Evaluation of Digital Community Information Systems

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ABSTRACT
Community information systems provide a critical link between local resources and residents. While online versions of these systems have potential benefits, a systematic evaluation framework is needed to analyze and document realized impacts. Based on data from a nation-wide study of digital community information systems, an evaluation framework is proposed.

Categories and Subject Descriptors
H.3.7. [Information Systems]: Information Storage and Retrieval – Digital Libraries

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1. INTRODUCTION
People rely on community information (CI) for a myriad of help-seeking and problem solving situations that arise in the course of everyday life [1]. Widespread use of the Web has encouraged information providers to develop digital CI systems (DCIS). The migration of CI to the online environment presents new issues for evaluating the impact of these systems. Documenting the effectiveness of DCIS is important as both public and private CI providers attempt to sustain support and allocate resources for a range of digital and non-digital community-wide information resources. Despite the plethora of evaluation frameworks from the systems perspective, organizational theory, and models of information retrieval, minimal research has directly addressed the issue of DCIS evaluation.

2. BACKGROUND ON DIGITAL CIS
CI comprises any information that helps people with day-to-day problems and enables them to fully participate as members of their community [2]. CI includes health, government, human services, education, transportation, recreation, etc. Libraries traditionally have been key players in identifying, organizing and managing CI. The goal of any CIS, digital or not, is to meet the everyday information needs of community residents within a local community context. DCIS refer specifically to organized collections of CI in the hypertext environment. DCIS share many common characteristics of digital libraries including: (a) a set of electronic resources and associated technical capabilities for creating, searching, and using information [3], (b) they are constructed, collected, and organized by and for a community of users and their functions capabilities support the information needs and uses of a particular geographic community [3], (c) they contain content that is more than a set of pointers (e.g. bibliographic information) to other material and contain some “full-form online material” [4], and (d) they contain content in multiple formats [4].

3. DCIS EVALUATION: AN IR PROBLEM
A nationwide study revealed that 73% of information professionals involved in developing and maintaining DCIS are unsatisfied with available evaluation tools [2]. Respondents indicated that current approaches to evaluation fail to determine the impact or effectiveness of DCIS.

The search for effective approaches to evaluation is complicated by three characteristics of DCIS. First, DCIS are operational systems. The structure, appearance, and organization of the content is continuously changing as information providers modify content and reorganize the relationships and formats of information artifacts. Second, multiple components must be carefully considered together to provide an integrated understanding of the operation, use and impact of DCIS. Third, DCIS must support access to diverse content. There is no standard type, format or structure to CI. DCIS must adequately support the information needs of community residents including those with disabilities and access to minimal bandwidth.

Despite these complexities, the search for effective evaluation frameworks ultimately relies on DCIS stakeholders. Research into the substance and impacts of DCIS indicates that the entire range of community stakeholders—from everyday users to information providers—view matching individual needs for information with available CI content as the primary goal of DCIS. Information retrieval is ultimately focused on the matching of information needs with available information resources.

4. DCIS EVALUATION FRAMEWORK
The proposed user-centered framework balances the need for practical analysis of operational systems with a systematic approach to guide implementers. Using Saracevic’s layered framework for evaluating digital libraries as a base [6], the layers
are adapted to reflect the nested layers applicable to the seeking and use of digital CI.

Because DCIS are currently organized around particular geographic communities, the "social level" is transformed into the label community. Evaluation in this layer must take into account the needs of a community (e.g., community analysis), the dynamics influencing use or nonuse, and interrelations between formal and informal systems of CI resource distribution. Essential to this evaluation layer are the critical issues identified by Bishop & Star [4] of (a) shared/distributed knowledge, (b) the ecology of online and off-line resources, and (c) the social nature of DCIS infrastructure.

The institutional level is transformed into the layer of information provider to encompass the specific role of CI providers: the entities responsible for the identification, creation, and formats of content. The success of DCIS relies upon a community's awareness of who has important CI to share and what potential gaps in CI often arise through contact with community residents. Essential to this process is the imperative that information providers are aware of the information needs and the ways in which DCIS can facilitate help-seeking at the community level. Key questions at this layer include: How do DCIS translate information available through community-level providers into substantive CI that individuals in the community can utilize? Once important CI is identified, is it transformed into information artifacts and represented in a way that community residents understand?

The individual level is broadened into the category of user to allow for the concept of organizational users, such as traditional CI centers including libraries, community-based organizations and information referral centers as well as individual community residents. This layer is directly concerned with the ways that DCIS are used. The primary issue to analyze in the user layer is the characterization of the help-seeking or problem-solving processes in which DCIS access is embedded. Key questions for analysis include: What brings users to DCIS systems? What barriers do potential users experience that prevent them from engaging DCIS for information retrieval? Do users have a cognitive understanding of DCIS that allows them to discern appropriate use of DCIS? In what ways can DCIS facilitate the retrieval of information through a refinement or increasing awareness of users' information needs?

The interface has remained in an interface layer with similar issues and impacts as noted by Saracevic [6]. Primarily concerned with user activity via system interaction, key questions include: Do DCIS support the appropriate range of browsers and access speeds that meet the expectations and resources of community residents? Is there a need to support additional interface components within a particular DCIS? Are additional "markers" or navigational aids required to help users retrieve information in the hypertext environment?

The content layer is concerned with identifying key issues associated with content scope and accuracy [5] along with how well information is collected, represented, organized, structured and managed [6]. Particular to DCIS are the evaluation questions: How well does the content of DCIS fill information gaps in the community. Do content reflect the full spectrum of community resources/services? In what ways does the content of DCIS help community residents utilize community-level resources? How well does the content augment existing information resources?

5. CONCLUSION

The evaluation framework emphasizes the importance of context. For DCIS, each layer informs significant factors influencing effective user-system interaction. Guiding the evaluation of information retrieval, the framework can be embedded within ongoing iterative design to improve/maintain effectiveness of DCIS over time.

6. REFERENCES