INFO 230

Josh Simpson

November 9, 2020

White Paper #3

Emerging skills for a new generation of research informationists

Emerging skills for a new generation of research informationists

Abstract

This paper will attempt to answer the question "what are the skills research informationists need in order to provide solutions to organizations' new and upcoming research and teaching needs?" I present an extensive primer on the history of the informationist profession – which pre-dates the research informationist by a decade or two depending on how you define its origins - not only to offer a historic frame but also because many of the competencies involved in the older informationist role are still present, both latently and actively, in the very different context of contemporary "eScience" research teams. Surveying the literature on research informationists reveals that expertise in data management and data preservation; new trends in scholarly communication; sophisticated search, appraisal and synthesis of search results; various kinds of instruction in diverse settings; funding compliance and grant writing skills; and in some cases preparing manuscripts and even co-authoring articles can all be desirable aptitudes for those seeking to employ a research informationist.

Introduction

The informationist role developed in the late 1970s from the confluence of the clinical medical librarian and library liaison roles, both examples of library outreach programs designed to deliver specialized services to their clinical or academic colleagues. Embedded within clinical or other kinds of teams, as opposed to conventional library staff, the informationist position was meant to provide doctors and other clinicians with the most relevant evidence from the literature to ensure the best diagnosis and treatment of patients (Shumaker, 2012). While the informationist position evolved within healthcare and health science contexts and is still

primarily associated with these fields, informationists are now found in a variety of other organizations, usually of the business, scientific and analytical variety but also in public and school libraries among others. The informationist profession encompasses many responsibilities, demands a broad and flexible skill set, entails the use of continuously evolving technologies, and typically requires secondary subject matter expertise. Over the past few decades informationists' duties have evolved from supporting healthcare professionals with expert search and reporting services (previously performed exclusively in medical / science libraries) to providing tightly integrated guidance, knowledge and functions which enable many aspects of rapidly advancing research methods and technologies, a change which coincides with the introduction of the new title research informationist.

These developments have led to an adaptation of the informationist role: the research informationist. The informationist position evolved within healthcare and health science contexts and is still primarily associated with these fields, but informationists are now found in a variety of other organizations, usually of the business, scientific and analytical variety but also in public and school libraries among others. Informationists in healthcare have been described as another type of clinical specialist – one with "equal voice with other specialists who support clinical decision-making" (Giuse, 1997) - like lab technicians and radiologists that physicians consult with and order services from "to ensure that the best available findings from the literature were informing all aspects of care" (Shumaker, 2012). The informationist is a type of embedded librarian, one who works within clinical teams instead of in a library to fulfill the information needs of clinical care teams, researchers and patients. In addition to conducting in-depth literature searching, summarizing and reporting for colleagues, informationists are also

frequently called on to provide information literacy training, manage electronic resources and other collections, build knowledge systems, and, more broadly, lend "support to transformational initiatives within and across functional areas of an enterprise as architects, governance experts, continuous improvement advocates and strategists" (Wikipedia). In academic healthcare and health science settings informationists / research informationists may also help prepare manuscripts, co-author and publish articles, give presentations at professional meetings and help with data analysis software, among other duties. It's not unusual for the informationist to be a faculty position at teaching institutions. In recent years there has been a movement towards deeper involvement by informationists in new research, scholar communications and data curation paradigms and practices which require competencies in "data management, data preservation, funding compliance, and grant writing" (Brunner and Osorio, 2017). After providing background on the history of informationists in a healthcare / health science context I will address the most recent incarnation of the profession, the research informationist.

Problem Statement

Clinical medical librarians and library liaisons have traditionally had some subject expertise in relevant domains in addition to library degrees. In the healthcare setting this has usually meant a life science, medical or public health degree. This convention has continued for most informationists in the healthcare field while other kinds of organizations require or prefer degrees in other relevant subjects, though Shumaker notes that "emphasis on this point is much stronger in the medical library literature than in the literature of embedded librarianship

in other sectors" (2012). I want to explore the emerging competencies needed by informationists and MLIS students trying to build their knowledge bases and skills in order to keep up with the ever-changing, technology-mediated, interdisciplinary practices related to contemporary research, chiefly data management and preservation. What trends in science-oriented organizations and academic departments are driving informationists and library science students into the new role of research informationist and demanding new proficiencies? Are there professional development resources - training, certifications, continuing education programs - or degrees available to aspiring or working informationists looking to increase their usefulness as research experts on their teams?

Literature Review

The shift from clinical librarians to informationists

As far back as the 1970s, clinical medical librarians had identified a serious bottleneck in their ability to provide the kind and quality of assistance that their patrons needed: the onerous amount of time, and in some cases specialized knowledge, required to read and synthesize complex information and present it to clients in a format that was accessible, rigorous and timely enough for clinical use. A new professional role was envisioned which, according to Shumaker, paired "expertise in information retrieval and a sophisticated understanding of the clinical environment, able to identify, retrieve, read, and summarize the literature in order to provide direct input into clinical questions" (2012). Recognizing an ongoing need for tighter integration with clinical teams, Giuse argued in 1997 for the necessity of making the case for embedded informationists: "we have no choice but to migrate into the clinical setting; to avoid

doing so is to deny our future in the information age." Despite the much older origins of the idea of the position that Shumaker claims, most overviews of the history of the term informationist credit its invention to an editorial by Davidoff and Florance in the Annals of Internal Medicine in 2000. Elaborating on the time constraints identified almost three decades earlier, they described some of the sources of inefficiency in medical librarianship that made a compelling case for the new role: "the information [the librarian must use] resides in scattered formats with inconsistent indexing and accessibility and requires time, domain knowledge, retrieval, and critical appraisal skills to convey the best of it to the point of care" (Canto, Grefsheim & Rankin 2008). Davidoff and Florance put it plainly: "the disappointing reality is that physicians still don't regularly search the medical literature themselves, nor do they ask for professional help in searching nearly as often as they need to" (2000). A host of other reasons for cultivating informationist positions embedded within hospitals have been noted, including changes in scholarly publishing, inconsistent and slow translation of research into practice, pressures on physicians to practice evidence-based medicine, ensure patient safety, and deliver cost-effective care (Giuse & et.al., 2005), and even a more informed patient population.

Informationist services in situ

Another conventional role for informationists is providing various kinds of embedded instructional services to different patrons in different contexts. In a teaching hospital, for example, this could range from education sessions which are part of a course or other formal occasions which the audience's attendance is mandatory to impromptu Q&A interviews with students, residents and physicians making their rounds. The line between providing instruction and providing information is often blurred. Fellow team members who would benefit from

improving their literacy in search techniques may prefer instead to get quick answers rather than information skills building lessons. Derosa advises informationists in teaching hospitals to consider the stage of their audience's educational and clinical careers, and "for what purpose they need the information – ranging from developing their own clinical expertise to presenting at morning report to informing clinical decisions in the course of caring for patients" (2018). The instructional-cum-informational role played by informationists in teaching institutions is evolving in the new research informationist context, as is the nature of the content and resources shared.

Emergence of the research informationist

In the past decade or so a new role has branched off from the informationist lineage: the research informationist. This development is a result of changes in research – generally of a scientific nature – which have been spurred by the massive explosion of data creation, technological and conceptual advances in data management and preservation and, to a lesser extent, new funding requirements. While modern data management arguably has a multi-decade history dating to the dawn of the computer age, data curation is both a newer and more overarching term referring to models that describe and structure interrelated processes of data creation, long-term data preservation in digital repositories, and enabling data access and reuse by other scholars. It is based on adherence to numerous standards, metadata schemas and media / hardware requirements, all of which demand intensive effort to meet exacting scientific specifications.

The research informationist in practice

Emerging skills for a new generation of research informationists

Taking a step back to look at the early stages of the relationship and dialog between researchers and informationists (here referred to as a librarian, but the title was later changed to research informationist), in Federer's case study of an initiative at the UCLA Biomedical Library funded by the NIH she observed that "most [of the scientists] did not request a specific service, but instead provided an overview of their research and data management practices to the librarian" (2013). The librarians then tried to point out gaps and limitations in the scientists' processes that they might improve upon, listing their most relevant skills:

- "advice on data management and curation, including metadata standards and preservation and preparation of data for sharing;

- expert searching for meta-analyses and systematic reviews; and

- bibliometric analysis and network analysis to identify potential research collaborators" (2013).

This cogent description encapsulates a good deal of the value that research informationist have to offer researchers. Each of these capabilities, expressed economically here, contain a wealth of knowledge and could be be unpacked in much greater detail. The NIH funding proposal had sketched out the basic expectations for data management activities, but Federer's informationist discovered that "a deeper understanding of the previous work of the research team, the data they had already gathered, and their work-flows for collecting data was essential in planning a more specific set of activities for the informationist to undertake" (2013). She identified three crucial tasks for generating long-term results and benefits: digitizing analog materials, aggregating disparate sources of data and creating metadata standards for the emerging field of research. The collaboration between informationist and

researchers was found to progress iteratively, "with the informationist proposing solutions to problems and the team suggesting how these solutions could be applied to their research" (2013).

Data Management and Curation

Data management has established itself as a critical component in the informationist's knowledge base in the past decade. One source of the demand for this knowledge is captured by Derosa: "many researchers and clinicians have not had formal training in the skills needed to work effectively with data, including data management, analysis, and visualization" (2018). This skills deficit is exacerbated if not caused by technological revolutions frequently referred to by the shorthand Big Data. Lyon traces the effect of this revolution on informationist roles: "the trend toward data-intensive research across all disciplines, has resulted in growing volumes of data which require pro-active management, curation and stewardship, and a portfolio of research data services is emerging" (2016). Digital curation, a course offering in some MLIS programs (albeit one that may require further study depending on one's interests in technical aspects), is an area of specialization which spans both theory and practitioner skills. It promotes the idea that data must be carefully curated from its inception through its reuse. It begins with codifying metadata practices at the point that data is first created (adding key descriptive metadata about the files generated), packaging data and metadata in digital objects and "ingesting" them into a digital repository, and making these objects accessible to a "designated community," often other scientists. Because many researchers and clinicians lack knowledge about data management much less data curation, the research informationist is well positioned to add a great deal of value to his research unit.

Emerging skills for a new generation of research informationists

Within the US, if not more broadly, the science and practice of data management has also been accelerated by new requirements for research grants from funding organizations – often government agencies – in data management and sharing policies. This trend in turn has created a need for expertise in funding compliance and grant writing which has again been taken up by research informationists. The NIH has had policies requiring "data management and sharing plans" (DMSP) in place since 2015, and more recently elaborated on that with a stipulation that grantees "submit a detailed plan outlining how they will manage their data throughout the research cycle, as well as how they will make the data available upon publication" (Derosa, 2018). It is becoming increasingly commonplace for journals and publishers to also require that authors make their data available upon publication. Familiarity with data policies and mandates are another benefit research informationists can bring to the table.

Recommendations

As Shumaker notes, using an older term for informationists of the healthcare / science variety: "education is an important, ongoing theme in the literature of embedded medical librarianship" (2012). At the risk of simplification, we can point to two sides of informationist and research informationist education: subject specialization and librarianship. The former refers to the scientific knowledge held by the researchers / clinicians / students with whom the informationist is embedded, and the latter broadly encompasses all the skills described in the literature review, from custom search services to data curation and much else. Several authors describe two educational tracks: "one for those who begin as librarians and the other for those

who begin as clinical professionals" (Shumaker, 2012). Though informationists in medical contexts with subject degrees are more common than not, Shumaker mentions several cases of institutions offering subject training in "bioinformatics" and other germane topics to informationists. Robison describes an ambitious program initiated by the NIH which provided "general courses in clinical research and biology, specialized courses in medicine and science relevant to the work of the group in which the informationist is embedded, and learning by regular participation in lectures, conferences, rounds, and lab meetings" (2008).

As for science researchers, informationists and librarians looking to enhance their data management and services, putting aside the MLIS path, there are a number of organizations including peer-based groups providing resources in relevant topic areas. The NIH's "Big Data to Knowledge" initiative funds some open educational programs in this vein, and the Medical Library Association offers continuing education courses in data management via webinars or in-person at their annual meetings (Derosa, 2018). Coursera provides online courses applicable to data management and related topics. Other promising developments for informationists and librarians include efforts by communities of professionals with experience in data services who are networking, organizing groups and offering support and sharing ideas both for insiders and newcomers alike. There are listservs and even hashtags used by research informationists and their ilk (#datalibs) among other social media activities. Myriad library and information science journals are publishing articles about the provision of data services within specific domain settings (Derosa, 2018), and the University of Massachusetts Medical School and Lamar Soutter Library publish the Journal of eScience Librarianship which is dedicated to "services related to data-driven research in science, technology, engineering, math, social sciences, medicine, and

public health" (2017). To return briefly to the graduate school context, Lyon (2016) presents an interesting and promising case study of an innovative program offered by the University of Pittsburgh's School of Information Sciences. Though the setting was a clinical health science situation, it was designed for students interested in professional roles that require mastery of diverse disciplinary research data practices. Students are embedded in a laboratory with researchers during an "immersive module." Evaluations by the MLIS students and faculty researchers were very positive. Lyon describes the ramifications of the program as highly encouraging for both researchers and students: "the potential extension of the immersive model for the delivery of research data services directly to researchers at their point of need is explored and a connection is made with the established concept of an informationist" (2016). There's little doubt that eScience and the multifarious roles that deeply integrated research informationists play within it will continue to thrive, continue to be transformed by new technologies, and continue to be driven by experimental new practices, concepts, and types of collaboration. Simultaneously, the educational opportunities in data curation and other prized skills for aspirational informationists, librarians, researchers and other students seem set to expand and diversify. The outlook for the eScience field and the research informationist profession is rosy indeed.

Emerging skills for a new generation of research informationists

REFERENCES

Brunner, M., Osorio, J. (2017). Recruitment, retention, diversity, and professional development. In T. Gilman (Ed.), *Academic librarianship today* (pp. 143-159). Rowman & Littlefield Publishers.

Davidoff, Frank, & Florance, Valerie. (2000). The Informationist: A New Health Profession? *Annals of Internal Medicine*, *132*(12), 996. https://doi.org/10.7326/0003-4819-132-12-200006200-00012

Derosa, A. P. (2018). A Practical Guide for Informationists. In *A Practical Guide for Informationists* Elsevier Science & Technology.

Federer, L. (2013). The librarian as research informationist: a case study. *Journal of the Medical Library Association*, *101*(4), 298–302. https://doi.org/10.3163/1536-5050.101.4.011

Giuse, N.B. (1997). Advancing the practice of clinical medical librarianship. *Bulletin of the Medical Library Association*, *85*(4), 437–438.

Giuse, N.B., Koonce, T., Jerome, R., Cahall, M., Sathe, N.A,, & Williams, A. (2005). Evolution of a mature clinical informationist model. *Journal of the American Medical Informatics Association : JAMIA*, *12*(3), 249–255. https://doi.org/10.1197/jamia.M1726

Lyon, L. (2016). Librarians in the Lab: Toward Radically Re-Engineering Data Curation Services at the Research Coalface. *The New Review of Academic Librarianship*, *22*(4), 391–409. https://doi.org/10.1080/13614533.2016.1159969

Robison, R. R. (2008). Informationist Education. *Medical Reference Services Quarterly*, *27*(3), 339–347. https://doi.org/10.1080/02763860802199034

Shumaker, D. (2012). *The embedded librarian: innovative strategies for taking knowledge where it's needed*. Information Today, Inc.

University of Massachusetts Medical School and Lamar Soutter Library. *Journal of eScience Librarianship.* 2017. http://escholarship.umassmed.edu/jeslib/.