Costing Reference: Issues, Approaches, and Directions for Research

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SUMMARY. The Assessing Quality in Digital Reference project is a first step toward understanding the cost of digital reference services in libraries. This article presents three measures isolated by project participants as being most useful for their immediate needs: total cost of providing digital reference service, the cost of digital reference service as a percent of the total reference budget, and the cost of reference as a percent of the total library or organizational budget. In addi-

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tion, it reviews selected outstanding issues in the ongoing question of how to determine the cost of reference services in libraries and offers direction for further study toward a general cost model for information services. doi:10.1300/J120v46n95_11

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INTRODUCTION

In 1936, Louis R. Wilson predicted that in ten years' time libraries would have methods in place for determining the costs of services and would be able to use them to defend their work (Lopez, 1973). It was a grand thought; however, here at the dawn of the new millennium we still do not have a clear idea of what reference services cost and no standard costing model that libraries can adopt to collect this data in a uniform way. The proliferation of electronic resources and the development of digital reference services have further complicated the problem of how to determine what it costs to deliver reference services. Nonetheless, the perceived benefits of understanding the cost of providing these services remain much the same.

Costing data is needed for:

- Planning
- Cost/benefit analysis
- Determining the effectiveness of service
- Determining the efficiency of service
- Determining the allocation of resources
- Evaluation
- Substantiation of funding
- Determination of fees
- Comparison of services within and across organizations.

The current reference environment is an eclectic mix of delivery modes in which traditional reference is only one service point. E-mail and chat reference services have become increasingly commonplace, as have consortium relationships that allow libraries to expand service hours and to offer the expertise of subject specialists and special collec-

tions to a wider user base. In the meantime, librarians continue to experiment with other technologies, such as video conferencing and instant messaging, to determine their usefulness in the never-ending effort to improve access for users.

Because understanding cost is such an important component of service evaluation, it was one of the measures of primary interest in the Assessing Quality in Digital Reference Study undertaken by the Information Use Management and Policy Institute at Florida State University and the Information Institute of Syracuse at Syracuse University supported by OCLC and the Digital Library Federation and a wide range of library organizations (http://quartz.syr.edu/quality/). The overall goal of this project was to better understand and describe the nature of quality digital reference services in order to develop practical and reliable methods, measures, and quality standards to assess these services. This project represents a first step toward the collection of cost data on digital reference services in libraries. There are, however, larger problems in the collection and analysis of cost data than could be resolved within the constraints of this study. This article summarizes selected outstanding issues and current approaches offered for collecting cost data for electronic services and offers direction for further study.

DETERMINING THE COST OF A SERVICE

Cost analysis is the process of determining the expenses associated with the provision of a service or the production of a product. These expenses can also be described as inputs and can include a range of items such as raw materials, physical facilities, and labor. At the simplest level, the cost of a service can be described as the total of all expenses incurred in the process of providing the service (Kingma, 2001).

While this explanation appears simple, the truth is that the processes it describes become highly complex when considered in detail. For instance, the determination of expenses requires being able to differentiate between fixed costs and variable costs. Fixed costs are those libraries have to pay no matter how much business they are doing (such as the cost of the building). Variable costs are expenses that fluctuate depending on how much business the service is generating. For instance, the number of reference transactions received will affect the number of personnel needed to provide this service. During quiet periods at the desk, minimal coverage makes sense. During peak periods, more personnel are required and so this variable cost goes up.

However, the issue of assigning costs becomes even more complicated when the issue of time on task is involved. For instance, it is common for reference librarians to do other work at the desk, when they are not actively engaged in reference service. Should the labor costs associated with staffing the reference desk be charged to reference services when activities such as committee work, general collection development, outreach activities, and the like are being performed there?

Other activities are harder to categorize such as the time reference librarians spend with users troubleshooting hardware and software problems. When this activity is considered in the realm of electronic resources it becomes even more complex. What percentage of the library's information technology infrastructure should be considered as in direct support of digital reference services? How do we identify and track use of electronic resources, such as online databases, that are tied to reference services?

Murfin (1993) called for definition of the nature of reference activities and the outputs associated with them. For instance, reference work involves not only answering questions, but also the development of reference findings aids, such as bibliographies and the notes created and shared by reference librarians based on the day's experience as well as time in training to learn about new technologies used to provide reference services. Then too, how much of the cost of the reference collection should be charged to reference services? It is certainly needed to support this function, but it is also used directly by users who do not seek reference services. For additional discussion of the issues surrounding the determination of cost for information services, see Abels (1997), Kingma (2001), Murfin (1993), and Murfin and Bunge (1989).

Beside the technical issues mentioned above, there are affective barriers that keep libraries and librarians from engaging in the process of costing reference. There has been an ongoing fear that this service is too expensive and that an investigation into cost would prove detrimental to a library's ability to provide reference services (Gross, McClure, & Lankes, 2002a; Lopez, 1973; McClure 1986; Murfin, 1993).

Approaches to Costing Reference

There is a major gap in the literature on Digital Reference Services in the area of economic models and accounting. Unfortunately, there is also a gap in this area as concerns the cost of providing traditional reference services. This means that currently it is not possible to extrapolate an existing standard procedure or measure to the provision of digital ref-

erence services. It also means that if it is desirable to compare the costs of different modes of providing reference, an extensive cost analysis of each method may be required to provide this information. Some examples of approaches that have been used in the literature to date include the input/output model, functional cost analysis, the library costing model, the equivalent valuation approach, and the cost minimization model.

The Input/Output Model. As concerns traditional reference services, Sayre and Thielen (1989) offer a cost analysis process for use in small public libraries. This is a very straightforward method in which the inputs necessary to support library services are isolated, measured, and accounted for and used to compute the per unit cost of a service based on the extent to which a service is utilized, i.e., how many people attend a program, number of items circulated, number of questions received at the reference desk.

Functional Cost Analysis. As noted above, assigning costs to library services is a much more complicated process than the input/output model suggests and for larger libraries this approach is likely too simplistic. Functional cost analysis is a related approach that has been explored in larger libraries that provide a variety of electronic resources as well as mediated searching with users (Abels, Kantor, & Saracevic, 1996).

This is another form of analysis in which the various costs of providing a service are defined and allocated to that service. In a study applying functional cost analysis to nine different reference services, the cost of reference service is reported to range from $1.16 to $35.52; the variation likely being due to how close an individual service came to operating at full capacity (ibid.). A great deal of the detailed work needed to ascertain costs performed in this study will also apply to the processing of costing out of various types of digital reference services.

The Library Costing Model. Hayes (1996) reports on the intricacies of assessing the costs related to the provision of electronic resources in support of reference within the framework of the Library Costing Model (LCM). While the LCM does not provide a detailed breakdown of the costs of digital reference, Hayes provides an interesting discussion of approaches to the problem of costing and provides insight on what might be involved in determining the true cost of providing digital reference services in libraries.

The Equivalent Valuation Approach. This approach, recently refined by Ryan and McClure (2003), is based on identifying an equivalent commercial service to the library service being costed. For example, the

value of providing answers to digital reference questions is whatever a similar commercial form is able to convince users to pay. If a particular commercial firm charges $15.00 for answering a "basic" reference question then the value of the library digital reference question activity is estimated to also be $15.00 per correct answer.

The Cost Minimization Model. Hegenbart (1998) writes about cost minimization as part of an interesting analysis of the Internet Public Library (IPL) meant to determine if and how it might become self-supporting. This article provides a detailed discussion of the cost structure and cost components of the IPL and its potential economic viability from a business perspective. Her analysis is pertinent not only to the IPL, but also to the question of how any Web-based, not-for-profit information service can be economically viable.

In addition to the approaches discussed above, Murfin and Bunge (1989, pp. 17-35) offer four methods for assessing the cost of traditional library services in academic libraries. They are:

- *Method One:* Formula for Determining the Full Cost of the Reference Transaction.
- *Method Two:* A Reference Service Cost Effectiveness Index Based on Success, Helpfulness, Accessibility and Time/Cost.
- *Method Three:* Cost (time taken) per Successful Question.
- *Method Four:* A Cost Benefit Formula.

These formulas were tested in academic libraries in a project funded by the Council on Library for research purposes and used in the Wisconsin-Ohio Reference Evaluation Program. There may be value in using this work as a starting point for addressing the current issue of how to evaluate digital reference services from a cost standpoint.

CURRENT ISSUES IN DETERMINING COSTS

As discussed above, there are many issues concerning how to assign costs to reference service that were identified early on, but have yet to be resolved in regard to either traditional or digital reference service.

- What costs should be included in the equation? What portion of materials, overhead, personnel, equipment (Abels, 1997; Kuhlman, 1995; Murfin, 1993)?

- Are there agreed upon definitions for reference and reference activity (Abels, 1997; Lopez, 1973; Murfin, 1993)?
- How do we cost unmediated reference uses of equipment, software, and collections (Murfin, 1993)?
- Do new services require more specialized intervention on the part of staff (Evans, 1995)?
- Are digital reference services more time consuming (and costly) than traditional reference services (Janes, 2002)?
- How can reference service costs that are not easily identified in the traditional library budget such as telecommunication and equipment, software, fees, royalties, etc., be identified (Abels, Kantor, & Saracevic, 1996; Evans, 1995)?
- How can one establish costing criteria in terms of the goals and objectives of the service (Evans, 1995)?
- Necessary data is often not available or not gathered (Evans, 1995).
- Without national standards, inter-institutional comparisons are difficult to make (Evans, 1995; Kantor, 1981). This is especially troublesome in the current environment where various partnerships and consortium arrangements require the sharing of resources.
- To what degree are libraries willing to invest the time and resources to perform such cost studies (Evans, 1995)?
- Staff may be reluctant to participate in cost studies due to concerns about how such data will be manipulated and used and the perception that collecting such data is more trouble than it is worth (Lopez, 1973; McClure, 1986; Murfin, 1993; Gross, McClure, & Lankes, 2002a).
- Library management may be reluctant to engage in cost studies out of fear that the true cost of these services will be difficult to substantiate to funding bodies (Gross, Lankes, McClure, 2002a; Lopez, 1973; Murfin, 1993).

These are but a few of the issues that have yet to be addressed in terms of costing library reference services–but they offer a flavor of the work that has yet to be done in this area.

The Assessing Quality in Digital Reference Approach

The Assessing Quality in Digital Reference Services project used a "best practices" approach in which base line data was collected using a

variety of methods during site visits at various types of libraries around the country. Data concerning current approaches to evaluating digital references services were also collected from librarians across the country through the project's "What's Your Story?" Web site. In addition to asking libraries to share current practice, they were also asked to share what they want to know about their services, but have not developed methods of assessment for, and also what do they need to know about their services in order to assess, improve, and promote them. This data on actual practices was also informed by an extensive and ongoing review of the literature on digital reference evaluation (Gross, McClure, & Lankes, 2002b).

The data collected in this process were used to inform the development of a set of measures, statistics, and metrics designed to evaluate various aspects of digital reference. The project advisory committee reviewed draft measures and statistics that the project team then revised. These measures were then field tested by a number of the libraries participating in the project and revised again, based on their feedback. The result of this project is the manual, *Assessing Digital Reference Library Services: Guidelines and Procedures* (McClure, Lankes, Gross, Choltco-Devlin, 2002).

The main finding of this process as pertains to the question of cost, is that the collection of cost data is only minimally performed by libraries and tends to be reported in very general terms. Digital reference is not normally considered separately from traditional reference for accounting or budgeting purposes. Both the cost of traditional reference and the cost of digital reference tend to be unknown. While participants in the project acknowledged the need for cost data mainly to meet demands from their funding agencies, they also voiced some fear that if the cost of providing digital references services were known, the low initial volume of transactions served through the new media might make it impossible for these services to continue. These concerns, coupled with a strong belief in the importance of providing reference service, echo an attitude toward the collection of cost data that has long been a stumbling block to understanding the costs of traditional reference services.

While the above issues need to be taken into account in order to address the question of how to successfully determine the cost of services, there are additional concerns and opportunities that previous work could not have anticipated, when reference services are migrated to the digital realm.

For example, there is a need to establish definitions for the types of reference services being provided in order to categorize services for the

purpose of determining costs and making comparisons. In practice, it is not necessarily easy to differentiate between traditional reference services and electronic reference services or between electronic reference services such as e-mail or chat because they are not always provided as separate, distinct services. For example, reference transactions that begin in a traditional face-to-face mode may be completed electronically through the electronic delivery of a PDF file or an e-mail response that follows after the user has left the building. Chat services may move to an e-mail-based format or even result in a face-to-face reference interview in some cases. How are these hybrid transactions to be categorized for costing purposes?

In the Assessing Quality in Digital Reference project a digital reference transaction is defined as one in which all communication between user and staff is conducted electronically or digitally (2002). Hybrid questions are accounted for separately in order to provide a measure of control and consistency in assessing this new and growing service role.

On the opportunity side of the new reference environment, the nature of much of the media used to provide digital reference has the effect of doing away with the ephemeral nature of the traditional reference transaction where the reference librarian often summarizes the question, its negotiation, and the result of the interaction with a hash mark. With digital reference comes the ability to capture the reference question, the reference process, and its resolution in a fixed format for later assessment. Records of reference transactions can now be harvested to feed Frequently Asked Question pages, inform collection development, and for a variety of evaluation uses such as determining the correct answer fill rate, facilitating peer review of reference work, and providing exact statistics on the number of questions received and answered, how long it takes to answer a reference question, and the number of transactions by day of week and time of day, which can make the calculation of cost more accurate and improve management functions such as determining staffing levels.

Determining the Cost of Digital Reference–A First Level Solution

As stated above, the manual produced by the Assessing Quality in Digital Reference project is the beginning of an ongoing process to develop statistics, measures, and quality standards to assess and improve digital reference services. The measures included in the manual are based on literature reviews, input from advisory committee members, and were field tested by a number of libraries participating in the project. Its overall purpose is to improve the quality of digital reference services and assist

librarians to design and implement better digital reference services, which meet user information needs.

In the area of cost, three measures were isolated by project participants as being most useful for their immediate needs. These are the total cost of providing digital reference service, the cost of digital reference service as a percent of the total reference budget, and the cost of reference as a percent of the total library or organizational budget.

Cost of digital reference service. This statistic summarizes the total cost of providing digital reference service at the level and to the extent that an individual library is able to calculate this cost. There are many barriers to the collection of this data including problems with how in-house records are kept and the relative difficulty of prorating costs where reference services are completely integrated (the same staff provide traditional and digital reference at the same time) and where cost factors, such as subscriptions and licenses to online resources and databases, are available for use in other departments or by users at home.

The stakeholders in the Assessing Quality of Digital Reference project recognize that there are many issues and considerations that need to be resolved in the costing of reference service, but also strongly feel it necessary to begin collecting this data at whatever level they can. There is increasing recognition that achieving understanding of cost factors, at whatever level they are available, is crucial when developing budgets, planning, and making decisions about the allocation of resources.

Cost of digital reference service as a percent of total reference budget. This measure looks at the total cost of reference, to the extent that it can be described, in relation to the total budget used to support all reference services (traditional, digital, hybrid). This measure is useful, as it provides a picture of the relative cost of digital reference to the total reference budget allowing for appropriate allocations to be maintained for all reference services. Among project participants, this measure was important to the digital reference setting because the cost of digital reference can often be comparatively high due to possible staffing issues, costs of resources, and training needs.

This measure can be difficult to compute relative to a library's ability to determine the real costs of the overall reference budget. For instance, it has been found that in the overall budget, automation and reference budget lines may be separate and the prorating of the cost of fee-based online databases may not allow for differentiations between use by digital reference, use by traditional reference, or use by patrons in the library or in remote locations. Additional problems may result when digital reference service is provided within a consortium arrangement.

Cost of digital reference as a percent of total library or organizational budget. This measure looks at expenditures for digital reference as a percent of the total budget for the total library. This measure is another aid to understanding the relative cost of this service to the organization as a whole. As stated above, informed decision-making relies on understanding the cost of providing services. This measure, like the others, will improve with the library's ability to agree upon the prorating and assignment of the cost of inputs such as staff and electronic resources. However, the process of collecting the data and beginning to work through these issues organizationally is an important step toward developing budgeting and accounting procedures that allow for the development of standard costing models for information services.

WHERE TO NEXT?

Clearly, the measures suggested above are only preliminary steps toward helping libraries collect cost data that will help them describe, improve, and promote reference services. A cost analysis model is still needed that will provide a method that supports cost comparisons by service type, between institutions, and for the appropriate assignment of costs in consortium arrangements. In the Assessing Quality for Digital Reference project it was determined that in addition to the issues outlined above a cost analysis model must provide a process that:

- Allows for the accounting of costs in a standardized way that makes the collection and analysis of data as uncomplicated as possible.
- Is accurate and reliable.
- Allows libraries to make accurate comparisons between different types of reference services.
- Allows for comparison of costs across libraries.
- Allows for appropriate value assignment to work completed in consortium relationships.
- Allows for the inclusion of cost data in the electronic transaction.
- Is meaningful to decision makers.
- Is meaningful to staff.
- Helps libraries to continue to build a culture of evaluation that includes continuing education for staff that demonstrates the value of evaluation.

It must also be remembered, however, that understanding the cost of providing service does not mean that minimizing cost is the ultimate goal of cost analysis. Assessments of cost must include assessments of service quality in order to provide a balanced view of library operations (Murfin, 1993). The Assessing Quality in Digital Reference project provides measures to assess service quality and a process for libraries to use in developing quality standards for digital reference services. This manual also gives guidance in the assessment of impacts and benefits that are needed to provide a context for determinations of cost and cost efficiency. Outcomes as well as outputs need to be measured and considered.

It may be that as interest in the service aspects of digital libraries grows, the economics of providing this service will get more attention. As it is, there is little to inform libraries that want to consider this issue. Further, as collaborative models continue to develop, the question of how to share the costs of providing 24/7 digital reference services, in what will inevitably be a global forum, has already come to light as an issue that will soon need resolution (Kresh, 2001).

Murfin (1993) points out that the development of cost data for reference services must be part of an overall effort to assign costs to all services provided by libraries in order to place the cost of reference services in perspective and to allow for a full understanding of service costs in libraries. But in fact, the degree to which libraries are committed to developing and maintaining such cost data as an overall ongoing evaluation effort is unclear.

In completing the Assessing Quality in Digital Reference Project, one reference librarian commented to a member of the study team that the evaluation–and costing–of digital reference was a procedure in search of practitioners. Until there is greater interest among library administrators–or perhaps greater pressures to justify services–research in costing library reference services is likely to be slow. Nonetheless, such research is essential and as budgets continue to tighten, increased concern about costing reference services may occur.

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