

Evaluating the Effectiveness of Integrated Information Literacy Instruction on Student Outcomes in the English W131 Multilingual Curriculum

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Number of graduate students in this study: 0
Estimated number of student records used in this study: 984,550

Executive Summary:

This study evaluates the educational outcomes of international students who complete multilingual sections of ENG-W131. After examining the effects of previous preparation and course sequences on ENG-W131 student performance using institutional data, this study assesses the information literacy skills demonstrated by students in the ENG-W131 Multilingual curriculum on their writing assignments. Key findings include that ENG-W131 appears to effectively prepare international students for other courses and that about half of international students who take ENG-W131 Multilingual satisfactorily meet learning outcomes for research writing. These findings will assist the ENG-W131 Multilingual Coordinator and instructors in further improving the ENG-W131 curriculum and instructional training.

Narrative:

Introduction

English W131 Multilingual is an English Composition course designed for students whose previous educational experience was in a non-English language. It enrolls approximately 480 students across 32 sections each year, and comprises many international students' core educational experience in English by fulfilling IUB's General Education English Composition requirement. English W131 focuses on college-level analytical writing, critical thinking, and research synthesis, as well as lexical and linguistic development.

In the 2017-2018 academic year, English W131 Multilingual courses participated in an IU Libraries information literacy curriculum grant. The grant aimed to address issues of source identification, evaluation, and integration in research writing, and develop library-based tutorials to facilitate students' research practices. As part of the IUB Libraries information literacy instructional programs,¹ these curriculum grants represent a key commitment to the Libraries' mission to provide research skills

¹ Information literacy is defined as the set of abilities required for individuals to recognize when information is needed, and to locate, evaluate, and effectively use the required information. IUB librarians teach more than 200 information-literacy focused instructional classes per year and contribute to the development of departmental curricula throughout the university.

training in support of Core Goal 1: An Excellent Education of the Indiana University and IUB Libraries strategic plans.

This collaboration between the English department and the Libraries presented an opportunity to examine the interrelationship between English composition and information literacy instruction for international students and to evaluate the effectiveness of their course-level integration on students' learning outcomes and educational success.

This project had two principal goals: first, we wanted to examine the educational outcomes of students who take ENG-W131 in order to evaluate if particular types of preparation or course sequences result in better student performance. Second, we sought to specifically evaluate the information literacy outcomes of students who participated in the new ENG-W131 Multilingual curriculum.

Methods

For the analysis of student outcomes, we included data from all courses completed by international students who took ENG-W131 from Fall 2009 (when the multilingual English composition curriculum was implemented) to Summer 2018 (approximately 5100 students). Due to difficulties with data processing, only courses with earned credits were included, while transfer grades and "S", "P" and "W" grades were excluded. Because most of the grade-based measures we examined failed the Kolmogorov-Smirnov test for normality, we utilized a series of non-parametric Spearman's rho correlation calculations and Mann-Whitney U distribution tests to examine differences in course performance between groups of students.

To evaluate students' information literacy outcomes we applied a rubric-based rating instrument (Table 1) to writing assignments collected from students enrolled in ENG-W131 Multilingual in Fall 2017. This rubric evaluated student's application of information literacy concepts across five functional criteria. 88 students agreed to include their assignments in this analysis.

Criteria	Satisfactory		Unsatisfactory	
	4	3	2	1
1. Controlling purpose or thesis <i>How well does the essay advance the purpose?</i>	The central purpose is readily apparent and all parts of the paper relate to the purpose.			The purpose is unclear.
2. Critical use of sources <i>How well does the student use sources?</i>	Student evaluates all sources effectively, connects them meaningfully with the purpose, and integrates them in the essay.			Student does not evaluate sources effectively, does not connect them meaningfully with the purpose, and does not integrate them in the essay.
3. Quality of sources <i>Does the student use quality sources?</i>	Student uses popular and scholarly sources that are timely, reliable, and credible.			Student uses a mix of sources but they are not timely, reliable and credible.
4. Integration of sources <i>How well are the sources woven into the essay?</i>	Attribution is clear through the use of well-integrated signal phrases (e.g., indicates identity of the source).			Attribution is unclear and poorly integrated in the essay.
5. Documentation <i>How consistently are the sources documented?</i>	Citations are used consistently in the essay and in the works cited page.			Citations are not used consistently in the paper and in the works cited page.

Table 1: W131 ML--Written Communication Rubric

Findings: Grade Outcomes Analysis

International students who took ENG-W131 exhibited higher overall GPAs than those who did not (Table 2). Interestingly, nonresident alien was the only ethnic group (as defined by institutional data) for which this is true. International students who completed Eng-W131 had a slightly higher average course grade than domestic students (3.273 vs. 3.222). Although this is a statistically significant difference ($p < .001$, independent samples t-test) but the effect size is very small (Cohen’s $d = .066$)². Overall GPA follows a similar pattern at 3.24 for international students who completed ENG-W131 and 3.14 for domestic students ($p < .001$) (Cohen’s $d = .218$)

	Completed W131	Did not Complete W131
American Indian/Alaska Native/Native Hawaiian	3.0814	3.0759
Asian	3.1438	3.2708
Black/African American	2.8136	2.8634
Hispanic/Latino	3.0271	3.0915
No Answer/Other	3.1657	3.2209
NR-Alien	3.2297	3.1063
Two or More Races	3.0505	3.1223
White	3.1735	3.2316

Table 2: Overall GPA & ENG-W131 Completion

The ENG-W131 grade was positively and moderately correlated with grades in other English courses and non-English courses for both international and domestic students, but was negatively correlated with relative performance in non-English courses (Table 3). Notably, the negative correlation for non-English course grade anomaly (the course grade minus the student’s cumulative GPA not including the target course (GPAO)) is much larger for domestic students than international students, meaning that the better these students performed in ENG-W131, the more they underperformed their expected grade in non-English courses.

	English Courses GPA ³	Eng. Courses Ave. Grade Anomaly	Non-English Courses GPA	Non-Eng. Ave. Grade Anomaly
International Students (N=5099)	.335**	0.057	.540**	-.156**
Domestic Students (N=10532)	.415**	0.012	.517**	-.480**

**Spearman's rho sig. at $p < .001$

Table 3: Correlations between ENG-W131 Grade and other grade outcomes.

² All effect sizes calculated at https://www.psychometrica.de/effect_size.html

³ All “English Courses” calculations exclude the grade in ENG-W131.

International students who took ENG-W131 performed better in non-English courses but about the same as predicted about by their overall performance when compared to students that didn't take ENG-W131 (Table 4). Both groups performed about the same in English courses.

	English Courses GPA	Eng. Courses Ave. Grade Anomaly	Non-English Courses GPA	Non-Eng. Ave. Grade Anomaly
No ENG-W131	2.96	-0.13	3.11	0.028
Had ENG-W131	2.95	-0.13	3.23	0.032
Mann-Whitney U (p<.05)	Retain H0	Retain H0	Reject H0	Reject H0
Effect Size (d)			3.451	3.448

Table 4: Grade outcomes for international students comparing ENG-W131 enrollment status.

Together, these findings appear to suggest either that ENG-W131 may be a particularly effective course for preparing international students for other courses, or that there may be an underlying selection factor that affects international students and domestic students differently (e.g. domestic students who take ENG-W131 might be less prepared or more poorly performing in other areas).

Next, we next investigated if different preparation sequences or ENG-W131 sections were associated with difference grade outcomes for international students.

International students who took at least one course in the English Language Improvement (ELI) sequence performed poorer in all course types when compared to students who did not take ELI courses (Table 5). This suggests that students who place into the ELI sequence may continue to struggle relative to their peers even after they complete ENG-W131. While all of these results are significant with relatively large effect sizes, given the similar grade anomaly results it appears that the ELI sequence may select for students who tend to perform more poorly overall.

	English Courses GPA	Eng. Courses Ave. Grade Anomaly	W131 Grade	W131 Grade Anomaly	Non-English Courses GPA	Non-Eng. Ave. Grade Anomaly
ELI Courses	2.86	-0.17	3.09	-0.10	3.19	0.04
No ELI Courses	3.12	-0.06	3.25	-0.05	3.30	0.03
Mann-Whitney U (p<.05)	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
Effect Size (d)	2.94	2.94	3.15	3.15	3.15	3.15

Table 5: Grade outcomes for international students comparing ELI enrollment status.

Similarly, international students who took at least one course in the Intensive English Program (IEP) performed more poorly in ENG-W131 and non-English courses (Table 6). Again, the grade anomaly results indicate that these courses may select for students who tend to perform more poorly overall.

	English Courses GPA	Eng. Courses Ave. Grade Anomaly	W131 Grade	W131 Grade Anomaly	Non-English Courses GPA	Non-Eng. Ave. Grade Anomaly
IEP Courses	2.75	-0.12	2.91	-0.05	2.96	0.06
No IEP Courses	2.96	-0.13	3.16	-0.08	3.24	0.03
Mann-Whitney U (p<.05)	Retain H0	Retain H0	Reject H0	Retain H0	Reject H0	Reject H0
Effect Size (d)			0.49		0.49	0.49

Table 6: Grade outcomes for international students comparing IEP enrollment status.

International students who took a multilingual ENG-W131 ML section performed about the same in ENG-W131 as those that took another section, but poorer in other English and non-English courses (Table 7). However, based on the grade anomaly results both groups over/underperform by similar amounts.

	English Courses GPA	Eng. Courses Ave. Grade Anomaly	W131 Grade	W131 Grade Anomaly	Non-English Courses GPA	Non-Eng. Ave. Grade Anomaly
Multilingual	2.917	-0.146	3.161	-0.063	3.225	0.032
Not Multilingual	3.082	-0.073	3.115	-0.153	3.269	0.034
Mann-Whitney U (p<.05)	Reject H0	Retain H0	Retain H0	Reject H0	Reject H0	Retain H0
Effect Size (d)	2.07			1.96	1.96	

Table 7: Grade outcomes for international students comparing ENG-W131 Multilingual enrollment status.

Overall, ENG-W131 did not appear to be associated with high grades in subsequent courses. For all ENG-W131 grade performance levels (i.e. A-D) except for “C,” students achieved lower grades and underperformed more relative to expectations post ENGL-W131 (Table 8). These differences were only significant for the “A” and “B” performance levels, and had a moderate effect size only for the “A” level. However, students with higher ENG-W131 grades exhibited higher average grades in subsequent non-English courses (Table 9) (One-way ANOVA: $F(3,4693)=46.37, p<.001$), with a large effect size (eta squared = .169).

These outcomes are likely partially related to students tending to take more difficult courses later in their university programs than their ENG-W131 experience, but the sequencing of ENG-W131 in relation to other courses may warrant additional analysis.

W131 Grade	Prior GPA	Post GPA	Effect Size (d)	Prior Grade Anomaly	Post Grade Anomaly	Effect Size (d)
A	3.56*	3.42*	0.369	0.12*	-0.04*	.655
B	3.2*	3.15*	0.11	0.09*	0*	0.28
C	2.88	2.9	N/A	0.08	0.06	N/A
D	2.75	2.59	N/A	0.14	-0.04	N/A

*Difference in mean is significant at $p < .01$ (Paired sample t-test)

Table 8: Mean grade performance and grade anomaly for courses take prior to ENG-W131 and post ENG-W131.

W131 Grade	N	Non-English Courses GPA after ENG-W131
A	1677	3.43
B	2304	3.17
C	668	2.92
D	47	2.59

Table 9: Average grades in subsequent non-English by ENG-W131 grade.

Findings: Information Literacy Analysis

The internal consistency of the information literacy rubric was evaluated using Cronbach's alpha calculated with the sum of the ratings in each of five criteria. This result ($\alpha = .906$) indicated a good level consistency across the criteria, providing a fairly high level of confidence that the rubric criteria measure a common information literacy construct.

Interrater reliability measures for three raters (Table 10) were calculated for scores in each criterion for the full dataset using an interclass correlation coefficient (ICC (2,3) (two-way random, consistency)). The raters achieved good (defined as above 0.60) scoring in each of the 5 criteria, which supports a fairly high level of confidence in the rubric evaluations.

Criteria	ICC (2,3)	Mean Score
1	0.769	2.58
2	0.754	2.38
3	0.745	2.62
4	0.735	2.45
5	0.734	2.23
Total	N/A	12.26

Table 10: Interclass correlation results (ICC (2,3)) for rubric ratings in the five information literacy criteria.

The average rubric score across each of the 5 criteria was between 2 and 3, meaning that on average ENG-W131 students were not quite satisfactorily meeting the information literacy standards (Table 11). Criteria 1 and 3 had a majority of scores that satisfactorily met the standard, while the other 3 criteria had 40-49% of scores meeting the standard. Unfortunately, since we do not have comparison course sections, we are unable to assess whether this level of performance is similar to other student groups at this time.

	1	2	3	4
Criterion 1	12.64%	32.57%	38.70%	16.09%
Criterion 2	14.56%	40.23%	37.93%	7.28%
Criterion 3	8.43%	35.25%	42.53%	13.79%
Criterion 4	11.11%	40.61%	40.61%	7.66%
Criterion 5	24.52%	34.48%	34.48%	6.51%

Table 11: Score distributions in the five rubric criteria

Reflection about the LAF Process

Our LAF research involved using a combination of institutional records and measures of international student success and achievement to determine the types of preparation and course sequencing that lead to better international student performance overall. In addition, we used a rubric-based assessment of the W131 ML research assignment to identify the kinds of information literacy instruction

that are most effective for this group. Following this mixed methods approach, we were able to address not only what types of course sequencing led to better student outcomes, but also, more specifically, we were able to determine learning outcomes for research writing that international students meet successfully as well as outcomes that need improvement.

One challenge we faced was in addressing the research question of the potential long-term effects of instructional interventions. We also proposed comparing the efficacy of new ENG-W131 ML interventions to previous versions of the curriculum, but we were unable to collect data sets that would address this question. For the future, we might consider tracking our current cohort of research participants through the next year of course work in order to determine what curriculum-level interventions were most effective, impactful, and sustainable.

Changes Undertaken, Connections to the Field, and Disseminating the Findings

Our findings related to curriculum-level interventions in information literacy reveal that while the majority of international students who take W131 ML satisfactorily meet learning outcomes for research writing associated with 1) controlling purpose or thesis (i.e. How well do students' research essays advance a central purpose related to all part of the paper?) and 2) the identification of quality sources (i.e. How well do students' research essays use both popular and scholarly sources that are timely, reliable/credible, and appropriate to the research?), a little less than the majority of students satisfactorily meet learning outcomes related to the critical use of sources, integration of sources, and consistent use of documentation style/formats. Based on these findings, the ENG-W131 ML Coordinator plans to make the following changes to the curriculum and to instructional training effective by Fall 2019 and to be piloted in Spring 2019: 1) increased instructor training around the teaching/learning of APA/MLA documentation styles; 2) increased instructor training around the teaching/learning of source integration, including but not limited to the use of models for attribution and in-text citation exercises; and 3) improved scaffolding for the teaching and learning of critical use of sources, including increased focus on heuristics for analytical writing and paragraph development.

There are exciting connections to be made between our LAF research and emerging work at the intersections of information literacy and writing studies. As DeSanto & Harrington (2017) note, "It's a timely moment to be a librarian and a composition scholar collaborating" (p. 275). In the last two years alone, we have seen the publication of two new books, include Baer's (2016) *Information Literacy and Writing Studies in Conversation: Re-Envisioning Library-Writing Program Connections* and Veach's (2018) *Teaching Information literacy and Writing Studies: Volume 1, First-Year Composition Courses*. In addition, numerous articles, conference presentations, and several webinars have appeared that present new possibilities for research and pedagogy at these intersections. Exigence for these heightened collaborations appears to be the result of generative correspondences between the Association of College and Research Libraries' (2015) *Framework for Information Literacy for Higher Education* and the Council of Writing Program Administrators et al.'s (2011) *Framework for Success in Post-Secondary Writing Instruction*, which share similar foundational understandings of learning outcomes associated with the teaching of research writing.

Our current LAF research presents some possible opportunities for contributing to the intersections of information literacy and writing studies, especially in its focus on multilingual student research writing and in its mixed methods, learning analytics approach. Multilingual student research writing represents an area within both information literacy and writing studies that deserves more attention, and few, if

any, studies currently draw on learning analytics methodologies to intervene in current scholarship. Two newer studies address the scaffolding of information literacy for multilingual students in a first-year course (Crist and Miles, 2018), and the information-seeking behaviors of multilingual students (Mina, Bohanna, & Li, 2018). However, neither of these studies address the long-term impacts or immediate learning outcomes of these interventions. An additional contribution that we could make to scholarship at the intersection of information literacy and writing studies would be in the analytical reflection on our collaborative process. Recent work, such as Stinnett & Rapchak (2018) look at collaboration models between librarians and writing instructors and attempt to address the limitations of skills-based information literacy instruction. These studies suggest alternative collaborative-based pedagogical models that more fully take into consideration the overlap in threshold concepts between information literacy and writing studies frameworks for higher-order conceptualizations in students' research writing. Stinnett & Rapchak (2018) lay important groundwork for us to consider how our learning analytics research might inform such collaborative processes.

For now, our plans for future work and dissemination involve continued partnership with the Bloomington Assessment and Research to obtain data sets that enable us to look at ENG-W131 ML grades and information literacy performance. We also plan to follow up on AY18-19 and AY19-20 data sets that looks at the performance of students who participated in the research this year. Other possible future collaborations include learning analytics faculty in Informatics, Economics, Chemistry and Education in research that analyzes the impact of developmental, supplemental, and tutorial services used to help students succeed in their undergraduate gateway courses.

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