

Access or Awareness? Identifying Relationships between Reference and Other Dimensions of Public Services

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Academic libraries are in the seemingly endless process of transforming public services to meet the needs of a continuously changing environment. Moreover, not only are academic librarians expected to serve more students with less money, the accessibility of an overwhelming amount of information has made information literacy skills a more visible component of a postsecondary education.¹ Despite the increased visibility of information literacy, reference transactions have been steadily declining in many academic libraries in the United States, including ARL libraries. Reference transactions are opportunities to engage patrons in informal teaching and learning activities,² in which librarians help users to develop information literacy and critical thinking skills. However, the decline in reference has been accepted by many as inevitable, since most of the students currently enrolled in our institutions are digital natives and part of the Google generation. Due, in part, to the decline in reference transactions, many academic libraries have consolidated service points, including reference desks and branch libraries, eliminated services point, or reduced staffing in order to save money.³ While it is imperative that libraries implement innovative and forward-thinking public services models to meet the expectations of these students, an investigation of the relationship between the number of reference transac-

tions and other aspects of public services is warranted in order to make evidence-based decisions about the transformation of public service models.

This study seeks to understand the relationship between different aspects of public services in Association of Research Libraries (ARL) libraries between 2006 and 2011, so that libraries can maximize the utility of their resources and create sustainable services in a constantly changing climate. In particular, this study seeks to answer the research question, “Do the number of instruction sessions, participants in library instruction sessions, service points, and service hours predict the number of yearly reference transactions?” The independent variables in this study are broken into two categories to determine if accessibility to or awareness of library services are important to the number of yearly reference transactions. This study is not meant to defend traditional reference services; innovation and change are imperative, as studies have shown that the traditional reference model is not cost effective,⁴ especially in light of declining numbers of transactions. Despite this, educating our patrons, both formally and informally, remains a critical component of what all academic libraries strive to do. Furthermore, the number of reference transactions is one of the only measures we have of how we are helping patrons on a one-on-one, informal basis across a range of universities.

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Literature Review

Rachel Applegate used 2002 and 2004 data from the Academic Library Survey (ALS) of the National Center for Educational Statistics (NCES) to determine if there was a decline in reference transactions in American academic libraries, and, if so, if this decline was dependent upon institution type. Applegate found that “the average American academic library saw its overall number of transactions decline approximately 2.2%” from 2002 to 2004.⁵ Although this decline was apparent across all institution types, doctoral institutions, including both ARL and non-ARL institutions, witnessed the largest declines. A decline was also apparent when reference transactions were analyzed in terms of FTE. However, when weekly reference transactions were analyzed by the number of librarians, the number of weekly reference transactions per librarian actually increased at masters institutions from 2002 to 2004. Applegate notes that the student-librarian ratio at masters level institutions increased during those years, meaning that the number of librarians decreased or the student body grew without a corresponding increase in the number of librarians. In sum, Applegate found that there was a decline in the number of weekly reference transactions in American academic libraries, but doctoral institutions, including both ARL and non-ARL institutions, are not representative of all academic libraries with respect to this decline.

The decline in reference transactions means that academic librarians are losing valuable opportunities to engage with users, particularly students. Many academic librarians view reference transactions as opportunity teaching, serving as teachable moments that use these one-on-one interactions to help students develop their information literacy or critical thinking skills.⁶ James Elmborg argues that a reference transaction “can be a powerful teaching station—more powerful, perhaps, than the classroom.”⁷ Elmborg believes that the informal, one-on-one, point-of-need instruction given in the reference transaction is more “authentic” than generalized classroom instruction.⁸ When reference transactions are viewed as teaching

opportunities, the decline in reference transactions is problematic.

Indeed the professional standards for reference services, the Reference and User Services Association’s (RUSA) Guidelines for Behavioral Performance of Reference and Information Service Providers, “emphasizes the importance of instruction in all reference environments.”⁹ Previous research indicates that students perceive that they are in fact learning when they make use of reference services. Denise D. Green and Janis K. Peach report that more than 90% of students in their study reported learning “something new about how to do research” and using library resources.¹⁰ JoAnn Jacoby and Nancy P. O’Brien found that 63.8% of undergraduate participants reported learning something new in the reference transaction.¹¹ Students also perceived increased confidence in finding and using information as a benefit of the reference transaction. Gillian S. Gremmels and Karen Shostrom Lehmann found that almost all participants in their study believed “the librarian taught them something.”¹² In addition, about three quarters of students who had received library instruction prior to seeking reference help “perceived a relationship between the reference librarian’s instruction and information literacy instruction.”¹³ Furthermore, reference as a teaching opportunity is possible no matter the medium of delivery. Christina M. Desai and Stephanie J. Graves compared the amount of instruction given in face-to-face and online reference transactions to determine if there was a difference between these media. The authors concluded that a difference did not exist, and users received library instruction between 82% and 89% percent of the time.¹⁴

A couple of publications have examined the potential relationship between formal library instruction and reference services. C. Paul Vincent writes that library instruction is “a necessary response to the information explosion,”¹⁵ but argues that library instruction is not enough to create an independent, self-reliant library user in light of the increasingly complex information landscape. Vincent believes that high-quality instruction and reference services should

go hand-in-hand, arguing that library instruction can “do little more than touch the surface”¹⁶ and sophisticated, one-on-one reference transactions can go into more depth, thus creating a symbiotic public services relationship. Vincent provides evidence from his own library that he believes demonstrates that there is indeed a positive relationship between library instruction and reference services.

E. Stewart Saunders uses ARL data from eighty-three libraries over a six-year period (1995-2000) to investigate whether library instruction leads to a decline in reference transactions, hypothesizing that students who have received library instruction might feel more self-reliant. Saunders cites Vincent’s opposing view, which states that library instruction should increase the number of reference transactions because library instruction “leads the user to understand his/her own shortcomings” in terms of library use and information seeking.¹⁷ The dependent variable in Saunders’ study was the number of reference transactions, and the independent variable was the number of students who received bibliographic instruction. Using regression analysis, Saunders found that the number of students receiving library instruction was positively correlated with the number of reference transactions, which refutes his initial hypothesis. Based on the analyses, Saunders predicts an increase of “two to seven questions for each person receiving bibliographic instruction.”¹⁸

Method

Data and Sample

The data used in this study come from the annual ARL (Association of Research Libraries) Statistics and were downloaded from the ARL Statistics Analytics website. The sample size for this study is 91 libraries, meaning that not all ARL libraries were included in the analysis. This study only investigates the relationship between reference transactions and other aspects of public services for ARL libraries affiliated with a university in the United States. ARL libraries that are not affiliated with a university, such as the Boston Public Library or the Library of Congress, were re-

moved prior to analysis, as were Canadian ARL libraries. Only libraries that had complete data for the years examined (2006-2011) were included in the analysis. Eight university-affiliated ARL libraries located in the United States were removed for incomplete data prior to analysis.

Analysis

This study uses ordinary least squares (OLS) regression models to analyze the data and identify statistically significant relationships. The number of yearly reference transactions is the dependent variable for the initial regression models used for analysis (Models 1a and 1b). Both will use the number of service points and the number of service hours as independent variables, but one model will use the number of instruction sessions as a third independent variable (Model 1a) and the other will use the number of participants in instruction sessions (Model 1b).

$$\text{Model 1a. } \text{reftrans} = \alpha + \beta_1(\text{svcpnt}) + \beta_2(\text{svchours}) + \beta_3(\text{grppres}) + \dots + \text{error}$$

$$\text{Model 1b. } \text{reftrans} = \alpha + \beta_1(\text{svcpnt}) + \beta_2(\text{svchours}) + \beta_3(\text{presptcp}) + \dots + \text{error}$$

These variables are discussed in more detail in the next section.

OLS regressions will be run for each year included in the study to determine if statistically significant relationships exist between the number of yearly reference transactions and the independent variables. If a consistent statistically significant relationship is found among any of the three independent variables using the initial models (Models 1a and 1b), the residuals will be plotted and analyzed to determine if the relationship between the number of yearly reference transactions and the statistically significant independent variables is linear or nonlinear. If the plots indicate that the residuals are not random, the dependent and statistically significant independent variables will be log-transformed in order to create a linear relationship, which should result in more accurate coef-

ficients, and a new OLS regression models will be run for each year included in the study. The new residuals will be plotted and examined for linearity.

If a statistically significant relationship is identified, the coefficients generated from the regression analysis will be used to make predictions that could be used as evidence to inform changes in public services models.

The reason for running separate OLS regression models for the number of group presentations and the number of participants in group presentations is that these two variables are highly correlated and including both of them in the same model could result in issues with multicollinearity. Multicollinearity affects the regression coefficients and the overall predictive power of the regression model.

Variables

Dependent Variable

The dependent variable for this study is the number of yearly reference transactions at ARL libraries. ARL libraries can provide an actual count of yearly reference transactions or an extrapolated yearly count from the number of reference transactions in a typical week. From 2007 to 2011, ARL libraries were instructed to include virtual reference transactions in the reported count.

Independent Variables

The independent variables in this study are the number of staffed library service points, the number of weekly public service hours, the number of library instruction sessions, and the number participants in library instruction sessions at ARL libraries for each year included. The number of service points is a count of points of services, including, but not limited to, reference and circulation desks, at main and branch libraries. The number of service hours is an “an unduplicated count of the total public service hours per typical full-service week... across both main library and branches.”¹⁹ Not included in this count are hours in which no library staff is present, even if portions of the library remain open. The number of library in-

struction sessions is a count of formal presentations by library staff including, but not limited to, class presentations, orientation sessions, or credit-bearing information literacy courses. The number of participants in library instruction sessions is a headcount of the total number of participants who attended the library instruction sessions that were reported to ARL for that year. ARL instructs members to only count each person one time for sessions that meet multiple times and have a constant enrollment. Despite this, it is possible that one student attended several “one-shot” library instruction sessions in a single year, so duplication may exist in this headcount.

The number of service points and service hours indicate the accessibility of reference services to the user. Due, in part, to the decline in reference transactions, many academic libraries have consolidated services points, including reference desks and branch libraries, eliminated services points, or reduced staffing in order to save money.²⁰ At the same time, academic libraries, particularly at large universities, are moving to a 24/7 or 24/5 model.²¹

The number of library instruction sessions and participants in library instruction sessions both indicate the opportunity to generate awareness of librarians and the services they offer. Library instruction sessions can help students to understand the ways in which librarians can help students throughout the research process. Also, library instruction sessions could increase how approachable a librarian seems to students. Furthermore, according to Melissa Gross and Don Latham, information literacy competency theory suggests that students who are not exposed to or do not adequately develop information literacy skills tend to overestimate their ability to find, evaluate, and use information and do not recognize expertise in others, such as librarians.²² Consequently, increased exposure to information literacy concepts through additional library instruction sessions should have a positive effect on reference transactions, in that students might be more able to recognize when they need help. Saunders’ hypothesis diverges from the rationale presented here, in that he argued instruc-

tion sessions could decrease the number of reference transactions because instruction should produce a “self-reliant user” who “has less need of the services a reference librarian provides.”²³ However, his analysis supports a positive correlation between library instruction sessions and the number of yearly reference transactions.

Control Variables

Control variables include the logarithm of the libraries’ total expenditures, the number of full-time students, and the number of faculty. All of the variables used in the regression analysis were used in Saunders’ study with the exception of expenditures. However, Saunders used the numbers of service points and services hours as control variables, rather than as independent variables. Since this study seeks to determine the importance of accessibility and awareness, these two variables were included as independent variables rather than control variables.

Limitations

As in any empirical study, the results of the study are only as good as the data that are collected and analyzed. Applegate provides a nice overview of the challenges of working with the number of reference transactions.²⁴ Furthermore, the possibility exists that libraries unintentionally reported inaccurate reference transaction totals. This is especially true if the

number provided is based on an extrapolation.

OLS regression models cannot determine causality. One might be tempted to interpret a statistically significant, positive relationship between the two awareness variables—the number of library instruction sessions and the number of participants in those sessions—as causing an increase in reference transactions, since the number of reference transactions is unlikely to cause an increase in these two independent variables. However, the method of analysis does not support that type of interpretation and should be avoided. OLS regression models can be used to make predictions based on the relationship between variables.

Finally, the results of this study should not be used to make generalizations about non-ARL libraries. Applegate’s study suggests that there are differences between ARL and non-ARL libraries in terms of reference transactions, and the assumption that ARL libraries are somehow representative of all academic libraries is problematic.

Results

Descriptive Statistics

The number of reference transactions as ARL libraries steadily declined between 2006 and 2010 (see Table 1). In terms of real numbers, the mean number of yearly reference transactions was 86,342 in 2006 and 60,436 in 2011. This is a decrease of 30%. The mean number of service points was 23 in 2006 and 2007, 22 in

TABLE 1
Means and Standard Deviations (N=91)

	2006	2007	2008	2009	2010	2011
Reference transactions	86,342 (54,688)	82,667 (54,986)	74,553 (49,861)	68,803 (48,234)	65,653 (48,973)	60,436 (46,147)
Service points	23 (12)	23 (12)	22 (12)	22 (11)	21 (12)	21 (12)
Service hours	121 (22)	122 (21)	123 (21)	124 (21)	124 (20)	125 (20)
Instruction sessions	928 (522)	931 (518)	962 (532)	997 (521)	1,013 (564)	978 (484)
Participants	15,447 (9,032)	16,499 (10,567)	17,508 (10,894)	17,045 (9,483)	17,413 (10,024)	17,723 (9,938)

Note: Standard deviations are in parentheses.

2008 and 2009, and 21 in 2010 and 2011. On the other hand, the mean number of service hours increased by one hour in each year examined, except for 2010, from 121 hours to 125 hours. The mean number of library instruction sessions increased every year with the exception of 2011. Between 2006 and 2010, the mean number of library instruction sessions increased from 928 to 1,013, which is a 9.2% increase. However, the mean number of library instructions dropped to 978 in 2011, a 3.5% decrease. The mean number of participants in library instruction sessions climbed from 15,447 to 17,508 between 2006 and 2008, but dropped to 17,045 in 2009. The mean then started to rebound with 17,723 participants in 2011. Between 2006 and 2011, the number of participants in library instructions sessions increased 14.7%. Although the number of library instruction sessions dropped in 2011, the number of participants in these sessions reached a high point in 2011. Also, the number of participants in library instruction increased at a greater rate than the number of sessions during this time period.

Data Analysis

The sample included the same 91 ARL libraries affiliated with a university in the United States for all years examined. The coefficient of determination (R-squared) for the initial OLS models (Models 1a and 1b) using the raw number of yearly reference transactions ranged between a low of 0.25 and a high of 0.47, meaning that the models explained between 25% and 47% of the variance in the number of yearly reference transactions (see Tables 2 and 3). When the dependent variable and statistically significant independent variables were log-transformed to produce greater linearity in the models (Models 2a and 2b), the coefficients of determination increased, ranging between 0.33 and 0.48 (see Tables 4 and 5). As is true with almost any regression model, the models in this analysis suffer from omitted variable bias, which means that variables that were not able to be included in the models likely contribute to the decline in reference transactions.

TABLE 2
Model 1a Regression Results (N=91)

	2006	2007	2008	2009	2010	2011
Service points	131 (613)	-49.93 (686.48)	375.55 (577.69)	-762.77 (578.39)	-596.89 (542.16)	131.79 (451.51)
Service hours	-271.08 (209.63)	-188.65 (248.28)	53.44 (224.16)	-112.82 (213.52)	14.37 (234.63)	-179.07 (214.81)
Instruction sessions	28.15** (10.70)	26.05* (12.23)	20.02 (10.47)	31.92** (11.14)	30.81** (11.26)	32.94** (10.83)
R-squared	0.46	0.35	0.32	0.33	0.29	0.33

** significant at the 1% level; * significant at the 5% level; Note: Standard errors are in parentheses.

TABLE 3
Model 1b Regression Results (N=91)

	2006	2007	2008	2009	2010	2011
Service points	267.96 (597.23)	124.73 (651.44)	517.03 (561.22)	-563.15 (571.81)	-190.92 (524.61)	353.89 (450.69)
Service hours	-307.53 (209.20)	-231.95 (241.40)	26.16 (219.63)	-167.95 (218.17)	6.07 (245.42)	-234.65 (221.47)
Participants	1.90** (0.67)	2.00** (0.63)	1.66** (0.60)	1.66* (0.68)	1.07 (0.67)	1.39* (0.60)
R-squared	0.47	0.40	0.35	0.31	0.25	0.30

** significant at the 1% level; * significant at the 5% level; Note: Standard errors are in parentheses.

TABLE 4
Model 2a Regression Results (N=91)

	2006	2007	2008	2009	2010	2011
Service points	0.0006 (0.0069)	-0.0011 (0.0081)	0.0056 (0.0075)	-0.0022 (0.0073)	-0.0015 (0.0066)	0.0041 (0.0066)
Service hours	-0.0031 (0.0024)	-0.0019 (0.0030)	-0.0007 (0.0029)	-0.0024 (0.0028)	-0.0005 (0.0030)	-0.0032 (0.0031)
Instruction sessions (Log-transformed)	0.3757** (0.1039)	0.3962** (0.1287)	0.3830** (0.1345)	0.4742** (0.1353)	0.5163** (0.1431)	0.5842** (0.1596)
R-squared	0.48	0.40	0.37	0.39	0.33	0.39

** significant at the 1% level; * significant at the 5% level; Note: Standard errors are in parentheses.

TABLE 5
Model 2b Regression Results (N=91)

	2006	2007	2008	2009	2010	2011
Service points	0.0025 (0.0069)	0.0022 (0.0081)	0.0097 (0.0074)	0.0019 (0.0075)	0.0027 (0.0067)	0.0083 (0.0067)
Service hours	-0.0032 (0.0024)	-0.0022 (0.0030)	-0.0009 (0.0029)	-0.0029 (0.0029)	-0.0013 (0.0032)	-0.0042 (0.0033)
Participants (Log-transformed)	0.3710** (0.1134)	0.3780** (0.1361)	0.5193** (0.1502)	0.3210* (0.1616)	0.3931* (0.1611)	0.3900* (0.1649)
R-squared	0.47	0.39	0.39	0.33	0.33	0.34

** significant at the 1% level; * significant at the 5% level; Note: Standard errors are in parentheses.

Findings

The number of service points and the number of service hours were not significantly correlated with the number of reference transactions in either of the two initial models used, meaning that, in general, the accessibility of reference services is not a significant determinant of the number of reference transactions at the ARL libraries examined in this study.

The number of library instruction sessions (Model 1a) and the number of participants in library instruction sessions (Model 1b) were significant at least at the 10% level in all but one year examined. The residuals were plotted for each year examined and did not appear to be random in distribution. The number of yearly reference transactions, the number of library instruction sessions, and the number of participants in library instruction sessions were all log-transformed in order to create a more linear relationship.

$$Model\ 2a.\ log_reftrans = \alpha + \beta_1(svcpoint) + \beta_2(svchours) + \beta_3(log_grppres) + \dots + error$$

$$Model\ 2b.\ log_reftrans = \alpha + \beta_1(svcpoint) + \beta_2(svchours) + \beta_3(log_presptcp) + \dots + error$$

When the new log-transformed OLS regression models were run both the number of library instruction sessions and the number of participants in library instruction sessions were statistically significant for all years examined. The accessibility variables were not statistically significant in these transformed models. Just as with the initial models, the residuals were plotted and examined. The residuals appeared to have the most random distribution with the two regression models in which the dependent variable and the statistically significant independent variables were log-transformed.

The findings suggest that the number of library instruction sessions and the number of participants in

library instruction sessions both have a positive and statistically significant with the number of reference transactions at university-affiliated ARL libraries in the United States between 2006 and 2011.

Predictions

Predictions can be made using the coefficients generated by the OLS regression analysis. For example, using the coefficient reported for the number of library instruction sessions (Model 1a) in 2011, for each additional instruction session we could expect to see an additional 33 reference transactions. Based on the coefficient for the number of participants in library instruction sessions (Model 1b) in 2011, we could expect to see between 1 and 2 additional reference transactions for each additional student.

The interpretation of the log-transformed models (Model 2a and 2b) is slightly different. For these models, a 1% increase in the statistically significant independent variable determines the predicted value of the dependent variable. Using the coefficient reported for the log of the number of library instruction sessions (Model 2a) in 2011, for a 1% increase in instruction sessions we could expect to see a 0.58% increase in reference transactions. If we use the mean numbers of reference transactions and of library sessions for 2011 (see Table 1), we find that an additional 10 instruction sessions could be expected to increase reference transactions by roughly 350. Based on the coefficient for the number of participants in library instruction sessions (Model 2b) in 2011, we could expect to see a 0.39% increase in reference transactions for each 1% increase in participants. Based on the mean number of participants in 2011, an additional 177 participants should yield approximately 235 additional reference transactions. In 2011, the findings suggest that the number of library instruction sessions is a bit more important in terms of increased reference transactions than the number of participants in those sessions based on the size of the coefficients. From 2006 to 2011, the coefficients for the number of library instruction sessions (Models 1a and 2a) getting consistently larger, whereas the coefficients for

the number of participants are inconsistent (Model 1b) or stay roughly the same throughout (Model 2b).

The predictions calculated in this section should be understood as ballpark figures. It is also important to remember that the relationship identified by Models 1a and 1b was not entirely linear based on the analysis of the plotted residuals. This means that there could be a point in which additional library instruction sessions or participants in those sections would not yield an increase in reference transactions.

Conclusion

The findings of this study indicate that accessibility of reference services in terms of service points and hours are not as important as the awareness generated by library instruction sessions in relation to the use of reference services at university-affiliated ARL libraries in the United States. Carefully considered consolidation of service points within a library likely will not affect students' use of reference services, nor will extended library hours. Even though 24/5 and 24/7 models have been really popular with students,²⁵ it does not appear that they are coming to the library to ask for reference help in the wee hours of the morning.

Although a causal relationship cannot be determined between the number of library instruction sessions and participants and the number of reference transactions, a significant, positive relationship did exist in these libraries between 2006 and 2011. One might be wondering how a significant and positive relationship between these variables can exist when the descriptive statistics (Table 1) indicate that the mean number of instruction sessions and participants is increasing while the mean number of reference transactions is simultaneously decreasing. Holding all other factors constant, increased library instruction will help to increase the number reference transactions at the ARL libraries in this study. However, this increase is not able to overcome the influence of other factors that contribute to the decline in reference transactions that were not able to be included in this study, either due to the lack of data or the inability to quantify such factors.

As we move forward and imagine what public services models should look like in the future, more nuanced data is crucial for making evidence-based transformations. While annual tallies of non-directional reference transactions can help us gauge the extent of informal teaching and learning opportunities, this data is not good enough. Susan M. Ryan's study of the cost-effectiveness of a traditional reference desk, as well as other studies, indicate that most reference questions do not need to be answered by a librarian.²⁶ Academic libraries, including both ARL and non-ARL libraries, need to start tracking and reporting meaningful teaching and learning opportunities through reference services in order to have valuable discussions about the future of reference services and the value they add to the learning experience.

Debra G. Warner, in consultation with her colleagues at Eastern Carolina University, devised a new classification system that they deemed to be more appropriate to the provision of reference services in the twenty-first century.²⁷ Two of the four categories Warner proposes are related to the idea of opportunity teaching for librarians—strategy-based and consultations—and do not include the more mundane, though important, non-directional questions like “How do I make the header different on the first page?” or “How do I access JSTOR from off-campus?” Rather than bemoaning the general decline of reference transactions in general, academic librarians should be thinking of ways to maintain or even increase strategy-based and consultation reference transactions, since these provide valuable, one-on-one, point-of-need teaching and learning opportunities. If ARL and ACRL were to collect data related to strategy-based questions and consultations, it would provide a more accurate picture of the informal teaching that librarians provide and the value that they add to the academic experience.

Notes

1. Association of American Colleges and Universities, *The LEAP Vision for Learning: Outcomes, Practices, Impact, and Employers' Views* (Washington, DC: Association of American Colleges and Universities, 2011), Laura Saunders,

- “Regional Accreditation Organizations' Treatment of Information Literacy: Definitions, Collaborations, and Assessment.” *Journal of Academic Librarianship* 33, no. 3 (2007).
2. James K. Elmborg, “Teaching at the Desk: Toward a Reference Pedagogy,” *portal: Libraries and the Academy* 2, no. 3 (2002), Gillian S. Gremmels and Karen Shostrom Lehmann, “Assessment of Student Learning from Reference Service,” *College & Research Libraries* 68, no. 6 (2007).
3. Rebecca Jackson, “Revolution or Evolution: Reference Planning in ARL Libraries,” *Reference Services Review* 30, no. 3 (2002).
4. Susan M. Ryan, “Reference Transactions Analysis: The Cost-Effectiveness of Staffing a Traditional Academic Reference Desk,” *Journal of Academic Librarianship* 34, no. 5 (2008).
5. Rachel Applegate, “Whose Decline? Which Academic Libraries Are ‘Deserted’ in Terms of Reference Transactions?” *Reference & User Services Quarterly* 48, no. 2 (2008), 181.
6. Susan Avery, “When Opportunity Knocks: Opening the Door through Teachable Moments,” *Reference Librarian* 49, no. 2 (2008); Susan E. Beck and Nancy B. Turner, “On the Fly BI,” *Reference Librarian* 34 (2001); Christina M. Desai and Stephanie J. Graves, “Cyberspace or Face-to-Face: The Teaching Moment and Changing Reference Mediums,” *Reference & User Services Quarterly* 47 no. 3 (2008); Elmborg, “Teaching at the Desk”; Gremmels and Lehmann, “Assessment of Student Learning”; JoAnn Jacoby and Nancy P. O'Brien, “Assessing the Impact of Reference Services Provided to Undergraduate Students,” *College & Research Libraries* 66, no. 4 (2005); Beth S. Woodard, “One-on-One Instruction: From the Reference Desk to Online Chat,” *Reference & User Services Quarterly* 44, no. 3 (2005).
7. Elmborg, “Teaching at the Desk,” 455.
8. *Ibid.*, 458.
9. Desai and Graves, “Cyberspace or Face-to-Face,” 243.
10. Denise D. Green and Janis K. Peach, “Assessment of Reference Instruction as a Teaching and Learning Activity: An Experiment at the University of Illinois-Springfield,” *College & Research Libraries News* 64, no. 4 (2003), 258.
11. Jacoby and O'Brien, “Assessing the Impact.”
12. Gremmels and Lehmann, “Assessment of Student Learning,” 493.
13. *Ibid.*, 494.
14. Desai and Graves, “Cyberspace or Face-to-Face”
15. C. Paul Vincent, “Bibliographic Instruction and the Reference Desk: A Symbiotic Relationship,” in *Library Instruction and Reference Services*, ed. Bill Katz and Ruth A. Fraley (New York: The Haworth Press, 1984), 45.
16. *Ibid.*, 44.
17. E. Stewart Saunders, “The Effect of Bibliographic Instruction on the Demand for Reference Services,” *portal: Libraries and the Academy* 3, no. 1 (2003), 35.
18. *Ibid.*, 38.
19. Association of Research Libraries, *ARL Statistics Questionnaire, 2010-2011*, 6.
20. Jackson, “Revolution or Evolution”
21. Andrew Richard Albanese, “The Best Thing a Library Can Be Is Open,” *Library Journal* 130, no. 15 (2005).
22. Melissa Gross and Don Latham, “Undergraduate Perceptions of Information Literacy: Defining, Attaining, and

- Self-Assessing Skills," *College & Research Libraries* 70, no. 4 (2009).
23. Saunders, "The Effect of Bibliographic Instruction," 35.
 24. Applegate, "Whose Decline?"
 25. Albanese, "The Best Thing a Library Can Be Is Open."
 26. Ryan, "Reference Transaction Analysis"; Marianne Stowell Bracke, Michael Brewer, Robyn Huff-Eibl, Daniel R. Lee, Robert Mitchell, and Michael Ray, "Finding Information in a New Landscape: Developing New Service and Staffing Models for Mediated Information Services," *College & Research Libraries* 68, no. 3 (2007); Deborah B. Henry and Tina M. Neville, "Reference and User Services Quarterly" 47, no. 4 (2008); Scott Carlson, "Are Reference Desks Dying Out?" *Chronicle of Higher Education* 55, no. 33 (2007).
 27. Debra G. Warner, "A New Classification for Reference Statistics," *Reference and User Services Quarterly* 41, no. 1 (2001).