WEB-BASED EVALUATION INSTRUCTIONAL SYSTEMS: DESIGN, DEVELOPMENT, ISSUES, & CONSIDERATIONS

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ABSTRACT

This paper details a long-term evolving effort to provide evaluation instruction designed to address specific information needs for selected target groups from a centralized location within a networked environment. Additionally, this paper examines a content design process that focuses on user-centered data-appropriate evaluation methods where the content of the instructional system is comprehensive, organized, and presented for use by library researchers and practitioners in a variety of library settings and situational contexts. Specific examples of web-based evaluation instructional systems developed by the authors are reviewed and suggestions are offered for the future development of such systems.

INTRODUCTION

Web-based evaluation instructional systems can be effective library tools for identifying data sources and developing evaluation strategies.[1] As a tool, libraries can use these instructional systems to provide insights and direction on the most appropriate evaluation approach to find specific data needed to:[2]

- Address and answer stakeholder concerns;
- Meet stakeholder needs;
- Make decisions about library resources and services;
- Demonstrate value of a library to institutions, governing bodies, etc.;
- Assist a library to have a voice in the political environment; and
- Support the role of the library as a public good.

The development and implementation of web-based instructional systems, however, must address issues related to the structure of and navigation within the system, and issues related to the content of the modules within the system.

As an analysis of an ongoing iterative learning process, this paper presents examples and examines selected issues and considerations related to the development and implementation of centralized web-based evaluation instructional systems. In addition,

this paper explores the opportunities that web-based evaluation instructional systems provide for libraries in a networked environment and presents insights into the development of a current web-based evaluation instructional system, drawing upon lessons learned from the design and implementation of prior web-based evaluation instructional systems.

EVALUATION CONTEXT

Research has shown that it is essential to match specific data needs to appropriate evaluation approaches in order to effectively address problems or issues.[3] With growing numbers of library services and resources allocated to the networked environment, library decision makers find it difficult at times to match data needs to appropriate evaluation approaches.[4] Within the networked environment, identification and retrieval of sources of data may require use of specific software or programming. Data sources may need to be retrieved from a number of locations via electronic collection means, such as from a library or library system's databases, vendor supplied data, or state or national databases (e.g., National Center for Education Statistics (NCES)). In addition, library decision makers may increasingly need specific data sources to justify the continued use, usefulness, value, and impact of more traditionally supplied services and resources (i.e., a brick and mortar setting).[5]

These changes within library settings force library researchers and practitioners to re-think the use of evaluation approaches to meet specific data needs. Evaluation within the library setting must now include attempts to collect data capable of providing insights regarding the performance of library services and resources in both the traditional and the networked environments.[6]

This dual or changing library environment necessitates the selection of best-fit evaluation approaches. Best-fit evaluation approaches are those developed to meet data needs within specific library settings and contexts. Through a planning process, researchers match evaluation approaches to specific data needs to effectively and efficiently address questions regarding services and resources provided traditionally, electronically, or both. Some considerations in the selection of best-fit evaluation approaches include:

- Identification of types and applications of available evaluation approaches;
- Data types the evaluation approaches provide;
- Resources needed to conduct the evaluations and data collection;
- Affects of library settings and situational context on data type and collection; and
- Degree to which the data collected addresses questions related to the use, usefulness, value, and/or impacts of library services and use of resources within specific contexts and settings.

The need exists to bridge and link funding, service/resource delivery, and evaluation frameworks to reveal maximum value, impact, benefits, and quality to the institutions and communities that libraries serve. Taking a best-fit approach to evaluation can help to

create these bridges. The development and use of a centralized evaluation instructional system can help to identify best-fit approaches. [7]

EVALUATION INSTRUCTIONAL SYSTEM DEVELOPMENT & DESIGN

Historically, when faced with a data need to address a problem or issue, the strategy employed by library researchers and practitioners was to identify available evaluation approaches, then adapt, develop, or adopt what could be a wide-ranging assortment of evaluation methods in attempts to meet data needs. [8] The evaluation methods used may have initially been developed for use in libraries or may have evolved in other fields (i.e., business, education, etc.). These attempts to find and modify evaluation approaches may address specific data needs; however, the question to ask is how effectively the evaluation attempts to, and the data collected address, a specific problem. [9]

Effective evaluation can provide data with the ability to describe and understand use, usefulness, value, and impacts of library services and resources. Poor evaluation, however, can provide results that range from wasting finite library resources and staff time to providing useless data that is incapable of answering questions about library services and use of resources. [10]

One approach to developing effective evaluation practices is the comprehensive presentation of evaluation approaches that include educational information on why, when, and how to conduct effective evaluation, and instructional information on the use of effective evaluation. Web-based instructional systems offer a means to present a comprehensive presentation of evaluation approaches with strategies on how to link funding to service/resource delivery. These instructional systems function as comprehensive repositories presented from a centralized and readily accessible network environment that can provide library researchers and practitioners the means to:

- Develop custom evaluation strategies (from planning to implementation to dissemination) through the use of educational modules coupled with interactive templates;
- Match data needs to appropriate evaluation approaches within the strategies;
- Select and use appropriate evaluations matched to data needs;
- Compare and contrast available evaluation approaches developed for specific library settings and situational contexts;
- Access and view evaluation approaches that have been applied within a library setting with suggestions and examples on how to adapt the approaches to meet specific data needs;
- Conduct evaluations by offering guidance for planning and templates for data collection efforts;
- Analyze data, prepare reports, and disseminate results;
- Locate additional online resources through links to other sources;
- Receive help and technical support for conducting evaluations; and

- Provide a dynamic forum for interaction that includes feedback and support from other researchers and practitioners.

Web-based systems are capable of providing the types of data needed, as evidence, of the extent to which a library meets institutional and local community needs and the needs of a diverse population of users within a library's community.
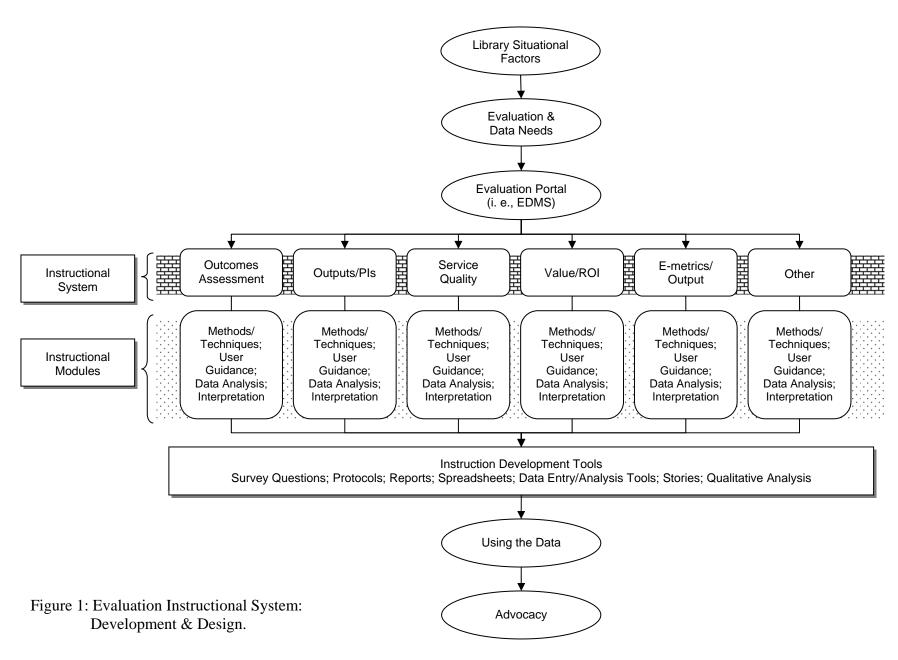
Web-based evaluation instructional systems offer an alternative to adapting or adopting evaluation approaches to meet data needs by providing a comprehensive presentation of readily available library evaluation approaches in a centralized web environment. These systems are designed to address the problem: *How can library managers, researchers, and practitioners better determine what type of evaluation approach will best meet the library's evaluation purposes and needs, given the library's current situational context (e.g. delivering impact, value, and benefits to communities and funding agencies)?*

Figure 1 (below) demonstrates the role of web-based evaluation instructional systems and their benefits for public libraries in the networked environment. At the top of the figure, library situational factors are used to determine specific evaluation and data needs. Evaluation systems are centralized portals that present educational and instructional materials capable of developing best-fit evaluation approaches matched to data needs.

A portal can help guide library researchers and practitioners in beginning an evaluation process. The portal can also provide guidance and education about various evaluation instructional systems and their benefits, helping a library to select the evaluation approaches that best-fit its unique needs. Instructional systems, such as E-metrics, Outcomes Assessment, or Value/Return on Investment (ROI), can each provide specific forms of instruction to gather, interpret, and employ various forms of evaluation data, based on the needs of the individual library. Each instructional system employs specific methods and techniques.

Instructional modules then help libraries address issues such as user guidance, data analysis, and data interpretation, while instructional development tools provide instruments used for gathering and analyzing data. Instruction development tools include samples, such as survey questions, protocols, reports, spreadsheets, data entry/analysis, stories, and qualitative analysis. Tools also include templates for use in planning, data collection, and reporting efforts.

Instructional modules can provide an interactive interface for producing actual evaluation strategies as participant's complete phases of the learning and instructional process along. These modules can also provide help features such as list-servs for information exchange with other module participants and email, or chat oriented technical support. Instructional modules offer additional support in the form of guidance, sample reports, and sample strategies for use of data and for advocacy efforts.

Web-based Evaluation Instructional Systems

Figure 1: Evaluation Instructional System:
Development & Design.

EXAMPLES OF WEB-BASED EVALUATION INSTRUCTIONAL SYSTEMS

The following overviews of three systems represent prior and ongoing development of evaluation instructional modules. Since 2002, the research team at the Information Institute has been involved in identifying and addressing issues in the design, development, implementation, and sustainability of the technical presentation of evaluation instructional systems, the content within the modules of the systems, and interactivity-related issues between users and the systems. In addition, the research team maintains, hosts, and regularly evaluates the E-metric system (EMIS) presented below as one of the examples.

Florida State Library Outcomes Training and Assessment Project (December 2002-January 2004)

The Florida State Library contracted with the research team to develop outcomes training systems on the development, use, and reporting of Library and Science Technology Act (LSTA) project outcomes. The Florida State Library received the primary grant from the Institute of Museum and Library Science (IMLS) for public and other libraries that receive LSTA grant funds. IMLS funded the project to serve as a national model for outcomes assessment of LSTA-based projects. The resulting system, the LSTA Toolkit is available at http://www.lstatoolkit.com/.

The LSTA toolkit is designed to provide instruction to participants on filing standardized mid-year and annual reports to the Florida State Library via an interactive outcomes plan wizard. The toolkit provides participants with guidelines to:

- Plan an outcomes assessment approach;
- Conduct outcomes evaluation;
- Develop a data collection plan including suggested techniques and methodologies; and
- Report project progress.

The toolkit also provides links to reports and guidelines as additional aides in data analysis, and the system contains strategies for reporting project results to interested stakeholder groups.

In developing the system, the research team conducted a review of data collection tools from past Florida library LSTA grant files. The research team attempted to identify best practices in the use of data gathering tools and data gathering methodology for all types of LSTA projects by reviewing two years of actual project results (mid-year and annual reports). Results of the review showed that few evaluation tools or methodologies, if used at the local library level, were contained within the reports.

As a result of the review process, the research team developed a list of specific evaluation methodologies (i.e. outputs and performance measures) available for use to

measure project outcomes, such as automation, technology training, literacy, and service to elders outcomes developed by grant recipients. Practical procedures were developed for library staff (i.e., LSTA grant recipients) to follow to integrate these tools into their data collection procedures. Descriptions and procedures included means of modifying the tools to fit local purposes, how to gather the data, who should gather the data, and how to record the data.

Following the review of the reports, the research team worked with a technology development team to assess the need for web-based training materials and recommend an appropriate means to produce print and online training modules for library use. The recommendation included designing an interactive web page. The result of the recommendation was the development and implementation of the LSTA toolkit by the technology development team with consultation from the research team. The final product of the research project, the LSTA toolkit is now housed on the Florida Department of State Division's server.

E-metrics Instructional System: Librarian Education in Network Statistics (October 2002 - March 2005)

The research team designed, developed, and implemented an E-Metrics Instructional System (EMIS). A National Leadership Grant in Education and Training from the Institute of Museum and Library Services (IMLS) provided funding for EMIS development and implementation. The EMIS instructional system is available at http://www.ii.fsu.edu/emis/.[11]

The purpose for creating the EMIS web-based evaluation system is to assist public librarians, state-library agency staff, and library consortia staff to better understand how to evaluate the use and uses of their online library services and resources. Research demonstrated the need for a comprehensive e-metrics training program that:

- Described the relationship between a library's (or state library agency/consortium) technology infrastructure and the e-metrics;
- Instructed librarians as to the intent and definitions of the e-metrics;
- Instructed librarians in the various methodologies and approaches for collecting e-metrics;
- Assisted libraries to develop a management and collection plan for e-metrics;
- Assisted libraries to develop in-house training programs to instruct staff in the collection and reporting of e-metrics; and
- Assisted in reporting network resources and services data for aggregation across public libraries.[12]

In particular, the research team created EMIS to provide understanding of the use of databases, digital reference services, and other selected services and resources.

Of the many e-metrics readily available for use in libraries (see http://www.niso.org/emetrics), EMIS presents recommended core e-metrics and provides

training modules to make adoption easier, more standardized, and more effective. In addition to the recommended core e-metrics, there are a number of other standardized and field-tested e-metrics developed for specialized uses and included within the EMIS modules (i.e., detailed measurement of virtual reference services or e-metrics devoted to academic research libraries). The value of EMIS is not simply that it informs the library community as to the availability of selected e-metrics, but also that its training modules encompass the measurement lifecycle – from E-metric selection, data collection, log analysis, data analysis, to use and presentation of data.

EMIS also provides other resources such as: the E-metrics catalog, a catalog of e-metrics that have been standardized and field tested to date for libraries; E-metric annual report templates, a collection of Microsoft Office templates and samples to assist in the creation of individualized E-metric Annual Reports; and the E-metrics resource list, a list of helpful resources related to e-metrics. As a part of the project, a range of instructional modules and workshops have been developed and presented around the United States. The Information Institute offers free local workshops in the use of the EMIS instructional system.

Evaluation Decision Management System (December 2005 - July 2008)

In December 2005, the Information Institute received an IMLS grant to address the question, *how can "best practice" evaluation strategies support public librarians in demonstrating the value of their libraries to the communities that they serve?* This current project addresses IMLS National Leadership Grant program priorities of enhancing public services in support of learning by increasing the ability of libraries to better utilize resources in the overall evaluation of library services and programs.

The primary product of this research will be the web-based evaluation decision management system (EDMS) librarians and others can use to assist in selecting, using, analyzing, and reporting data from various evaluation approaches. The EDMS builds on the LSTA toolkit and the EMIS systems. Once completed, this demonstration project will provide public librarians and managers with:

- Overview of leading evaluative approaches that are used and are useful in a public library setting;
- Types of data each approach provides;
- How each data type helps describe specific library services, resources, and programs;
- Strengths and weaknesses of each approach;
- Success with which libraries have employed the different approaches;
- How situational factors within library settings affect the successful use and utility of these approaches; and
- Ways in which to engage in and use various evaluation strategies, analyze evaluation data, interpret evaluation results, and present evaluation findings for advocacy and management purposes.

The primary purpose of the current project is the provision of a web-based means to select best-fit evaluation approaches matched to specific data needs based on unique situational factors and contexts at a local library level.

Figure 2 (below) describes the current approach for developing the EDMS. There are two key components of the EDMS. The first component is an instructional system that can be accessed directly from the homepage without a log-in/authentication procedure. This component provides a set of instructional modules that describe various evaluation approaches that compare and contrast the strengths of these approaches for specific evaluation situations.

The second component is an interactive problem solving approach that will require a log-in and authentication process so that previous work and outputs can be maintained for a specific library. This approach will automatically harvest web-based library statistical data from the National Center for Educational Statistics, state library agencies, and other sources. These sources will provide a profile of available data for an individual library. The database in this component will allow users to query specific evaluation problems, manipulate available data (or add new/additional library data if desired), and select the type of output desired from the database.

The framework shown in Figure 2 offers both description information as well as interactive customized data for a particular library and its particular evaluation needs. This framework will assist in developing the EDMS and will facilitate assessment research and education by library and information science scholars, assessment instruction in accredited library degree programs, and assessment activities in libraries at a national level. The project will also produce a number of workshops, seminars, and presentations held in selected cities to disseminate the findings from the study and introduce the library community to the EDMS developed as part of the study.
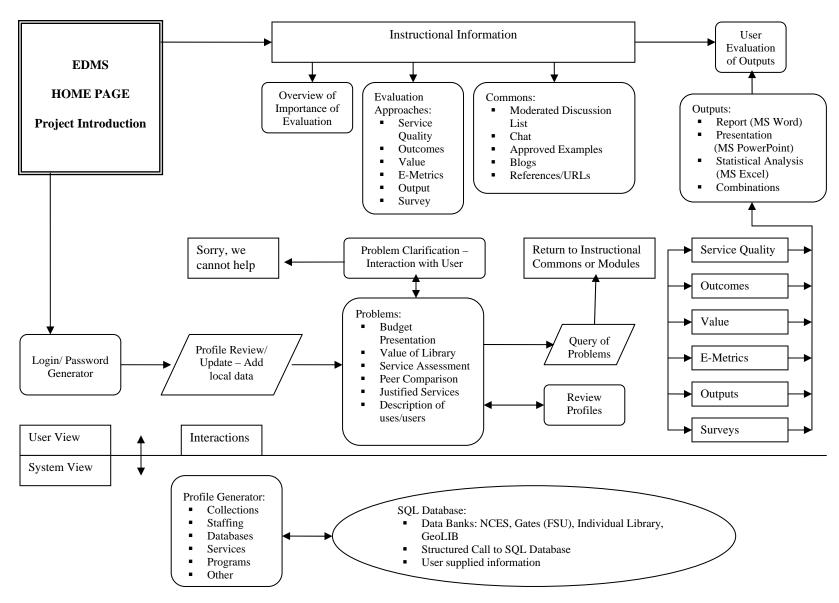
Web-based Evaluation Instructional Systems

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│  ┌───────────────┐  │              │     Instructional Information     │───────▶│     User     │
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│  │   Project     │  │       │Overview of│ │Evaluation │ │Commons:      │     │Outputs:          │
│  │ Introduction  │  │       │Importance │ │Approaches:│ │ ▪ Moderated  │     │ ▪ Report(MS Word)│
│  │               │  │       │    of     │ │ ▪ Service │ │   Discussion │     │ ▪ Presentation   │
│  └───────────────┘  │       │Evaluation │ │   Quality │ │   List       │     │   (MS PowerPoint)│
└─────────────────────┘       └──────────┘ │ ▪ Outcomes│ │ ▪ Chat       │     │ ▪ Statistical    │
           │                               │ ▪ Value   │ │ ▪ Approved   │     │   Analysis       │
           │                               │ ▪ E-Metrics│ │   Examples   │     │   (MS Excel)     │
           │                               │ ▪ Output  │ │ ▪ Blogs      │     │ ▪ Combinations   │
           │                               │ ▪ Survey  │ │ ▪ References/│     └──────────────────┘
           │                               └───────────┘ │   URLs       │              ▲
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Overview of EDMS diagram:

- **Instructional Information** flows to: Overview of Importance of Evaluation; Evaluation Approaches: Service Quality, Outcomes, Value, E-Metrics, Output, Survey; Commons: Moderated Discussion List, Chat, Approved Examples, Blogs, References/URLs
- **User Evaluation of Outputs** ← Outputs: Report (MS Word), Presentation (MS PowerPoint), Statistical Analysis (MS Excel), Combinations

Lower section:

- Sorry, we cannot help ← Problem Clarification – Interaction with User
- Return to Instructional Commons or Modules
- Service Quality, Outcomes, Value, E-Metrics, Outputs, Surveys
- Login/ Password Generator → Profile Review/ Update – Add local data → Problems: Budget Presentation, Value of Library, Service Assessment, Peer Comparison, Justified Services, Description of uses/users → Query of Problems
- Review Profiles
- User View / System View | Interactions
- Profile Generator: Collections, Staffing, Databases, Services, Programs, Other
- SQL Database: Data Banks: NCES, Gates (FSU), Individual Library, GeoLIB; Structured Call to SQL Database; User supplied information

Figure 2: Overview of EDMS

ISSUES AND CONSIDERATIONS

Developers of web-based evaluation instructional systems face a number of issues and considerations as part of the design and implementation process beyond that of the presentation of evaluation approaches. Developers need to consider issues such as the anticipated audience, other stakeholders, perspective of the system, and presentation approach at entry into the system. In employing a comprehensive approach to developing an evaluation instructional system, system developers must consider relationships other than just evaluation content or the infrastructure created to deliver that content. Some key issues and considerations identified through a needs assessment of Advisory Board members and Project Partners of a current web-based evaluation instructional system are presented below.

Targeted Audience

A content design process focused on comprehensive user-centered data-appropriate evaluation methods has to focus first on the users of the system, the targeted audience. Initial or early iterations of content and system design may have to be limited in scope based on:

- Broad levels of need in a library community;
- Factors that may affect evaluation within this community such as available resources (i.e., staff size, funds available);
- Skill level of participants to conduct the evaluations;
- Training needs to conduct the evaluations;
- Available time for researchers, practitioners, and support staff to conduct evaluations; and
- Potential number and/or types of evaluations necessary to meet a specific information need (i.e., required advocacy and accountability efforts at local, state, and national levels).

There are means to address these issues such as conducting a needs assessment of the targeted audience before deciding on content and system design.

Developers can provide additional help features within the system such as access to technical support, list servs for participants to post questions, and/or links to additional instructional and educational sources. Planned training sessions and presentations of the system can also provide support.

Motivation and Commitment to Evaluate

Some large libraries with available resources only conduct limited or required evaluations while smaller libraries with limited resources may conduct numerous evaluations. Motivation and commitment may be the key factors in the use of a system, more so than size or type of library. Developers should consider content development based on surveys of targeted audiences' use of evaluation. Other important considerations

include: what evaluations are conducted, under what circumstances (i.e., situational context), and why were the evaluations are conducted. An understanding of the types and scope of evaluations the target audience already conducts can form the foundation of the type of content contained within the instructional modules of the system.

Education Factors

Education as a factor in content development may be as valuable a feature in a system as the evaluation content. A need may exists to motivate those who conduct evaluations to move from primarily conducting required evaluations (i.e., reactive state) to planned evaluations in anticipation of needs, future advocacy efforts, and for inclusion of evaluation in a library's management decision-making process (i.e., proactive state).

Levels of System Entry

Anticipated target audiences have differing levels or degrees of experience in conducting evaluations. They also have differing levels of available resources, funds, and staff time to commit to a project for data collection efforts for evaluation. Developers of evaluation instructional systems can provide levels, or tiers of entry levels, that address the data needs for differing experience levels and available resources of targeted audiences.

Content Development

There are numerous approaches related to content development of modules. Approaches determine the focus of the content within the modules. Some examples include:

1. Evaluation approach – entry modules contain broad categories of evaluation approaches (i.e., outputs, outcomes, service quality, etc.). This approach assumes a certain level of experience in conducting evaluation.
2. Context approach – entry modules contain a series of questions presented to participants to determine the type of evaluation needed based on the context of the need (i.e., local library advocacy, state and federal reporting requirements, etc.). The context approach would guide participants to the best evaluation approaches to meet specific needs based on the question addressed.
3. Scenario approach – also referred to as problem, purpose, case study, and situational approaches, the entry modules describe a number of common, recurring situations. The scenario approach would also guide participants to the best evaluation approaches to meet specific needs based on the scenario presented.

There are other approaches to consider for content development. Developers can include each of the above as differing levels of entry to the system.

Descriptive versus Interactive Educational Strategies

The degree to which a web-based evaluation instructional system can be automated and customized to meet specific and situational needs of a particular library is an important consideration in the development of these systems.   The EMIS approach is largely a descriptive, one directional means of education in which the user works through a set of previously developed instructional modules. Because these modules are general treatments of the topics, the extent to which the modules are appropriate for the user's specific library and evaluation needs may be limited.

The EDMS approach relies on both a description and interactive strategy. Although this approach is currently under development, the goal is to provide an interactive, problem solving technique that allows the user to engage in the selection of the data to be used for the evaluation, the approach that would be taken (e.g., e-metrics, outcomes, service quality, etc.), and the type of output desired from the evaluation. Moving toward a semi-automated, interactive evaluation approach may increase the ease with which such evaluations can be done.

Situational Factors and Contexts

Included within the data collection efforts, instructional module developers should give special attention to identifying situational factors and the contexts of evaluations that may be unique to a specific library regarding success with evaluation. Such situational factors may include governance structures, user demographics, resource availability at the library, staff make-up, and many others. Understanding situational factors and context will inform the final recommendations for which types of evaluation may be most useful and in what settings.

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ENHANCING WEB-BASED INSTRUCTIONAL SYSTEMS

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Library decision makers, researchers, and practitioners find themselves in a situation where they need a range of evaluation data and information to assess specific aspects of library services and programs. Rapidly evolving evaluation approaches have led to the development of numerous evaluation techniques and strategies within both the traditional and the networked environment. There are, however, few tools or resources available to aide in the selection of best-fit evaluation approaches needed to fulfill specific evaluation needs. The range of evaluation techniques and strategies available require that library administrations, researchers, and practitioners carefully match an available evaluation practice to meet their library's specific needs.

Within an environment of technological change and increasing pressures to justify services and resources, libraries in the networked environment must embrace new technologies to help them address these concerns. Web-based evaluation instructional systems are a promising means for helping libraries meet the pressures they face. There are, however, a number of steps system developers can take to enhance the development of these systems.

Developers can conduct pre-development data collection activities to determine module content, system design, and entry-level needs. Examples of data collection activities include:

- Needs assessments, including interviews, surveys, and focus groups of interested and affected stakeholder groups (i.e., library boards, administrators, patrons, etc.);
- Site visits to institutions and libraries to review evaluation practices and situational factors that may effect the evaluation;
- Collection of existing evaluation documentation and reports when possible;
- On-site interviews with library researchers and practitioners; and
- Attendance at seminars or demonstrations where researchers and practitioners present and explain how they conduct evaluation approaches in a particular type of library.

Data collection activities during pre-development stages can help system developers identify best evaluation practices.

Additional data collection activities to enhance evaluation instructional systems include review of selected library evaluation reports, a review of current literature and research related to evaluation and assessment practices in the library community, and a review of best practices for library evaluation methods and measures. In conducting these data collection activities, system developers will be able to:

1) Map the various areas within libraries where research is applied;
2) Identify the types of evaluation frameworks used within each library area (internal research efforts) or for each areas outside the library (external research efforts);
3) Compile and cross-reference research efforts based on circumstance and situational context; and
4) Compile a list of results as reported by researchers and practitioners for each circumstance and situational context.

Results of the data collection activities will identify areas within a library being assessed, the extent of this assessment, the evaluation frameworks used to conduct the assessment, and the degree of effectiveness (or lack thereof) of this assessment from a researcher perspective as reported within the results.

While web-based evaluation instructional systems offer many potential benefits to libraries, there is a need for more research and development in this area. This paper explored the opportunities and potential benefits that centralized web-based evaluation instructional systems can provide for libraries in the networked environment. Perhaps most significantly, web-based evaluation instructional systems, by providing the types of information detailed above, may have long-term value in helping libraries maintain or enhance funding, advocate for their roles in the communities they serve, and develop long-term sustainable strategies for support.

ENDNOTES

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