacy." *Information Literacy Handbook.* Edited by Christopher N. Cox and Elizabeth Blakesley Lindsay, Association of College and Research Libraries, 2008, pp. 103–12.

Eldredge, Jonathan. "The Librarian as Tutor/Facilitator in a Problem-Based Learning (PBL) Curriculum." *Reference Services Review*, vol. 32, no. 1, 2004, pp. 54–59.

Engeldinger, Eugene. "Teaching Only the Essentials - The Thirty-Minute Stand." *Reference Services Review*, vol. 16, no. 4, 1988, pp. 47–50.

Fister, Barbara. "Teaching the Rhetorical Dimensions of Research." *Research Strategies*, vol. 11, no. 4, 1993, pp. 211–19.

Foster, Helen. "Growing Researchers Using an Information-Retrieval Scaffold." *Teaching English in the Two-Year College*, vol. 31, no. 2, 2003, pp. 170–78.

Gannon-Leary, Pat, and James Carr. "New Partnerships for Learning: Meeting Professional Information Needs." *Journal of Education and Work*, vol. 23, no. 1, 2010, pp. 65–77.

Gandhi, Smiti. "Faculty-Librarian Collaboration to Assess the Effectiveness of a Five-Session Library Instruction Model." *Community and Junior College Libraries*, vol. 12, no. 4, 2004, pp. 15–48.

Haglund, Lotta, and Per Olsson. "The Impact on University Libraries of Changes in Information Behavior among Academic Researchers: a Multiple Case Study." *The Journal of Academic Librarianship*, vol. 34, no. 1, 2008, pp. 52–59.

Haines, Laura L., Jeanene Light, Donna O'Malley, and Frances A. Delwiche. "Information-Seeking Behavior of Basic Science Researchers: Implications for Library Services." *Journal of the Medical Library Association*, vol. 98, no. 1, 2010, pp. 73–81.

Hall, Russell. "The 'Embedded' Librarian in a Freshman Speech Class: Information Literacy Instruction in Action." *College and Research Libraries News*, vol. 69, 2008, pp. 28–30.

Haller, Cynthia R. "Toward Rhetorical Source Use: Three Student Journeys." *WPA: Writing Program Administration*, vol. 34, no. 1, 2010, pp. 33–59.

Head, Alison J. "Learning the Ropes: How Freshmen Conduct Course Research Once They Enter College". *The Passage Studies*. Project Information Literacy, 2013. *projectinfolit.org*.

Heathcock, Kristin. "Embedded Librarians: Just-In-Time or Just-In-Case? A Research Study." *Journal of Library and Information Services in Distance Learning*, vol. 9, nos. 1–2, 2015, pp. 1–16.

Helms, Marilyn M., and Melissa Whitesell. "Transitioning to the Embedded Librarian Model and Improving the Senior Capstone Business Strategy Course." *The Journal of Academic Librarianship*, vol. 39, no. 5, 2013, pp. 401–13.

Hightower, Christy, and Christy Caldwell. "Shifting Sands: Science Researchers on Google Scholar, Web of Science, and PubMed, with Implications for Library Collections Budgets." *Issues in Science and Technology Librarianship*, vol. 63, 2010.

Howard, Rebecca Moore, et al. "Writing from Sources, Writing from Sentences." *Writing and Pedagogy*, vol. 2, no. 2, 2010, pp. 177–92.

Hufford, Jon R. "What Are They Learning? Pre- and Post-Assessment Surveys for LIBR 1100, Introduction to Library Research." *College and Research Libraries*, vol. 71, no. 2, 2010, pp. 139–58.

Jamali, Hamid R. and Saeid Asadi. "Google and the Scholar: the Role of Google in Scientists' Information-Seeking Behaviour." *Online Information Review*, vol. 34, no. 2, 2010, pp. 282–94.

Kadavy, Casey, and Kim Chuppa-Cornell. "A Personal Touch: Embedding Library Faculty into Online English 102." *Teaching English in the Two-Year College*, vol. 39, no. 1, 2011, 63–77.

Keast, Darren. "A Class For Vets, Not By a Vet: Developing a Veteran-Friendly Composition Course at City College of San Francisco." *Composition Forum*, vol. 28, fall 2013.

Kesselman, Martin A., and Sarah Barbara Watstein. "Creating Opportunities: Embedded Librarians." *Journal of Library Administration*, vol. 49, no. 4, 2009, pp. 383–400.

Keller, Daniel. "Locating Reading in Composition Studies" *Chasing Literacy: Reading and Writing in an Age of Acceleration*. UP of Colorado, 2013.

Kim, Sung Un, and David Shumaker. "Student, Librarian, and Instructor Perceptions of Information Literacy Instruction and Skills in a First Year Experience Program: A Case Study." *Journal of Academic Librarianship*, vol. 41, no. 4, 2015, pp. 449–56.

Kvenild, Cassandra, and Kaijsa Calkins. *Embedded Librarians: Moving Beyond One-Shot Instruction*. American Library Association, 2011.

Larson, Richard L. "The 'Research Paper' in the Writing Course: A Non-Form of Writing." *College English*, vol. 44, no. 8, 1982, pp. 811–16.

Markgraf, Jill, Kate Hinnant, Eric Jennings, and Hans Kishel. *Maximizing the One-Shot: Connecting Library Instruction with the Curriculum*. Rowman and Littlefield, 2015.

Matthew, Victoria, and Ann Schroeder. "The Embedded Librarian Program." *EDUCAUSE Quarterly,* vol. 29, no. 4, 2006, pp. 61–65. er.educause.edu.

Mazziotti, Donna, and Teresa Grettano. "'Hanging Together': Collaboration Between Information Literacy and Writing Programs Based on the ACRL Standards and the WPA Outcomes." *Declaration of Interdependence: The Proceedings of the ACRL 2011 Conference, March 30–April 2, 2011, Philadelphia, PA*, edited by Dawn M. Mueller, Association of College Research Librarians, 2011, pp. 180–90.

McClure, Randall. "Examining the Presence of Advocacy and Commercial Websites in Research Essays of First-Year Composition Students." *WPA: Writing Program Administration*, vol. 32, no. 3, 2009, pp. 49–74.

—. "WritingResearchWriting: The Semantic Web and the Future of the Research Project." *Computers and Composition*, vol. 28, no. 4, 2011, pp. 315–26.

McClure, Randall, and Kellian Clink. "How Do You Know That?: An Investigation of Student Research Practices in the Digital Age." *portal: Libraries and the Academy*, vol. 9, no. 1, 2009, pp. 115–32.

McClure, Randall, et al. "The Search for the Skunk Ape: Studying the Impact of an Online Information Literacy Tutorial on Student Writing." *Journal of Information Literacy*, vol. 5, no. 2, 2011, pp. 26–45.

Mery, Yvonne, and Jill Newby. *Online by Design: The Essentials of Creating Information Literacy Courses*. Rowman and Littlefield, 2014.

Mery, Yvonne, et al. "Why One-Shot Information Literacy Sessions Are Not the Future of Instruction: A Case for Online Credit Courses." *College and Research Libraries*, vol. 73, no. 4, 2012, pp. 366–77.

Murray, Jacqueline. "Likert Data: What to Use, Parametric or Nonparametric?" *International Journal of Business and Social Science*, vol. 4, no. 11, 2013.

Mueller, Derek. "Mapping the Resourcefulness of Sources: A Worknet Pedagogy." *Composition Forum*, vol. 32, fall 2015.

Norman, Geoff. "Likert Scales, Levels of Measurement and the 'Laws' of Statistics." *Advances in Health Sciences Education*, vol. 15, no. 5, 2010, pp. 625–32.

Nuti, Sudhakar V., et al. "The Use of Google Trends in Health Care Research: A Systematic Review." *PLOS ONE*, vol. 9, no. 10, 2014.

Oakleaf, Megan. *The Value of Academic Libraries: A Comprehensive Research Review and Repor*t. American Library Association, Sept. 2010, ala.org.

Perelman, Les. "Information Illiteracy and Mass Market Writing Assessments." *College Composition and Communication*, vol. 60, no. 1, 2008, pp. 128–41.

Perl, Sondra. "The Composing Process of Unskilled College Writers." *Research in the Teaching of English*, vol. 13, no. 4, Dec. 1979, pp. 317–36.

Petersen, Bruce T., and Jill N. Burkland. "Investigative Reading and Writing: Responding to Reading with Research." *College Composition and Communication*, vol. 37, no. 2, 1986, pp. 236–41.

Rosinski, Paula, and Tim Peeples. "Forging Rhetorical Subjects: Problem-Based Learning in the Writing Classroom." *Composition Studies*, vol. 40, no. 2, 2012, pp. 9–33.

Purdy, James P., and Joyce R. Walker. "Liminal Spaces and Research Identity The Construction of Introductory Composition Students as Researchers." *Pedagogy*, vol. 13, no. 1, 2013, pp. 9–41.

Rabinowitz, Celia. "Working in a Vacuum: A Study of the Literature of Student Research and Writing." *Research Strategies*, vol. 17, no. 4, 2000, pp. 337–46.

Rhodes, Lynne A. "When is Writing Also Reading." *Across the Disciplines*, vol. 10, no. 4, 2013, wac.coloradostate.edu.

Rowlands, Ian, et al. "The Google Generation: The Information Behaviour of the Researcher of the Future." *Aslib Proceedings*, vol. 60, no. 4, 2008.

Samson, Sue, and Michelle S. Millet. "The Learning Environment: First-Year Students, Teaching Assistants, and Information Literacy." *Research Strategies*, vol. 19, no. 2, 2003, pp. 84–98.

Sánchez, Fernando, et al. "Engaging Writing about Writing Theory and Multimodal Praxis: Remediating WaW for English 106: First Year Composition." *Composition Studies*, vol. 42, no. 2, 2014, pp. 118–46.

Sapp, Nelson, et al. "One-Shot or Embedded? Assessing Different Delivery Timing for Information Resources Relevant to Assignments." *Evidence Based Library and Information Practice*, vol. 8, no. 1, 2013, pp. 4–18.

Si, Li, et al. "Embedded Services in Chinese Academic Libraries." *The Journal of Academic Librarianship*, vol. 38, no. 3, 2012, pp. 175–82.

Shipka, Jody. "A Multimodal Task-Based Framework for Composing." *College Composition and Communication*, vol. 57, no. 2, 2005, pp. 277–306.

Sennyey, Pongracz, et al. "Exploring the Future of Academic Libraries: A Definitional Approach." *The Journal of Academic Librarianship*, vol. 35, no. 3, 2009, pp. 252–59.

Stevens, Ruth S. "Using Google for Legal Research." *Michigan Bar Journal*, vol. 93, no. 7, 2014, p. 56.

Sura, Thomas. "Fostering Research Identities in Two-Course Writing Sequences: A Curricular Perspective." *Composition Forum*, vol. 32, fall 2015.

Vetter, Matthew A. "Archive 2.0: What Composition Students and Academic Libraries Can Gain from Digital-Collaborative Pedagogies." *Composition Studies*, vol. 42, no. 1, 2014, pp. 35–53.

Waite, Kathryn, et al. "The Role and Responsibilities of an E-Tutor Librarian." *Journal of Library and Information Services in Distance Learning*, vol. 5, no. 4, 2011, pp. 129–48.

Walker, Kevin, and Michael Pearce. "Student Engagement in One-Shot Library Instruction." *Journal of Academic Librarianship*, vol. 40, nos. 3–4, 2014, pp. 281–90.

White-Farnham, Jamie, and Carolyn Gardner. "Crowdsourcing the Curriculum: Information Literacy Instruction in First-Year Writing." *Reference Services Review*, vol. 42, no. 2, 2014, pp. 277–92.

Wolfe, Joanna. "Rhetorical Numbers: A Case for Quantitative Writing in the Composition Classroom." *College Composition and Communication*, vol. 61, no. 3, 2010, pp. 452–75.

"WPA Outcomes Statement for First-Year Composition (3.0)." Council of Writing Program Administrators, wpacouncil.org.

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