

Disseminating National Library of Medicine Knowledge into Communities: Fighting Health Disparities

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Introduction

How to disseminate technology such as digital libraries is an important issue. Diffusion of new tools and skills takes time. As Internet resources grow in the area of health education, many librarians face challenging questions from patrons and online visitors. The research presented here is part of an effort to raise search standards in such a vital area as health information and to direct users to authoritative sources. To "google" a medical condition is to start a search that can introduce one to for-profit organizations and require a lot of time, which is valuable for someone who is sick. To visit the National Library of Medicine (NLM) web site instead, introduces searchers immediately to authoritative and current data. In the changing online environment, information developers may prepare a "field of dreams," and once it is built, the promise that "they will come" is not realized. In this paper and conference presentation, we introduce a method for inviting, training, and researching digital library users to become effective knowledge disseminators.

Outcomes-based evaluation research provides tools that might be applied to improving the use of a digital library. This paper is a progress report on the Eagles E-Health project, a yearlong effort to disseminate information about the resources available through the NLM into communities and a college campus in North Carolina. In a collaboration between the School of Library and Information Sciences and the Health Education Department at North Carolina Central University (NCCU), a training process has been developed to teach healthcare professionals and volunteers to share resources available in the databases of the NLM. Supported by a grant from the United Negro College Fund Special Programs (UNCFSP) Corporation, a cross-disciplinary research team of faculty, staff, and students is developing the training and assessing the effort with intervention evaluation analysis tools. The paper describes tools and methodologies that analyze the use of online resources.

Research and Project Goals

The dissemination or diffusion of technology as Don Berwick¹ has noted requires time and variety in training, information, and applications. Today many librarians, not just health science librarians, but also public, school, and academic librarians are approached with health questions from patrons. The library user may be suffering from poor health or have a relative or friend with a problem. Internet search engines such as Google and Yahoo return links to documents and web pages that are often produced by profit-based organizations and part of commercial sites. The objective, online resources of the NLM are deep and richly developed. They include not only publications from the PubMed database, but also interactive tutorials, videos, graphics and directories of local resources designed for all reading levels.

Low literacy including health literacy and computer technology skills is among the reasons that minority communities may not be accessing health information online. Additionally, the amount of information available online can seem overwhelming and intimidating, which creates an even greater reluctance to utilize information electronically available through the NLM databases. Differences in literacy levels and socio-economic status also help perpetuate a "knowledge gap" and contribute to health disparities within minority communities. The thesis behind the E-Health research project is that with introductory training workers in schools, libraries and community health centers can lead information seekers to the more reliable, authoritative resources provided online by the NLM. Furthermore, these users can be the technology first-adopters who spread the practice and skills to the economically disadvantaged areas where many health disparities exist. Ultimately the team hopes to improve health in such areas in NC with a proven methodology for training and introducing the technology of digital libraries.

Thus, the primary goal of the Eagles E-Health project is to narrow the knowledge gap that contributes to

health disparities by increasing the utilization of NLM resources. The targeted audiences are the NCCU community and a network of local healthcare organizations throughout the state. The study has 3 parts:

1. Develop and deliver training
2. Collect data on intervention effectiveness
3. Analyze and report results

The team believes this research can impact both health care and library science practices. Efforts to evaluate the effectiveness of digital libraries, such as the NLM, can contribute to improvements in the design and technology of digital libraries. Evaluation of the intervention can promote a sustained effort to overcome the health knowledge gap in underserved communities. Research analysis will be based on data collected from pre-tests, post-tests, proficiency tests, and interviews.

The 2007-2008 study is one of four E-Health studies being supported by the UNCF-SP at historically black colleges and universities. Besides North Carolina Central University (NCCU), the schools participating are Coppin State University, Delaware State University, and Morehouse School of Medicine. A specific goal of the NCCU study is to increase collaboration across campus disciplines and with statewide organizations working to eliminate health disparities. On NCCU's campus the collaborative effort includes participants who are students, faculty and staff in the subject areas of public health, library science, information science, psychology, and nursing. Working with the NCCU team on what has been named the "Eagles E-health" project are community healthcare partners that include approximately 20 grantees of the Health and Wellness Trust Fund's Health Disparities Initiative (HDI) from throughout NC.

By disseminating information on and beyond campus, community organizations may improve their health literacy and ease-of-use with online technologies. The research team is committed to continuing to provide and improve our NLM educational materials beyond

graphics that match the online material. Thus, attendees can follow along as the instructor demonstrates a feature or introduces a database. The NLM information with *screen shots* reinforces the instructor's examples and helps the learner adapt to the pace of the hands-on class. Periodically, time is given to allow users to complete an exercise, practice with an interactive feature, or explore the digital library on their own. The printed workbook anchors the class to keep the workshop on schedule.

With the use of flyers and email, participants are recruited. The Eagles E-health project was designed to include community partners as well as on-campus organizations. Planning in advance to reserve a computer lab is part of scheduling the training. With the inter-disciplinary team, groups from both undergraduate and graduate organizations are on team. When at remote sites, participants have been invited to bring laptops. Moreover, for web-based technology, the site still needs to provide wired access or wireless connections to the Internet if there is no lab. The Eagles E-health project is fortunate to have assistance from the HDI and support of two project officers who know the communities throughout the state. Overall, scheduling is part of disseminating the technology as you find community partners in the process.

Part Two: Collect Data on Intervention Effectiveness

In addition to workshop evaluations that can improve training, you can contribute to the development of a technology by researching the results of your training efforts. The outcomes-based methodology requires written pre-tests be administered to determine awareness of online health information and skill levels. A post-test questionnaire is provided about a month later. To reach the attendees after the hands-on workshop, the post-test questionnaires can be taken online. In addition, to measure learning a basic proficiency test was developed. Finally, users or professional librarians can also be invited to participate in follow-up interviews to collect qualitative data. On the Eagles E-health project, faculty participants have been invited

to participate in semi-structured interviews by phone or in person to determine long-term impact, such as plans to utilize the NLM in the future. Details about the methodology and design of the Eagles E-health research study follow.

One of the primary goals of the Eagles E-health project is to increase information literacy, specifically regarding the use of the NLM's public health information resources. To this end, participants' familiarity with the Internet and NLM information portals were measured. Pre- and post-tests were used to determine the degree of familiarity that users have with online interfaces, particularly those offered to the public by the NLM. The pre- and post-tests are similar and are intended to measure any increase in awareness of and use of NLM health information resources after subjects are involved in the training sessions. In addition to pre- and post-tests that measured participant's familiarity with online information services, participant's proficiency with the resources highlighted by the training was measured.

The pre- and post-tests were developed by specialists in the area of public health and survey development. The tests were intended to measure awareness of and comfort with the use of online information resources before and after training. The topics studied with the pre- and post-hoc testing included familiarity with and use of health-related Internet based information resources, preferred sources of online health information, and ability to evaluate the quality of information provided. One of the goals of the program is to measure awareness of and use of online resources among targeted populations. Thus, a significant portion of the pre- and post-tests measure to what extent participants and their community use online health information resources, particularly resources provided by the NLM. Further, the tests were targeted to their particular cohort and varied somewhat to more appropriately address that group. There are 3 different versions of the Post-Test: Students, Faculty and Staff, and Community. For example, participants who

were students were asked if they perceived a need to introduce students to online health information resources, whereas health care industry professionals were asked if they perceived that same need among colleagues and the public.

The Eagles E-health Project provides training for community members, faculty and students in the use of the NLM's major consumer health information source, Medline Plus and other NLM information resources. The purpose of the proficiency test is to demonstrate the knowledge of trainees in the use of information resources provided by the NLM. The proficiency test, which was administered as part of the post-test, measured the ability of the participant to use two or more of the databases presented in the training. A minimum level of proficiency of two databases is a requirement of the NLM program, so a test was developed to meet this requirement. Proficiency tests were developed for a number of the databases to which participants were exposed, including SeniorHealth, Medline Plus and the Drug Information database. Questions were either developed from the content provided from these websites during the training or were culled from the self-test portions of the NLM database websites. Participants were first given a series (5-10) of questions specific to the NLM's flagship public health information portal, www.MedlinePlus.org. Respondents then were presented with one or two sets of questions based on the content of other health information resources that had been presented during the training session.

By evaluating the degree to which participants utilize NLM online health information resources before and after training and by demonstrating participant's proficiency with those information sources, we hope to be able to confirm that we have satisfied the United Negro College Fund and the National Library of Medicine's goals of increasing awareness of and use of free, high-quality public health information.

Part Three: Analyze and Report Results

The Eagles E-health project team is still collecting data for analysis. Research results will be reported to the funding organization, the UNCFSP and to the NLM. Published articles with details are being planned. Thus, analysis is not always the end of a project. Whenever you start disseminating technology, you may find yourself involved in continued training just as the technology continues to evolve. The results of research on the training and diffusion of information provides feedback and future direction.

NCCU's Department of Public Health Education is coordinating the Eagles E-health project as a cross-disciplinary and innovative team approach to training the NCCU campus community and staff in the use of online NLM resources to access health information. Beyond the campus, the training team is conducting workshops that are addressing a wide range of health issues, such as diabetes, cardiovascular diseases, and cancer. The workshops were designed to transfer the necessary technical information while respecting the diversity of computer and literacy skills. Results of the baseline pre-tests, the post-tests and three-month follow-up data will be used to assess the knowledge gap regarding the use of online resources among and between racial minorities, and to evaluate the Eagles E-health effectiveness in changing knowledge, attitudes, behaviors, and skills. The NCCU Department of Public Health Education will continue to monitor and support this network of local and community partners at least until 2009 in its capacity as the technical assistance and management team for the HDI.

Conclusion

Alongside race and ethnicity, one other important factor contributing to health disparities is the degree to which people understand health information and can successfully navigate the health care system². North Carolina has a high percentage of individuals with low literacy levels raising concerns about its implications for and association with poorer health out-

comes noted earlier. Therefore, increasing access to high quality health information and improving health literacy levels are critical issues that need to be included in programs designed to eliminate health disparities.

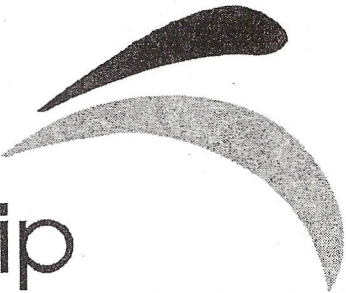
As described, the Eagles E-health project will continue using the workshop information and materials developed and disseminated during this first year of study for a subsequent two years. As new staff is added, or staff needs change, the NCCU e-Health project management team will be committed to continue working with those activities and researchers implementing health disparities work. A commitment to disseminating technology in any area, not just health, can lead to community improvements for many years to come. Users you train may share what they learn. The methodology described here for training, researching, and reporting results is one approach you also may be able to apply.

References

1. Donald M. Berwick, "Disseminating Innovations in Health Care," *Journal of the American Medical Association* 289 (2003).
2. *North Carolina Health Literacy Report* (Institute of Medicine, 2007).

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