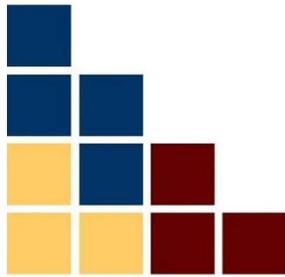# The Impact of Information Literacy Instruction on Student Success: A Multi-Institutional Investigation and Analysis

Greater Western Library Alliance

The Greater Western Library Alliance (GWLA) is a consortium of 36 research libraries located in the central and western United States founded in 1999.

GWLA is a dynamic, effective, project-oriented consortium, nationally recognized as a leader in the transformation of scholarly communication, and a facilitator in the application of new information technologies.

The activities and collaborative projects of the Alliance expand access to quality information both within and beyond the boundaries of the consortium. The highly skilled staffs of its member libraries capitalize on new technologies, to forge effective and meaningful partnerships, and to promote innovation and excellence.

Our common interests intersect in programs related to scholarly communication, interlibrary loan, shared electronic resources, cooperative collection development, digital libraries, staff development and continuing education. GWLA is a 501(c) (3) non-profit corporation headquartered in Kansas City, with staff offices also located in Phoenix.

Our deepest gratitude to Patricia Iannuzzi, Dean Emerita, UNLV Libraries, for inspiring us to take this project on.

Additional thanks to Lisa Hinchcliffe and Roger Schonfeld for their expertise and guidance.

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The Impact of Information Literacy Instruction on Student Success: A Multi-Institutional Investigation and Analysis

Executive Summary

With over 42,000 students from 12 major research universities and over 1700 distinct courses represented, the multi-institutional nature of this study is unprecedented.

Our goals are to evaluate and improve library instruction programs, to quantify the library's role in the academic success and retention rates of undergraduate students, and provide actionable findings for libraries and their information literacy instruction programs.

This study compares the academic outcome measures, retention, GPA and hours earned, of students who received library instruction interactions as part of their course's curriculum with those who did not. A large set of de-identified registration data about 42,624 students enrolled in 1,725 courses was collected from twelve (12) participating universities for the academic year 2014-2015.

This study identified three major findings that demonstrate the value of information literacy instruction:

- Student retention rates are higher for those students whose courses include an information literacy instruction component.
- On average, First-Year GPA for students whose courses included information literacy instruction was higher than the GPA of students whose courses did not.

- Students exposed to library instruction interactions successfully completed 1.8 more credit hours per year than their counterparts who did not participate in courses containing information literacy instruction.

The study is currently in the second year of data collection for the 2015-2016 academic year, with the goal of extending the study to incorporate long-term measures of academic success, such as 4-year and 6-year graduation rates and cumulative GPA while assessing the impact of course-related library instruction pedagogies.

The hope for the longitudinal aspect of this study is to track the ongoing presence of any course-related library instruction for the student cohort(s), which students may receive throughout their undergraduate studies, and to ascertain the cumulative impact of library instruction on their eventual graduation from the institution.

The ability to expand on the positive results found in the first year of this study to the wider community of academic libraries will be increased with the participation of additional institutions in subsequent years of data collection.

Project Origins

For decades, the value of academic libraries and academic librarians has been debated across all types of educational institutions. The exceptional rate of technological change combined with a lingering stereotype of what academic librarians' roles are, has necessitated an evolution that is both reactive and proactive to the academic environment. Through all this, one constant remains; academic librarians and specifically their instructional duties are an essential piece in post-secondary education.

Information literacy is paramount to ambitions of post-secondary education in our global society. The constructs of creating life-long learners, world citizens, critical thinkers and producers of new knowledge are all key concepts in information literacy and are not bound by school or discipline. The ability to find, evaluate, and use information efficiently and effectively has never been more critical than in our modern technology saturated society.

The tendency to take information literacy skills for granted is a cause for concern for academia, yet information professionals struggle with articulating the value of information literacy instruction. While it is easier to find information than, ever before in history, finding valid unbiased information has never been more difficult Evaluating information is becoming increasingly more complex.

Combine all this with post-secondary education's desire to create well rounded graduates that meet the liberal education ideal; a need to holistically evaluate the impact of all types of information literacy/library instruction across all types of institutions in different geographic locations and disciplines is warranted. The majority of research that can illustrate the significant benefits of information literacy instruction are primarily case studies, or limited to one type of institution.

Thus this longitudinal study undertaken by the member institutions of the Greater Western Library Alliance is motivated by the eagerness to form an

understanding of the impact of information literacy on the national level, serve as an inventory and baseline, allow for information professionals and faculty to articulate value with data, allow for data driven programming and planning, and serve as a genesis to information literacy data collection that could lead to an open resource for practitioners and researchers to contribute to and utilize.

By creating and analyzing data related to first-year library instruction and then by following these students longitudinally at member institutions, while new data on freshman students is added, libraries will strengthen instructional relationships across their individual campuses and ensure that professional discourse on curriculum development, instructional practices, and student learning outcomes for information literacy.

This study is unique in both its scope and ambition and will help create a better understanding of library student learning outcomes across diverse campuses. This larger scope will foster discussion across institutions regarding how libraries can improve their instructional efforts for greater student success. The intention is to create a longitudinal, multi-institutional dataset that can inform best practices for information literacy instruction across the nation.

Research Questions

The designers of this study sought answers to the following:

1. What effect does library instruction have on the **retention**?
2. Which **specific library instruction methods have the greatest impact on retention**?
3. What effect does library instruction have on **academic success**?
4. What effect does **specific library instruction interactions have on academic success?**

Data Collection

A large set of de-identified student data was collected from twelve (12) participating universities for the academic year 2014-2015 for first-year courses. Because the study was designed to focus on teaching methods and not on comparison of individual institutions, full details of the analysis results are not provided in this report.

Participating Universities:

Arizona State University (ASU)   University of Houston (UH)

Baylor University (BU)   University of Nevada at Las Vegas (UNLV)

Brigham Young University (BYU)   University of New Mexico (UNM)

Kansas State University (KSU)   University of Southern California (USC)

University of Missouri (MU)   Utah State University (USU)

Southern Methodist University (SMU)   Washington State University (WSU)

Term data used for this study is from Fall 2014 – Spring 2015 only. If a winter mini-semester was reported during this time, it was included in the study.

Instruction data collected included variables relating to teaching methods and delivery of instruction, time the librarian spends in the library session, and between librarians and course instructors on assignment and course design. These data also include university courses that contained library instruction and in which participants are enrolled. Appendix A provides a full list of instruction variables and operational definitions.

Institution data collected was for 100-level/1000-level/freshman-level courses. Student data collected is for all first-year first-time students who began enrolling for the Fall 2014 semester.

Data points included student demographics (gender, ethnicity, year of birth), course(s) enrolled in, class level, hours attempted and hours earned, and GPA. The entire list of data points requested is included in Appendix B.

Data Issues: Cleaning and Merging

Some institutions provided two data sets: library instruction data and institution data. Others provided three datasets: library instruction data, institution data that was divided into two separate data sets: institutional course and grade data for all de-identified student IDs and student demographic data.

Using the de-identified student ID and the university course number as the match points, all data sets were merged into a single database.

The completed dataset retained one record for all first-time first-year students, whether or not the student had attended any library instruction as determined from the data as reported.

Several issues with these data were seen during the data cleaning and matching process, including library-reported instruction interactions that did not match the student or institutional data. The data also revealed numerous cases (approximately 9%) of students participating in library instruction more than once due to being enrolled in more than one class during this time that included library instruction.

These records were retained and treated as repeated measures of library instruction for those students.[1] The summary of student demographics represents the actual number of students who participated, 42,624, but several students, approximately 9% of the total, participated in more than one instruction session during the study period, which brings the total of student interactions to 47,012.

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[1] This was the case for all analyses except that of the effect of library instruction on retention in answer to question 1.

Data Issues: Course Variations

Some participating university courses included more than one library instruction session. In these cases, the sessions were combined.

Differences in reported teaching methods and session characteristics were reported as "Hybrid." For example, one session may have used a tutorial teaching method, but another session did not. This would be reported as a "Hybrid" tutorial teaching method.

Study Participation and Variable Exclusions

Data about 42,624 students was collected from 12 participating institutions, and 1,725 university courses that included a library instruction component were also identified. Enrolled in these 1725 courses were 20,939 students, representing about 49% of the 42,624 students included in the study dataset.

The remaining 21,685 students did not have an information literacy component in the courses they took during the study term. Approximately 9% of the 42,624 students were enrolled in more than one course featuring library instruction, bringing the total number of student interactions up to 47,012. Full time students represented 79.3% of the students in this study.

Gender: Overall 53% of the participants are female and 47% are male.

Ethnicity: Categories include Alaskan Native/Native American, Asian/Pacific Islander, Black/African American, Hispanic/Latino, Multiracial, and White.

The sparsity of some of the ethnicity categories renders this variable unreliable for analysis purposes without combining categories. The decision was made to exclude this variable from the first-year analysis, but may be included in the future.

Class Level is dominated by freshmen for all institutions and so has numerous cells unpopulated in the table of institution versus Class Level. Moreover, there are 10.5% missing values for this variable. This variable was also excluded from the analysis for the same reason that Ethnicity was excluded coupled with the high missing value rate.

Age: A Student's t-test comparing the means of students birth year with respect to whether they attended library sessions showed there is no significant difference in the mean ages between these two groups (p=0.3442), so this variable was also excluded from the study. *First-time Earned Hours* is used in this study in place of the indicator variable that only records *Full-time* or *Part-time*.

The dataset representing all students and all their courses with associated library instruction sessions has a total of 47,012 records, which includes multiple records for the 9% of students who were enrolled in more than one course with library instruction. The repeated measures for students taking multiple courses that include library instruction interactions serves to properly weight the study for the cumulative effect of additional library instruction, and to account for the session characteristics and teaching methods of all the students' sessions.

A breakdown of participation summary by institution is in Appendix C, which includes summary tables of all the variables discussed in this section of the report.

What Effect Does Information Literacy Instruction have on Retention?

A Fisher's Exact Test was conducted for each institution to determine whether student retention was independent of attending library training classes. In this analysis, each student included in the study is represented by a single record.

Based on these data, the results for eight of the twelve institutions were highly significant indicating that attendance in library training classes is highly associated with student retention in these eight institutions.

Based on these data, the results for eight of the twelve institutions were highly significant, indicating that attendance at information literacy sessions is highly associated with student retention at these eight institutions. Spearman correlation coefficients showed positive correlations for all institutions with significant results.

> The results… for eight were highly significant, indicating that **attendance in library training classes is highly associated with student retention.**

Spearman correlation coefficients showed positive correlations for all institutions with significant results. That is, those attending library instruction tended to have a higher retention rate.

Which *Specific Library Instruction Methods* Have the Greatest Impact on Retention?

While some institutions may not show significance overall for the relationship between *Library Instruction* and *Retention*, this does not necessarily mean that this is the case for specific library instruction methods, so associations between retention and specific teaching methods will be explored more fully in future years of the study.

It is also worthwhile to determine which methods are having the greater influence on retention for those institutions that show overall significance, and which have a positive and which have a negative association, enabling institutions to focus resources in line with best practices for library instruction.

A series of Fisher's Exact Tests were conducted for each institution and teaching method. Results are summarized in the table below, where statistically significant results (p-values) are those values that are less than 0.05.

Non-significant results could mean that students exposed to that teaching method were just as likely to leave the institution as those who were not. However, it could also mean that that particular teaching method was not used for a sufficient number of students to ascertain its effectiveness. Spearman correlations were used to ascertain whether the significant findings had either a positive or negative association with retention.

Teaching Method	Number of Institutions			
	Using Method	Significant Result	# Positive Effect	# Negative Effect (*)
Active Learning	12	8	7	1
Directed Practice	12	8	7	1
Flipped Instruction	10	6	5	1
Lecture	12	7	6	1
Other	3	0		

(*) The negative column does not represent a single institution.

All teaching methods, except "Other" are used by most institutions and most show significant positive associations with retention.

Instruction Session Characteristics

A series of Fisher's Exact Tests were conducted for each institution and session characteristic. Results are summarized in the table below, where statistically significant results (p-values) are those values that are less than 0.05.

Non-significant results could mean that students exposed to that session characteristic were just as likely to leave the institution as those who were not. However, it could also mean that that particular session characteristic was not used for a sufficient number of students to ascertain its effectiveness. Spearman

correlations were used to ascertain whether the significant findings had either a positive or negative association with retention.

Session Characteristic	Number of Institutions			
	Using Method	Significant Result	Positive Effect	Negative Effect
Assignment	9	2	2	0
Library Tour	7	2	0	2
One-time Library Instruction	12	7	7	0
Online Tutorial or Digital Learning Object	8	3	3	0
Research Guide Used	10	6	6	0

All session characteristics are found among the majority of institutions. Session characteristics having a significant association with *Retention* for most institutions using that approach are: *One-time Library Instruction* and *Research Guide Used*. Both of these approaches have a positive association with *Retention* across all institutions using this session type.

What Effect Does Library Instruction Have on the Academic Success of College Students?

Academic success of the students in this study is measured by their *First Year GPA* and *First-Year Hours Earned.* These two variables are significantly and positively correlated across all institutions. In this portion of the study. If a student had more than one course with a library instruction session, additional records were included for that student, one record for each course and its related session characteristics were represented.

Students receiving library instruction can be **expected to complete 1.8 more credit hours per academic year** than those who did not attend the training. **The significance of this finding is extreme.**

A Student's t-Test (without regard to institution) comparing the group that attended library instruction with the group that did not for each of the two success measures shows that in both cases there are statistically significant differences in the parameter means as shown in the table below, where the significance for both is p << 0.05.

On average, *First-Year GPA* for students who attended library training was 0.02 points higher than students who did not. These students can be expected to complete 1.8 more credit hours than those who did not attend the training. The significance of this latter finding is extreme p = 7.69E-102. This has far-reaching repercussions for student 4-year and 6-year graduation rates.

Comparing academic success of those who Attended Library Training with those who did not.							
Academic Success Measure	t-test for Equality of Means (*)						
	t	df	Sig. (2-tailed)	Mean Difference (Attended - Did not attend)	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
First-Year GPA	2.610	42898.1	0.0091	0.02167	0.00830	0.00540	0.03795
First-Year Earned Hours	21.483	43348.4	7.69E-102	1.79331	0.08348	1.62969	1.95692

(*) Equal variances not assumed

These tests were repeated for each individual institution. Mean *First-Year GPA* of those who attended library training was significantly different from those who had not attended in eight (8) of the twelve (12) institutions: five (5) in which the mean of the attendees was greater than non-attendees and three (3) in which the mean of the attendees was less than non-attendees.

Mean *First-Year Earned Hours* of those who attended library training was significantly different from those who had not attended in eleven (11) institutions: ten (10) being greater number of hours for those who attended and one (1) being less.

What Effect Does *Specific* Library Instruction Interactions Have on the Academic Success of College Students?

This question was answered using a Multivariate Analysis of Variance (MANOVA) statistical method in which several independent variables were analyzed for their influence on *First-Year GPA* and on *First-Year Earned Hours*, which are the two dependent variables in the model. In this analysis, if a student was enrolled in more than one course with a library instruction component, the additional records were included for that student, one record for each course and its related session characteristics to be represented. Following are the independent variables in the model:

Demographics:
1. Gender
2. ESL required

Teaching Methods:
1. Active Learning
2. Directed Practice
3. Flipped Instruction
4. Lecture
5. Other

Session Characteristics:
1. Assignment
2. Library Tour
3. One-time Library Instruction
4. Online Tutorial or Digital Learning Object
5. Research Guide Used

Rather than perform this analysis on each institution individually, an analysis of variance was performed using *First-Year GPA* as a dimension reduction tool to determine if some natural grouping of institutions could be found, as discussed in what follows. This variable was chosen over *First-Year Earned Hours* because it

showed a greater split among the institutions with respect to mean differences in the t-tests that were previously discussed.

Preliminary Analysis of Variance

A preliminary analysis of variance (ANOVA) was performed to determine whether there are differences between institutions with respect to *First-Year GPA*. This analysis showed that the variances of *First-Year GPA* are non-homogeneous across institutions ($p \ll 0.001$).

Levene's Test of Equality of Error Variances			
Dependent Variable: First-Year GPA			
F	df1	df2	Sig.
202.219	11	46462	**.000**
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.			
a. Design: Intercept + Institution			

And that there are differences between institutions ($p \ll 0.001$).

Tests of Between-Subjects Effects					
Dependent Variable: First-Year GPA					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3015.668[a]	11	274.152	383.487	.000
Intercept	293788.690	1	293788.690	410955.411	.000
Institution	3015.668	11	274.152	383.487	**.000**
Error	33215.307	46462	.715		
Total	434709.314	46474			
Corrected Total	36230.975	46473			
a. R Squared = .083 (Adjusted R Squared = .083)					

A post-hoc analysis using Tamhane's T2 multiple comparisons suggests that the institutions cluster into five groups with respect to their *First-Year GPAs*. This

analytical method does not assume equal variances and is appropriate for use with large data sets. In what follows, the analyses will be repeated on each of the five groups.

Multivariate Analysis of Variance (MANOVA)

The tables below summarize the findings from the MANOVAs for each of the five groups formed from the results of the post-hoc Tamhane's T2 multiple comparisons. "Sig" in the table means Significant at the 5% confidence level.

A "Y" means that "Yes, that variable has a significant influence" on the corresponding dependent variable. If there is a "Y" in the Sig column, then a notation will indicate whether the influence is positive or negative. The final two columns in the table are a tally of the number of groups that showed a positive influence on the dependent variable, along with notation as to how many had a positive influence.

| | First-Year GPA MANOVA | | | | | | | | | | Number of Institution Groups | |
| | Group A | | Group B | | Group C | | Group D | | Group E | | | |
	Sig	Effect	Sig	Effect	Sig	Effect	Sig	Effect	Sig	Effect	Sig	Effect
Gender	Y	F > M	Y	F > M	Y	F > M	Y	F > M	N		4	4 F > M
ESL	Y	+	N		N		Y	+	N		2	2 +
Lecture	N		N		N		N		N		0	
Flipped	Y	-	N		N		N		N		1	0 +
DirPrac	Y	+	N		N		Y	+	N		2	2 +
Active	Y	-	Y	-	Y	-	N		N		3	0 +
Other	Y	+	N		N		NA		NA		1	1 +
One shot	Y	-	N		N		NA		N		1	0 +
Tutorial	N		N		N		NA		NA		0	
Resguide	Y	+	N		N		NA		Y	+	2	2 +
Assign	Y	-	Y	+	Y	+	N		N		3	2 +
Tour	Y	-	N		N		NA		NA		1	0 +

First-Year GPA tends to be most positively influenced by the individual being female, an international student, attendance at library instruction using Directed

Practice teaching methods, Research Guides and Assignments used as part of the Session Characteristics. The teaching method showing the most noticeable negative influence is *Active Learning*.

First-Year Hours Earned seems to be influenced by more factors than is the case for *First-Year GPA*. Females tend to complete more course hours. Teaching Methods of noticeable influence are Flipped Instruction, Active Learning, Tutorials and Library Tours.

Factors in these MANOVAs not showing significance may be areas where improvement could help, but could also be the result of not having enough students for detection of its effect.

Summary

This study demonstrates that Library Instruction plays an important role in the educational success and retention of first-year first-time students at many universities, specifically through the library instruction sessions connected to the

> Library Instruction plays an **important role in the educational success and retention** of first-year first-time students

students' courses. In this first year of the study, *First-Year GPA* and *First-Year Hours Earned* were the available measures of academic success that were shown to be positively associated with library instruction interactions.

The study is currently in the second year of data collection and analysis for the 2015-2016 academic year, with the goal of extending the study to incorporate long-term measures of academic success, such as 4-year and 6-year graduation rates and cumulative GPA in assessing the impact of course-related library instruction interactions.

The complexity of combining library instruction data and student course data across multiple institutions proved to be the most challenging aspect of the study to date. Subsequent years of data collection and analysis may comprise a mix of institutions that continue participating in the study as well as new institutions joining the study for the first time. As such, it is anticipated that new cohorts of first-year first-time students may be analyzed in subsequent years, as well as the ongoing analysis of the original cohort of students represented in this first year of the study. This will enable the continued study of library instruction on first-year retention as well as the impact on long-term measures of academic success.

> In this first year of the study, *First-Year GPA and First-Year Hours Earned* were the available measures of academic success that were **shown to be positively associated with library instruction interactions.**

For some of the larger institutions, the logging of specific library instruction methods may not be feasible for the entire curriculum (i.e. for all courses incorporating library instruction interactions, including upper-level courses), so it is not clear at this time whether specific library instruction methods can be tied to long-term measures of academic success. However, the hope for the longitudinal aspect of this study is to track the ongoing presence of any course-related library instruction for the student cohort(s), which students may receive throughout their undergraduate studies, and to ascertain the cumulative impact of library instruction on their eventual graduation from the institution.

The multi-institutional nature of this study is unprecedented, and is the most valuable aspect of the study efforts thus far. The ability to extend the positive results found in the first year of this study to the wider community of academic libraries will be increased with the participation of additional institutions in subsequent years of data collection for this study.

The complexity and effort required to normalize and compile the multiple sources of data are well worthwhile, considering the potential for this research to confirm the strategic role of academic libraries in meeting the academic mission of the university.

Appendix A: Instructional Variables Reported with Operational Definitions

For every first-year class that has some type of library educational intervention, participating institutions report the following:

- Library Instructor: If a single librarian is associated with this course/section. If the librarian is the only instructor of record, the librarian's name is used as both instructor and librarian.
- Date of session
- Duration of session in minutes
- Number of students
- Class meeting format: in-person or online
- Instructor's name: In most cases, a non-librarian
- Course subject
- Course number
- Course section

Teaching method:

- Lecture: A presentation and/or demonstration, with or without the help of projection of the active website, power-point slides, handouts, etc., with students listening/watching but not actively practicing the methods.

- Flipped classroom: Students were assigned material to complete in advance (modules, videos, tutorials, assignments, etc.), then followed by library instruction which covers the material in greater depth or covers other additional material

- Directed practice: Students followed along on their computers and performed tasks, e.g. using certain search terms and strategies suggested by the librarian.

- Active learning: Students worked in groups or individually to complete in-depth activities and tasks assigned by librarian instructions or to capture learning.

- Other

Session characteristics:

- One-time library instruction: One-shot library workshop for this class with no other meeting planned

- Online Tutorial or digital learning object: Course/section has an online library tutorial or learning objects integrated as assignment(s) or assessment(s)

- Research guide used: Librarian designed a customized research guide for this course/section

- Librarian helped design assignment: Librarian collaborated with instructor to develop at least one major credit-bearing assignment for the course/section.

- Library tour: An organized class tour of library facilities

- Other session characteristics

Course characteristics:

- Librarian helped design course: A librarian helped develop the overall course assignments and/or syllabus through collaboration with the instructor of record for the course.

- Course/section is co-taught by librarian/instructor: A librarian and at least one non-librarian are both instructors of record for the course/section

- Credit-bearing library class, taught by librarian: Librarian(s) is/are the only instructor(s) of record.

- Credit-bearing non-library course taught by librarian: Librarian(s) is/are the only instructor(s) of record.

- For credit bearing course: Number of units or credit hours

- Full-credit course or partial-credit course

- Quarter, semester, or other

- For credit bearing course: Number of times the class met (i.e., number of sessions)

- For credit bearing course: Usual duration of each class meeting (i.e., session duration)

Appendix B: Institutional Data Collected

Student's unique de-identified code (permanently assigned for longitudinal purposes)
Student's Gender
Student's Ethnicity
Student's Class Level (fr, so, jr, sr)
Student's Birth Year
Student ESL Course Required (English as a Second Language – for international students)
Student's total # of credits earned (cumulative at one-year out, two years out, three years out, etc.)
Student's Fall 2014 to Fall 2015 Retention designation (Yes/No)

Student's Fall 2014 term GPA
Student's # credits attempted during Fall 2014 term
Student's # credits completed during Fall 2014 term

Student's Winter 2015 term GPA (if applicable)
Student's # credits attempted during Winter 2015 term (if applicable)
Student's # credits completed during Winter 2015 term (if applicable)

Student's Spring 2015 term GPA
Student's # credits attempted during Spring 2015 term
Student's # credits completed during Spring 2015 term

Student's Summer 2015 term GPA (if applicable)
Student's # credits attempted during Summer 2015 term (if applicable)
Student's # credits completed during Summer 2015 term (if applicable)

Student's First-Year GPA (2014-2015 Academic Year)
Student's # of First-Year credits attempted (2014-2015 Academic Year)
Student's # of First-Year credits completed (2014-2015 Academic Year)

All Courses Taken by the Student during the 2014-2015 Academic Year:
Course Number & Department
Course Section
Course Name
Term In Which Course Was Taken
Grade For That Course

Appendix C: Library instruction Participation Summary

Participating Institutions

Participating Institution	# University Courses (*)	Attended Course with Library Instruction (**)			
		Yes	No	Total	% Yes
Arizona State University (ASU)	191	2,291	6,817	9,108	25.2%
Baylor University (BU)	104	1,161	168	1,329	87.4%
Brigham Young University (BYU)	100	1,450	2,609	4,059	35.7%
Kansas State University (KSU)	323	2,760	1,045	3,805	72.5%
University of Missouri (MU)	187	2,456	3,678	6,134	40.0%
Southern Methodist University (SMU)	60	533	787	1,320	40.4%
University of Houston (UH)	101	1,388	1,395	2,783	49.9%
University of Nevada Las Vegas (UNLV)	167	2,096	1,620	3,716	56.4%
University of New Mexico (UNM)	129	1,525	1,607	3,132	48.7%
University of Southern California (USC)	92	1,490	595	2,085	71.5%
Utah State University (USU)	80	640	830	1,470	43.5%
Washington State University (WSU)	191	3,149	534	3,683	85.5%
TOTAL	**1,725**	**20,939**	**21,685**	**42,624**	**49.1%**
(*) The number of courses that match data recorded in the instructional dataset for each institution.					
(**) Attendance based on those courses that matched with the instructional dataset.					

Gender of Students by Institution

Institution	Gender			Total
	Unknown	Female	Male	
ASU	0	4,302	4,806	9,108
BU	0	804	525	1,329
BYU	0	2,802	1,257	4,059
KSU	0	1,967	1,838	3,805
MU	0	3,254	2,880	6,134
SMU	0	658	662	1,320
UH	0	1,281	1,502	2,783
UNLV	0	2,082	1,634	3,716
UNM	0	1,742	1,390	3,132
USC	147	1,067	871	2,085
USU	0	839	631	1,470
WSU	0	1,894	1,789	3,683
Total	147	22,692	19,785	42,624

Ethnicity of Students by Institution

Institution	Race								
	African American/ Black	Native American/ Alaskan Native	Asian/ Asian American	Asian/ Pacific Islander	Hispanic/ Latino	White/ Non-Hispanic	Multi-racial	Un-known	TOTAL
ASU	410	98	481	25	1,934	4,631	414	1,115	9,108
BU	100	5	91	1	175	886	67	4	1,329
BYU	26	9	93	17	234	3,348	202	130	4,059
KSU	144	14	153	5	243	3,033	140	73	3,805
MU	541	9	147	2	233	4,812	195	195	6,134
SMU	56	4	72	2	125	915	50	96	1,320
UH	305	1	758	3	851	574	114	177	2,783
UNLV	269	8	634	59	1,104	1,127	410	105	3,716
UNM	69	85	140	5	1,579	1,071	121	62	3,132
USC	94	3	420	8	239	705	115	501	2,085
USU	15	32	9	11	65	1,017	20	301	1,470
WSU	182	22	206	16	543	2,230	335	149	3,683
TOTAL	2,211	290	3,204	154	7,325	24,349	2,183	2,908	42,624

Class Standing of Students by Institution

Institution	Class Level					Total
	Freshman	Sophomore	Junior	Senior	Unknown	
ASU	9,108	0	0	0	0	9,108
BU	1,329	0	0	0	0	1,329
BYU	3,299	687	72	1	0	4,059
KSU	3,630	131	7	0	37	3,805
MU	6,134	0	0	0	0	6,134
SMU	1,320	0	0	0	0	1,320
UH	2,707	52	24	0	0	2,783
UNLV	3,314	391	10	0	1	3,716
UNM	2,476	615	39	2	0	3,132
USC	2,085	0	0	0	0	2,085
USU	1,470	0	0	0	0	1,470
WSU	3,683	0	0	0	0	3,683
Total	**40,555**	**1,876**	**152**	**3**	**38**	**42,624**

Instructional Format Totals

Meeting Format	Frequency	Percent
In-person	18,930	74.7%
Online	4,340	17.1%
Tour	16	0.1%
Hybrid	381	1.5%
Unknown	1,660	6.6%
Attendees	**25,327**	**100.0%**
Non-attendees	21,685	46.1%
Total	**47,012**	

Full-Time/Part-Time Status of Students

Full-Time/Part-Time Status		
Status	Frequency	Percent
Full-Time	33,788	79.3%
Part-Time	8,836	20.7%
Total	42,624	100.0%

Appendix D: Study Contributors

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