Library Faculty Publications

Library Faculty/Staff Scholarship & Research

3-20-2018

Integrating Information Literacy and Evidence-based Medicine Content within a New School of Medicine Curriculum: Process and Outcome

Joanne M. Muellenbach
University of Nevada, Las Vegas, joanne.muellenbach@unlv.edu

Kathryn M. Houk
University of Nevada, Las Vegas, kathryn.houk@unlv.edu

Dana E. Thimons
University of Nevada, Las Vegas

Bredny Rodriguez
University of Nevada, Las Vegas, bredny.rodriguez@unlv.edu

Follow this and additional works at: https://digitalscholarship.unlv.edu/lib_articles

Part of the Information Literacy Commons, and the Medical Education Commons

INFORMATICS EDUCATION

Becky McKay Johnson and Catherine Pepper, Column Editors

Integrating Information Literacy and Evidence-Based Medicine Content within a New School of Medicine Curriculum: Process and Outcome

Joanne M. Muellenbach

Kathryn M. Houk

Dana Thimons

Bredny Rodriguez

ABSTRACT. This column describes a process for integrating information literacy (IL) and evidence-based medicine (EBM) content within a new school of medicine curriculum. The project was a collaborative effort amongst health sciences librarians, curriculum deans, directors, and faculty. The health sciences librarians became members of the curriculum committees, developed a successful proposal for IL and EBM content within the curriculum, and were invited to become course instructors for Analytics in Medicine (AIM). As course instructors, the librarians worked with the other faculty instructors to design and deliver active learning class sessions based on a flipped classroom approach utilizing a proprietary Information Mastery curriculum. Results of this collaboration may add to the knowledge base of attitudes and skills needed to practice as full faculty partners in curricular design and instruction.

KEYWORDS. Academic health sciences libraries; collaboration; curriculum; evidence-based medicine; information literacy; undergraduate medical education

Joanne M. Muellenbach, MLS, D-AHIP (joanne.muellenbach@unlv.edu) is Founding Director, Health Sciences Library, and associate professor, UNLV Libraries, 2040 W. Charleston Boulevard, Las Vegas, NV 89108-7201.

Kathryn M. Houk, MLIS, AHIP (kathryn.houk@unlv.edu) is assistant professor and Health Sciences Librarian, Health Sciences Library, UNLV Libraries, 2040 W. Charleston Boulevard, Las Vegas, NV 89108-7201.

Dana Thimons, MLIS, MS, AHIP (dana.thimons@unlv.edu) is assistant professor and Health Sciences Librarian, Health Sciences Library, UNLV Libraries, 2040 W. Charleston Boulevard, Las Vegas, NV 89108-7201.

Bredny Rodriguez, MLS, AHIP (bredny.rodriguez@unlv.edu) is assistant professor and Health Sciences Librarian, School of Medicine InfoCommons, UNLV Libraries, 1001 Shadow Lane, Las Vegas, NV 89106-7408.

Comments and suggestions should be sent to the Column Editors: Becky McKay Johnson (remjohns@utmb.edu) and Catherine Pepper (cpepper@tamu.edu).

INTRODUCTION

Founded in 1957, the University of Nevada Las Vegas (UNLV) is a comprehensive and growing research university of approximately 29,000 students and 3,000 faculty and staff dedicated to teaching, research, and service. The major areas of strategic focus for the campus are: attaining a Carnegie Foundation designation as Tier One "Research University/Very High"; entering the top 100 American research universities; and developing a public medical school in Southern Nevada that will boost the regional economy and provide the community with enhanced access to quality health care.

UNLV University Libraries is Southern Nevada's only research library system. It is comprised of Lied Library, which is the main library, and four satellite libraries: Health Sciences Library, Architecture Studies Library, Teacher Development & Resources Library, and Music Library. University Libraries is staffed by 127 individuals, with 56 tenure-track faculty librarians, including the Founding Director of the health sciences library, and the health sciences librarians.

The UNLV School of Medicine (SOM) is a new, allopathic, public medical school in Southern Nevada with a vision to "create a world-class center of excellence and innovation for medical education, patient care, and research that prepares Nevada's physicians with the most advanced knowledge, treatments, and technologies while serving the health care needs of our diverse urban community."[1] In October 2016, the SOM was officially granted preliminary accreditation by the Liaison Committee on Medical Education (LCME). In July 2017, the School of Medicine enrolled its charter class of 60 students. At the same time, the SOM's faculty practice plan, UNLV Medicine, began operations, and ten residency programs accredited by the

Accreditation Council for Graduate Medical Education (ACGME) were transferred under the

UNLV Graduate Medical Education (GME) program.[2, 3] Additionally, UNLV has a School of

Allied Health Sciences, School of Community Health Sciences, School of Nursing, and School

of Dental Medicine.

LIBRARIAN INVOLVEMENT ON THE CURRICULUM COMMITTEES

The former UNLV Libraries Dean had a vision for the new health sciences library. She led the

strategic planning efforts for the library to support student, faculty, and community research and

professional development.[4] These efforts led to the hiring of a Founding Director, Health

Sciences Library, who came onboard in April 2016. This position was responsible for building a

new health sciences library from the ground up.[5] In addition to planning, directing, and

implementing all library resources and services, the Founding Director had a professional goal to

design and deliver information literacy (IL) and evidence-based medicine (EBM) content within

the SOM curriculum. EBM aims to locate the most relevant and valid evidence in support of

clinical care. This often involves the steps of assessing the situation, asking a well-built clinical

question, acquiring the necessary information, appraising the information for its relevance and

validity, and applying the new knowledge to clinical decision-making. In 1991, Gordon Guyatt

coined the term *evidence-based medicine* to highlight the importance of not only physician

expertise but also current research evidence and patient values in clinical decision-making.[6] A

first step toward the design and delivery of IL and EBM content within the SOM curriculum was

for the Founding Director and health sciences librarians (the HSL librarians) to become members

of the curriculum committee and its subcommittees.

In keeping with the former Dean of Libraries' vision for embedding librarians in the curriculum and facilitating library faculty partnerships with the colleges, the HSL librarians used the curriculum meetings to highlight library resources and services and to provide orientation as it related to curriculum business.[7] The SOM Founding Dean also shared her vision for how the new health sciences library would impact students. The SOM Dean believed that a problem-based learning (PBL) curriculum is library-intensive. Given that UNLV Libraries has aided students by pushing research-based learning concepts into the undergraduate curriculum, the Dean stressed that the curricular involvement of the health sciences library would be an extension of what was already being done, "just at a different level and health-related."[8]

There were many benefits to membership on the course planning committees. The HSL librarians were provided with accounts to the learning management system, LCMS+, and became deeply involved in the curriculum development process. This process included the mapping of learning outcomes and the creation of assessment tools. LCMS+ accounts also facilitated the librarians' ability to review course syllabi and link the materials, such as library subject guides, from the course sites. Overall, the health sciences library became more visible, as did the important role that the HSL librarians played as curricular partners.

IL AND EBM CONTENT PROPOSAL AND COURSE INVOLVEMENT

The SOM curriculum was designed to provide medical students with intensive, hands-on educational experience. Innovative components of the curriculum included emergency medical technician certification; problem-based learning focused on real-life clinical cases; cutting-edge virtual anatomy and microscopy; an outpatient longitudinal integrated clerkship; medical

Spanish; hospitality in health care principles integrated into the student and patient experience; and community service experience.[9] As Phase One of the SOM curriculum took shape, the HSL librarians began to identify courses and specific sessions within the curriculum where IL and EBM content could be integrated. They conducted a literature review to find out if others had developed similar curricula, identified assessment tools, and created and mapped content learning outcomes. These content learning outcomes included LCME standards, Association of American Medical Colleges' Core Entrustable Professional Activities (EPAs), Association of College & Research Libraries (ACRL) information literacy competencies, and the ACRL *Framework for Information Literacy for Higher Education* concepts. Simons and colleagues found that information literacy learning that took place in context using measurable outcomes was more meaningful, enduring, and likely contributed to patient care.[10] Brown and Nelson noted that the librarians' efforts to integrate medical informatics components into the first two years of the medical school curriculum resulted in a higher degree of usage of information resources, but that obtaining time to incorporate new content was difficult, emphasizing the importance of being involved in the curriculum revision process.[11] Swanberg and colleagues designed a session that focused on the seventh core EPA – to prepare medical students in quickly and effectively locating existing evidence to apply to patient care at the time of entering residency.[12] They found that students had displayed progress toward achieving this EPA through increased awareness and interest in searching EBM resources in the pursuit of evidence-based clinical practice and lifelong learning as future physicians.[12]

The HSL librarians identified the Analytics in Medicine (AIM) course as one of the most conducive for them to incorporate EBM. AIM is taught during Phase One of the SOM curriculum and is a longitudinal, multi-part course that included the topics of bioethics,

epidemiology & biostatistics, and EBM. The steps of EBM that focused on assessing the information need, creating a well-built clinical question, and acquiring the needed information were the HSL librarians' areas of expertise. SOM curriculum leaders expressed interest in adopting the Information Mastery curriculum, developed by Allen F. Shaughnessy and David Slawson,[13] and invited the Founding Director of the Health Sciences Library to work with the AIM Interim Course Director to develop an outline of EBM sessions. The HSL librarians continued to review course syllabi and, over the first quarter of 2017, they drafted a proposal for IL / Information Mastery and EBM content within the SOM curriculum. In May 2017, the proposal, which included learning outcomes, topics and schedule, and a learning outcomes rubric, was presented to SOM curriculum leadership. Ultimately, the HSL librarians' proposal was approved, and they were invited to lead the design and delivery of EBM within the AIM course. This involvement required design of new course content and sessions that followed a structure established for AIM by curriculum leadership.

DESIGN AND DELIVERY OF EBM COURSE SESSIONS

With the matriculation of UNLV SOM's charter class of 60 students in July 2017, a key priority for the HSL librarians was to become familiar with the Information Mastery curriculum and to design the two EBM sessions that would be delivered in the fall 2017. Also in July, a fourth health sciences librarian was hired. This librarian took the lead in coordinating the frequent EBM planning meetings, as well as drafting the documents that were required for each EBM session as a part of the overall AIM course.

The AIM course was based on a flipped classroom approach, with the goal to engage students in active learning during class sessions so they could explore and apply the material through discussion and case-based activities. To that end, each AIM course session was comprised of three class groups, 20 students per class, held in medium-size classrooms. For each class group, three faculty were in charge of the topic areas: bioethics, epidemiology and biostatistics, and EBM. The expectations of the team instructors were that instructors would teach each session for which they were the primary faculty, and instructors would attend as many of the other sessions as possible. There was also a requirement that the content presented by each group be identical. To that end, faculty guides, student activity guides, and student reading lists needed to be created and posted on the LCMS+ site in advance of each session.

Planning for the first EBM session was focused on a thorough review of the Information Mastery curriculum materials, including the online evidence-informed decision-making modules and session exercises. Although much of the Information Mastery content was well-designed and accurate, it was not always in line with the AIM faculty's approach to EBM instruction. For example, the evidence hierarchy presented within the Information Mastery curriculum did not include systematic reviews, and the instructors had to creatively mention that there were other hierarchies that should be considered. There was also a strong desire to provide students with some basic, but essential, library information, along with the EBM content, due to the library session being removed from the SOM general orientation schedule. After many hours of individual review, HSL librarian meetings, and AIM course meetings, the HSL librarians developed an *Introduction to EBM* session, with detailed content and activities. Activities included two large group activities: multiple choice questions using Poll Everywhere—an audience response system—and a discussion on limitations of EBM; and two small group

activities: health questions that students brought to class, and table of contents article placement within a hierarchy of evidence. For each activity, which included use of the classrooms' whiteboards, timing was of the essence. The HSL librarians were asked to facilitate the sessions, rather than to lecture. As facilitators, the librarians were responsible for keeping the large group discussions on-track, providing brief instructions prior to the activities, checking in with the groups during their activities and providing feedback, and wrapping up the session.

Planning for the second EBM session, *Developing & Answering Clinical Questions*, began immediately after the first EBM session was completed. The HSL librarians reviewed the feedback from the first session and made adjustments. They eliminated the use of polling software and decreased the number of activities to three. Students were asked to send their group faculty a two- or three-sentence pre-class reflection, describing the purpose of PICO in their own words and outlining a background versus a foreground question. PICO is a framework used to form a clinical question and facilitate the literature search. PICO stands for P – the patient problem, I – the intervention, C – the comparison, and O – the outcome.[14] At the beginning of the class, the HSL librarians asked students to share their reflections. There were three small-group activities – creating a PICO and a well-built clinical question based on clinical case one; creating a PICO and a well-built clinical question based on clinical case two; and searching point-of-care tools and PubMed based on the clinical questions designed around case two. Students were asked to show their results on the whiteboards, to discuss the advantages and disadvantages of the various point-of-care tools and PubMed, and reflect on when they might choose to use PubMed instead of a point-of-care tool.

Immediately following each AIM session, faculty from all three groups met to discuss how their sessions went and provide feedback. These sessions were where the faculty learned

how and why one session may have deviated from another. For example, in one group during the *Introduction to EBM* class, a facilitator encountered polling software that did not work and had to continue the activity by using show of hands. In addition, there was often discussion about timing for particular activities and suggestions for limiting activities or redistributing time across activities during future classes. These debriefing sessions were made standard practice for the entire AIM curriculum, with similar issues arising for discussion across the bioethics and epidemiology and biostatistics threads.

OUTCOMES

In order to assess student learning, each HSL librarian worked from a photographed list of their student group, and provided comments on their level of participation, grasp of EBM content, and other related points to relay to the course director. The HSL librarians plan to review further the standardized measures for pretests and posttests of search skills, and hope to select one that could demonstrate how the EBM content improved the students' search performance, among other skills. Because AIM is a SOM course, any future EBM assessment methods will have to be approved by SOM curriculum leaders. With regard to the course evaluation, the AIM course was evaluated by six student representatives, selected by SOM curriculum leaders, at certain points throughout the semester. This was a challenge for the HSL librarians because they were not able to obtain individualized feedback about the specific EBM sessions. However, feedback from the six student representatives and course faculty will continue to inform the design and delivery of the AIM course content overall.

Integrating with the AIM course brought an increased sense of connection with the SOM for the HSL librarians, who became more widely accepted as members of the medical education team. The HSL librarians' involvement with AIM and the curriculum committees led to more collegial and professional relationships with SOM faculty. Overall, the HSL librarians became active partners in undergraduate medical education.

While there were many benefits and positive outcomes for the HSL librarians working closely with the SOM, several challenges arose throughout the process. One major challenge was balancing the time commitment for creating and executing the EBM sessions with the duties and responsibilities of opening a new library and providing services. As tenure-track academic faculty, the HSL librarians had to meet expectations set by the main library for scholarship and service on library and university committees. Helping colleagues at the main library understand the groundbreaking changes that were taking place on the medical campus and within the medical curriculum was sometimes challenging. Other challenges included quickly adapting to several substantial changes made by the SOM curriculum leaders based upon student feedback and other factors. For example, the dates of instruction were altered and class sessions were expanded from one hour to two hours a few weeks prior to the first session. One SOM faculty left the AIM course a few weeks into classes and was not replaced until three weeks prior to the conclusion of the semester. This brought forth a request for the HSL librarians to prioritize having regular attendance at the weekly AIM classes. In addition, based on student feedback, the AIM course leaders rearranged the instructors for the three groups in order to create a better mix of faculty with in-depth, active-learning experience and those with less experience. This led to all of the AIM instructors having to adapt to new SOM faculty instructor partnerships late in the semester.

CONCLUSION

Overall, the HSL librarians' involvement in the design of a new course for a new SOM was a positive experience. Membership on the SOM course planning committees allowed them to participate in the creation of a new curriculum and strengthened partnerships with SOM faculty. However, the degree of involvement was time-consuming. The librarians' involvement required the ability to compromise due to the multiple stakeholders involved, as well as the flexibility to deal with uncertainty when delivering the proprietary Information Mastery curriculum.

As the HSL librarians plan for the EBM sessions that will be delivered in subsequent semesters, new considerations for primary responsibility of EBM preparation and instruction will arise as a fifth health sciences librarian joins the team. The HSL librarians will also continue to investigate methods for bridging the information literacy gap that is not being filled through the AIM course. Ideas for bridging the gap include the use of online content and in-person workshops. Overall, this experience may help library science educators and health sciences librarians further identify the attitudes, knowledge, and skills required for successful practice in undergraduate medical education and health sciences libraries.

REFERENCES

1. UNLV School of Medicine. "Our Vision." Accessed January 9, 2018.
   https://www.unlv.edu/medicine.
2. UNLV School of Medicine. "Milestones Accomplished." Accessed January 9, 2018.
   https://www.unlv.edu/medicine/milestones.

3. UNLV School of Medicine. "About Graduate Medical Education." Accessed January 9, 2018.

    https://www.unlv.edu/medicine/gme.

4. Pietrucha, Raegen. "Planning A Health Sciences Library for Southern Nevada." University

    Libraries *eCONNECTIONS*. December 1, 2015.

    https://www.library.unlv.edu/econnections/2015/12/planning-health-sciences-library-

    southern-nevada.html.

5. Kennedy, Sean. "New Faces: Joanne Muellenbach." UNLV News Center. September 19,

    2016. https://www.unlv.edu/news/article/new-faces-joanne-mullenbach.

6. Straus, Sharon E., Paul Glasziou, W. Scott Richardson, and R. Brian Haynes. *Evidence-Based*

    Medicine: How to Practice and Teach It. 4th ed. Edinburgh, Scotland: Elsevier Churchill

    Livingstone; 2011.

7. Yunkin, Michael. "Iannuzzi to Retire as Dean of UNLV University Libraries Sept. 1st."

    University Libraries News Blog, February 14, 2017.

    https://www.library.unlv.edu/newsblog/2017/02/iannuzzi-retire-dean-unlv-university-

    libraries-sept-1st.html.

8. "The School of Medicine Planning Dean on the New Health Sciences Library, in: Planning A

    Health Sciences Library for Southern Nevada." University Libraries *eCONNECTIONS*.

    December 1, 2015. https://www.library.unlv.edu/econnections/2015/12/planning-health-

    sciences-library-southern-nevada.html.

9. *"*UNLV School of Medicine Curriculum Map: Charter Class Entering 2017." Accessed

    January 9, 2018. https://www.unlv.edu/medicine/curriculum.

10. Simons, M. R., M. K. Morgan, and A. S. Davidson. "Time to Rethink the Role of the Library in Educating Doctors: Driving Information Literacy in the Clinical Environment." *Journal of the Medical Library Association* 100, no. 4 (October 2012): 291-296.

11. Brown, Janis F., and Janet L. Nelson. "Integration of Information Literacy into a Revised Medical School Curriculum." *Medical Reference Services Quarterly* 22, no. 3 (Fall 2003): 63-74. doi:10.1300/J115v22n03_07.

12. Swanberg, Stephanie M., Misa Mi, and Keith Engwall. "An Integrated, Case-Based Approach to Teaching Medical Students How to Locate the Best Available Evidence for Clinical Care." *MedEdPORTAL Publications* 13 (2017): 10531. https://www.mededportal.org/publication/10531/.

13. Tufts University School of Medicine. "Center for Information Mastery." Accessed January 9, 2018. http://medicine.tufts.edu/Education/Academic-Departments/Clinical-Departments/Family-Medicine/Center-for-Information-Mastery.

14. Richardson W. Scott, Mark C. Wilson, Jim Nishikawa, and Robert S. A. Hayward. "The Well-built Clinical Question: A Key to Evidence-based Decisions." *ACP Journal Club* 123, no. 3 (November-December 1995): A12.