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Beyond Google: Finding and Evaluating Web-Based Information for Community-Based Nursing Practice

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Beyond Google: Finding and Evaluating Web-Based Information for Community-Based Nursing Practice*

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Abstract

Nurses are challenged to find and use reliable, credible information to support clinical decision-making and to meet expectations for evidence-based nursing practice. This project targeted practicing public health and school nurses, teaching them how to access and critically evaluate web-based information resources for frontline practice. Health sciences librarians partnered with nursing faculty to develop two participatory workshops to teach skills in searching for and evaluating web-based consumer and professional practice resources. The first workshop reviewed reliable, credible consumer web-resources appropriate to use with clients, using published criteria to evaluate website credibility. In the second workshop, nurses were taught how to retrieve and evaluate health-related research from professional databases to support evidence-based nursing practice. Evaluation data indicated nurses most valued knowing about the array of reliable, credible web-based health information resources, learning how to evaluate website credibility, and understanding how to find and apply professional research literature to their own practice.

KEYWORDS: information literacy, evidence-based practice, public health nurses, school nurses

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Nurses must base care decisions on best practice evidence from peer-reviewed research literature. The Internet and sophisticated search engines and databases have significantly changed how nurses find this clinical information. Although Internet users have a breadth of information resources readily available, the quality of these resources is unmonitored. As a result, there is often a disconnect between the convenience of Google searching for *any* information and purposeful searching of more complex databases for *reliable, credible* information (Brophy & Bawden, 2005; Devine & Egger-Sider, 2009; Ripple, 2006; Schultz, 2007). Our goal was to address this disconnect by linking practicing nurses to reputable health information source and beginning to develop a culture of professional practice based on information literacy skills. In a project funded by the National Library of Medicine and approved by the University of Missouri Institutional Review Board, nursing faculty partnered with health sciences librarians to offer participatory workshops about information retrieval and critical evaluation skills to public health and school nurses across the state. Specifically, these workshops focused on two substantive areas: (a) consumer databases providing publicly available information resources for client and family education, and (b) professional databases essential to implement evidence-based concepts into nursing practice.

CONCEPTUAL FRAMEWORK

Over the past 30 years, the American Library Association (ALA) has advocated for the American public to be “information literate”. Individuals’ need to know how to find, evaluate and use information effectively was emphasized in the final report of the Presidential Committee on Information Literacy (1989). Competing with the concept of *information literacy* is the concept of the *digital divide*, a term introduced in the mid-1990’s to describe gaps between those with and those without computer access. However, the digital divide has evolved over the past 15 years beyond computer ownership to include the ability to access information via the Internet.

To address technology issues associated with the digital divide, an international multidisciplinary panel assembled by Educational Testing Service (2002) examined relationships between concepts of information literacy and the technical side of information and communications management. The model created by this panel, The Framework for Information and Communication Technology (ICT) Literacy, is designed along a continuum of information management, from retrieving to managing and evaluating information and finally

creating new information (Figure 1). This framework was used to guide the design and implementation of two workshops.

Attribute	Description
Access	Knowing about and knowing how to collect and/or retrieve information
Manage	Applying an existing organizational or classification scheme
Integrate	Interpreting and representing information, involving summarizing, comparing and contrasting
Evaluate	Making judgments about the quality, relevance, usefulness, or efficiency of information
Create	Generating information by adapting, applying, designing, inventing, or authoring information

Figure 1. Information and Communication Technology Literacy Framework. From “Digital Transformation: A Framework for ICT Literacy” by Educational Testing Service, 2001. Princeton, NJ: International ICT Literacy Panel. Used with permission.

The Association of College and Research Libraries (ACRL) operationalized ALA’s information literacy statement, developing standards, performance indicators, and outcomes for application to higher education. Although designed to evaluate college students, these six standards also speak to the goals of evidence-based practice expected from nurses in education and practice.

An information literate individual is able to: (a) determine the extent of information needed, (b) access the needed information effectively and efficiently, (c) evaluate information and its sources critically, (d) incorporate selected information into one’s knowledge base, (e) use information effectively to accomplish a specific purpose, and (f) understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally (ACRL, 2000).

LITERATURE REVIEW

Nurse educators are challenged to close the nursing information digital divide by assuring nurses have the information literacy skills needed for evidence-based nursing practice. However, professional databases are not usually nurses' first approach for finding and using information. Tanner, Pierce, and Pravikoff (2004) assessed nurses' information literacy needs to determine readiness to practice from an evidence base. While two-thirds responded that they regularly or often need information, 43% indicated that workplace resources are totally inadequate or less than adequate. Many reported they do not search or only poorly search professional databases, i.e. CINAHL (75%) and MEDLINE (55%). However, nurses do general searching on the Internet (59%) but rarely go beyond basic individual searches to web-based tools such as listservs or chatrooms to access nursing information. Beke-Harrigan, Hess, and Weinland (2008) reported similar search behaviors. In a study of 1,442 acute care nurses employed in one large hospital system with readily available library resources, 43% reported starting a search with Google. Of that group, 64% reported success in obtaining results using a general search engine such as Google. While 49% started a search using CINAHL or MEDLINE, a much smaller percentage reported successful searching (20% and 24% respectively) of these professional databases.

Barriers remain to information access and use. At the worksite, lack of time, combined with lack of library access and database or computer access are obstacles (Bertulis, 2008; Dee & Stanley, 2005; Gilmour, Scott, & Huntington, 2008; Lawton, Montgomery, & Farmer, 2001; Tanner et al., 2004). Lack of competency in searching, inadequate computer technology skills, and lack of interest are individual challenges (Estabrooks, O'Leary, Ricker, & Humphrey, 2003; Spenceley, O'Leary, Chizawsky, Ross, & Estabrooks, 2008). Bertulis points out that "nurses tend to base the selection of the information source on convenience and accessibility rather than quality" (p. 35).

NEEDS ASSESSMENT

Based on previous work with associate degree nurses (ADN) enrolled in an online course in population-based concepts, our group identified that ADN public health and school nurses had difficulty gathering sufficient and relevant data to develop an evidence-based practice solution to an identified public health nursing problem. Therefore, a needs assessment was conducted to clarify sources of information public health and school nurses use in everyday nursing practice.

Practicing nurses representing rural and urban local public health agencies and K-12 schools responded to an online survey about their information use preferences. Nurses were asked, *Where do you get information to manage practice issues?* Of 66 participants, 73% reported their primary source of information was readily available, e.g. already on their desk, given to them by administrators or peers, or compiled from local or state databases. The Internet was used by 26% and only 1% used the library as an information source. Evidence-based support for practice interventions and outcomes was obtained from the Internet (33%), easily available information (44%), the library (8%), or “don’t know” (15%). Identified barriers to accessing and using information included: lack of equipment, inability to access equipment, lack of time, and inability to utilize technology. Slightly less than one-half used email and 14% had skills to access library information. These results are consistent with those of Tanner et al. (2004) that nurses do not necessarily recognize the need to look beyond their immediate work environment for information resources, are using one another as the first source for professional information, and are limited by computer technology skills and accessible electronic information databases, a 21st century digital divide.

WORKSHOPS IN CONSUMER AND PROFESSIONAL DATABASES

These data validated issues related to finding and using web-based information in public health and school nursing practice. Using the ICT literacy framework to design two workshops, health sciences librarians and nursing faculty collaborated to incorporate the ICT hierarchy of skill-building into web-based information use. In both workshops, participants were first directed to up-to-date, reliable, credible web resources by the health sciences librarians, while methodically teaching the ICT literacy skills of *access* to web-based information and databases. Secondly, there was a focus on *managing* this information through application of a prescribed set of information literacy criteria to information sources. With examples set within the context of clinical practice, the higher levels of *integration* and *evaluation* of information into practice were addressed. In particular, these literacy concepts paralleled concepts of evidence-based practice related to appropriateness, relevance, and feasibility of integrating research-based information into clinical decision-making (DiCenso, Cullum, & Ciliska, 2008; Haynes, Devereaux, & Guyatt, 2002).

Half-day workshops (4-6 hours) were scheduled at six regional locations, each with Internet access and individual computers for participants. The workshop goals were: *Workshop 1*, identify consumer databases directed at easy-

to-read client information, and evaluate credibility of information sources; and *Workshop 2*, use professional databases to retrieve information for evidence-based practice. Figure 2 outlines the project design and implementation.

Figure 2. Flow chart of information literacy skill-building project.

Workshop One

Participants completed a pre-workshop, online assessment of search preferences. Google and Yahoo were most familiar and used most frequently. Among health information websites, Centers for Disease Control and Prevention (CDC), the primary information source for public health data and issues, was used most frequently. Table 1 details results from the pre-assessment.

Table 1

Pre-Assessment Results of Database Use (N=178)

Databases	Not Known	Occasional Use	Frequent Use
Google	7 (4%)	49 (28%)	123 (69%)
Yahoo	13 (7%)	118 (66%)	36 (20%)
PubMed	85 (48%)	50 (28%)	21 (12%)
MEDLINEPlus	81 (46%)	78 (44%)	22 (12%)
CDC	25 (14%)	80 (45%)	75 (42%)

The workshop focused on finding consumer-based health information, available in the public domain, which nurses could use to support their practice. Examples such as answering questions from clients, investigating unfamiliar conditions or health issues in order to manage these conditions, or preparing presentations to community groups set the context for workshop leaders to direct participants to reliable information. Participants first conducted an individual Google search and then rated the quality and types of information retrieved. This exercise led to a discussion about evaluating credibility of websites, following the guidelines developed by the Medical Library Association (MLA). See Table 2.

Librarians directed participants to explore other credible websites, identifying important information attributes and nuances for each site. The MLA criteria for evaluating websites served as the anchoring resource. Each workshop was customized to the audience, i.e., local public health nurses, state public health programmers, and school nurses. Websites were introduced that would most likely be used in community-based practice settings. Selected websites are included in the Appendix. Additional sites are linked through these websites, particularly National Library of Medicine URL's.

Table 2

Criteria for Evaluating Websites

Criteria	Interpreted As
Purpose	What is the intended use of the site, e.g. information, advertising and sales, propaganda, etc.?
Sponsorship/Authorship	Who or what organization supports and/or funds the site and why?
Content and Quality	What type of information is available? What evidence is cited? Is this consistent with what is already known by healthcare professionals?
Currency	Is the information current? When was the site last updated? Is that date noted on the website?
Audience	Who is the intended audience, e.g. general public, health professionals, researchers, school personnel, others?
Design	What is the appearance of the site? Is the information easy to find, clear, and uncluttered? Is an index with links available?
Links	Are links available to other credible sites known to you or that meet credibility criteria?
Privacy	Does the site include a privacy statement about protection of privacy, protection of confidentiality and non-sharing to third parties, and contact information for the questions?
Disclaimer	Is there a statement referring users to healthcare professionals for diagnosis and treatment?

Note. For more information, see <http://www.nlm.nih.gov/medlineplus/healthywebsurfing.html> or <http://mlanet.org/resources/userguide.html>

Workshop Two

The second workshop focused on access to and integration of professional databases, i.e., PubMed and CINAHL, to find peer-reviewed information to use in professional practice. This workshop was particularly challenging since search skills are viewed as “academic” and “something I don’t do at work”. Rather than a traditional librarian database demonstration, the workshop centered around concepts of evidence-based practice and use of literature-generated guidelines as the basis for searching for relevant information.

The workshop was designed around a specific context related to a public health or school nursing clinical issue, such as management of influenza (public health nursing) or management of bullying in schools (school nursing). Lead-in questions such as, *Why do we follow the algorithms in our procedure manuals? How do we know this is best practice? What is and where do we find the literature to support this practice guideline?*, grounded the workshop in regulations and policies nurses are required to follow. Using this clinical context, librarians embedded PubMed and CINAHL search skills into the background questions to engage the group in actively working through the steps of the search process.

The presentation moved back and forth between the *how*, i.e., the technical side of searching, and the *why*, the cognitive side of credible, reliable sources of information. With guided instruction, participants identified literature that most closely corresponded to existing algorithms or guidelines. During workshop planning and selection of the clinical topic, librarians assured a systematic review could be retrieved in the sample search on the chosen topic. Using this systematic review, participants were led in a critical appraisal of the review with a discussion about the type and quality of individual studies that made up the review. To summarize the workshop, steps of the evidence-based process were reviewed, emphasizing the importance of searching professional databases to find research literature to support clinical practice decisions.

FOLLOW-UP TEACHING-LEARNING RESOURCES

To reinforce learning, tools were developed as follow-up supplements to the workshops. Librarians regularly updated the consumer website list, emailed the list to participants, and posted it to the project website. A monthly electronic newsletter, *Need to Know*, included short, easy-to-read news columns with tips for effective searching, new websites, evaluating health content published in the popular press, and train-the-trainer frontline teaching strategies. Voice-over PowerPoint tutorials related to evidence-based concepts and critical appraisal of research studies were recorded and posted to the website to support evidence-based practice skill-building and use in practice. At the end of the project, all materials were updated and made available in CD format to public health nursing and school nursing contacts and organizations, to local public health agencies and the state health department, and through project resource files at the University Health Sciences Library. Project participants will have ongoing access to assistance, resources, and face-to-face training from the regional health sciences librarian liaison for the National Network of Libraries of Medicine, one of the contributors to this project. Our work has been archived on MOspace, a digital

repository for scholarly work and resources created by students, faculty, and staff at the University of Missouri. As an open access resource, it makes knowledge and research products from the University available to the wider community of researchers and scholars and assures preservation of these materials for the future.

EVALUATION

Over three years, 22 consumer workshops with 204 participants and 22 professional database workshops with 407 participants were held. Public health nurses from 42 local public health and community-based service agencies, school nurses from the six Missouri regional school health districts, and members of four statewide bureaus within the Missouri Department of Health & Senior Services attended the workshops. Three to six months post-workshop, online Survey Monkey[®] evaluations were solicited from public health and school nurse participants only, excluding non-nurse public health professionals. Post-workshop evaluations focused on the degree to which nurses implemented the training into their practice. Key results are presented in Table 3.

Fifty percent reported a moderate or significant impact of the training on their work. In written responses, they stated they frequently use MEDLINE and MEDLINEplus, PubMed, CDC, and Mayo Clinic for their nursing practice, and bookmark the *Top Ten Most Useful Websites* (<http://mlanet.org/resources/medspeak/topten.html>) on the Medical Library Association website for quick access. Web sites most often recommended to clients include MEDLINEplus, CDC, Mayo Clinic, and KidsHealth.

Participants reported the single most valuable instruction from the first workshop was learning how to evaluate the credibility of websites. Comments such as, “there is a difference in the validity of information – always consider the source” and “check if information is updated and current; if not, it’s probably not a good choice”, indicated that nurses better understand how to discriminate sources. One participant commented “I can feel comfortable that the information I am giving out from these websites is the correct information”. The literacy skill of evaluating credibility of information using established criteria easily transfers to evaluating other sources of information, beyond web-based information only.

Learning to search professional databases was more challenging. Of particular note were comments related to use of limits (narrowing topic), setting the context by using examples (“ask participants to prepare topics prior to training and have them use these in training”), and having “advanced” training to allow

more practice. One participant reported she learned “how not to be afraid to read research”, that first critical step in implementing evidence-based practice concepts in the workplace.

Table 3

Selected Project Evaluation Results

Demographics				
	Number Held	Public Health Nurse Attendees	School Nurse Attendees	Other Public Health/Health Attendees*
Workshop 1	22	137	108	52
Workshop 2	22	20	269	28
Totals	44	157	377	80
* Administrators, Program Managers, Quality Improvement Coordinators, Dietitians, Academic Nurse Educators, Staff Development Nurse Educators, Local Librarians				
Nurses' Responses to Key Evaluation Questions				
How has the training impacted your work? n = 229 responding				
	Not at all 16 (7%)	Somewhat 96 (42%)	Moderately 80 (35%)	Significantly 37 (16%)
How many times per month do you recommend consumer health sites to your clients? n = 228 responding				
	Never 62 (27%)	1-3 times 133 (58%)	4-7 times 20 (9%)	8 or more times 13 (6%)
How many times per month do you recommend consumer health sites to other staff? n = 229 responding				
	Never 36 (16%)	1-3 times 119 (52%)	4-7 times 44 (19%)	8 or more times 30 (13%)
How often do you search professional databases (PubMed) to find journal articles for your practice? n = 197				
	Never 65 (33%)	1-3 times 95 (48%)	4-7 times 25 (13%)	8 or more times 21 (11%)

Participants also identified additional learning needs. Comments such as, “need a refresher now that I’ve used it”, “not enough time to explore and search during the workshop”, and “provide reminder steps every once in a while”, suggested the need for regular learning reinforcement. Specific to the evidence-based practice workshop, participants commented on the complexities associated

with searching, the number of details to remember, and the need for one-on-one question-answer sessions and additional supervised practice. In the *Need to Know* newsletter (the most successful reinforcement strategy), database searching tips, new websites, teaching-learning ideas, and critique of popularized research were most used by participants. The PowerPoint modules were reported to be ineffective. Although these tutorials required use of technology, the modules were static and did not allow for the interactive engagement the project promoted.

Barriers identified by participants to finding information and using new skills included lack of time to perform searches at work, limited or no computer/Internet access, firewalls in place preventing searching, and more practice time needed to improve search skills. These issues in part account for Table 3 survey responses of *never* or *1-3 times per month* for sharing information with peers and clients and independent searching of professional databases.

An ongoing issue outside of academic health centers is the lack of access to professional databases. PubMed is one of the few that is freely available, and yet it provides only limited access to full articles. As a result, users have limited access to the full range of professional journal articles, and thus are hampered in accessing best practice evidence. As a part of this grant, we facilitated memberships on a short term basis to the Missouri Area Health Education Center Digital Library, a National Library of Medicine sponsored program to provide regional online access to professional databases and professional journals at a nominal annual fee.

DISCUSSION

Our results are similar to earlier survey results (Beke-Harrigan et al., 2008; Tanner et al., 2004), indicating that training can impact information-seeking behaviors and preferences for selection of reputable information sources. Although participants better understand information literacy skills related to searching, applying, and evaluating information, lack of time and competing commitments at work, limited access to technology, and ongoing need to reinforce new skills are barriers, again consistent with earlier findings.

If a similar project is undertaken, content related to consumer databases can be disseminated to practicing nurses at low cost and minimal training time through website postings or distribution of hard copy materials. It is recommended that an introduction to the purpose and use of the materials is given before posting or distributing, optimally in a face-to-face situation. The essentials

of this workshop should include a review of the criteria for evaluating websites (Table 2) and a current listing of reliable, credible websites updated frequently by the librarians.

Content for the evidence-based practice workshop is best suited to interactive discussion. Nursing faculty can frame the context and relevance of the content to nursing practice and librarians can provide expert guidance in searching for information. Connecting search skill-building to clinical relevance helped maintain the group's interest and participation throughout the workshop. Planning was essential to establish the sequence of the example and mock up the search to assure the topic yielded key teaching activities, particularly an exemplar systematic review. Having a well-designed comprehensive research study provided the needed elements for discussion about critical appraisal of the literature and the hierarchy of evidence. Revisiting the clinical question with newly retrieved evidence from the search at the end of workshop was necessary to reinforce the connections to finding information and applying it to clinical practice. While the face-to-face approach is costly, the interactive discussion is critical to understanding.

The project served only public health and school nurses allowing us to focus resources and customize workshops specifically to community-based nurses. Workshop examples with materials from their settings facilitated manageable discussion about access, use, and implementation of information into practice. Contact with participants before, during, and after they attended workshops was critical to recruiting new participants. A long-term benefit is the relationships that developed between the librarians and nursing faculty and with the public health and school nurses that extend beyond the time limit of this grant. Nurses who attended the workshops and later worked individually with librarians are better able to appreciate the skills and added value of our library partners, viewing them as readily accessible and as critical connectors to up-to-date, credible information resources.

CONCLUSION

The standard for today's nursing practice is to use best evidence and create best practices for clinical care. The training built on the ICT literacy framework to find, evaluate, and use web-based information offered by our nursing-library partnership helped address these evidence-based nursing practice competencies. Yet, teaching and learning information search and retrieval skills is more than simply exposing a group to information. Engaging participants and providing

easy-to-use reference materials and customizing face-to-face presentations to each audience is essential. For more complex evidence-based practice skill-building, providing hands-on experiences and framing search activities in real-time practice questions and solutions connects learners to details of the content, i.e., specific websites, search strategies, and evaluation of sources. While information search and retrieval skills are fundamental to an evidence-based practice environment, it cannot be assumed nurses have these skills.

This project provides a model to systematically address needed skill-building in information literacy assessment, incorporating the knowledge of library information specialists with experiential learning. As quality information makes its way to the frontlines of nursing care, these information skills acquired by practicing nurses translate to better information for clients and improved nursing care decision-making. Nurse educators in educational and practice settings can influence nursing's digital divide by teaching and promoting information literacy skills, from the early steps of information retrieval to the final steps of using and integrating information to design best practices in clinical care.

APPENDIX

Selected Websites for Consumer and Professional Practice Information

Consumer Sites (URL)	Notes
http://mlanet.org/	Medical Library Association website that includes links to the top 10 health websites, easy to read materials, English/Spanish database http://mlanet.org/resources/consumr_index.html
http://medlineplus.gov/	Consumer health information sponsored by the National Library of Medicine and National Institutes of Health.
http://phpartners.org	A collaboration of U.S. government agencies, public health organizations and health science libraries.
http://www.kidshealth.org	Designed for kids, teens, and parents, sponsored by Nemours.

http://www.nihseniorhealth.gov	Designed for older adults with large print, contrast background, audio feature, limited material on each screen.
http://ghr.nlm.nih.gov	Genetics Home Reference providing genetics information written for consumers.
http://www.rarediseases.org	National Organization for Rare Disorders.
http://nccam.nih.gov	National Center for Complementary and Alternative Medicine.
http://www.ashastd.org	American Social Health Association for information about sexually transmitted diseases.

Professional Databases (URL)	Notes
http://pubmed.gov	National Library of Medicine's search engine including MEDLINE.
http://www.guideline.gov	National Guideline Clearinghouse for evidence-based clinical practice guidelines sponsored by Agency for Health Care Research and Quality (AHRQ).
http://www.medicine.ox.ac.uk/bandolier/index.html	Bandolier, the United Kingdom journal for evidence-based health care.
http://scholar.google.co.uk/	Special section of Google for professional literature (site not vetted).
http://www.iom.edu	Institute of Medicine authored by expert panels on various health and health care topics.

Note. URL addresses accurate as of June 3, 2010.

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