

Academic and Clinical Roles of Health Science Libraries in the Context of New Technologies

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Abstract

Purpose: To discuss the academic and clinical role of health science librarianship in the context of new technologies.

Design/methodology/approach: This paper is a concept paper on the new roles of libraries in health sciences education, and therefore, a conceptual review based on existing literature on the subject is done in this paper.

Findings: Libraries are increasingly using new technologies, and their collections are increasingly being stored in electronic form. The health sciences library is closely associated with medical information literacy, medical informatics, evidence-based research skills, and problem-based health science education.

Practical Implications: The integration of health science educational activities into the health science curriculum is a promising trend. Many educational opportunities have emerged in these fields as a result of the many changes taking place in the environment of the health sciences. The library also needs flexibility, adaptation, and creative solutions in this situation.

Originality/value: This paper presents the roles of libraries in supporting health science library users in their teaching and research with the help of new technologies and in supporting quality education in the health sciences.

Keywords: Clinical Role of Libraries, Health Science Library, Librarian in Health Science Institutes, Technologies in Health Science Libraries, Librarian's Education Role in Health Science Libraries

1. Introduction: A rapid advancement is seen in health science in biomedicine, technology, and health education practices. Changes in health science education and technology have led to the emergence of a wide range of new educational roles for libraries. To play these new roles, health science libraries need to be aware of innovative and evolving models for the curriculum of health science education and for the continuing education of students, teachers, and practitioners in this field. Libraries should also be constantly informed and knowledgeable, especially with new applications of technology and in the emerging disciplines of medical information science. And for this, libraries need to understand the demands of libraries in order to teach information management skills to students, teachers, and practitioners.

The terms "lifelong learning," "problem-based learning," "independent study," "information literacy," and "medical information" are also reflected in the thinking of health science teachers, special commissions, and recommendations from accredited institutions (Rankin & Sayre, 1993).

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Medical libraries have been instrumental in providing information to researchers, physicians, and undergraduate and professional students about molecular information resources and consulting services (Tennant & others, 2002).

Changes in medical information and technology have revolutionised health care. Medical and health sciences libraries have become integral parts of education and training, as have databases, research instruction, and technical training for learning and applying technical skills.

Librarians and staff in the field of health science libraries face challenges in providing a diversity of formal and informal instructional programmes to their users in the library to play a new educational role. Libraries of health sciences play a new role using information management, new information technology, and database search related to various health sciences using the internet. In addition, libraries use the latest technology to help library users find the information they need. Due to this new situation, new skills are being sought from libraries to get new information on health education.

2. Health Science Libraries: The primary goal of a health science library is to help different types of users, such as medical practitioners, health professionals, health science students, patients, consumers, and health science researchers, acquire, update, and evaluate scientific information required by health care. This type of library is established to provide library users with access to health-related scientific information to continuously update information, evaluate health information, find resources, provide support, and assist in research. These types of medical libraries are commonly found in medical schools, hospitals, and medical or health organisations. This type of library is stocked with print and digital journal collections on health sciences, print reference books, and electronic resources (Medical Library, 2007).

3. The Educational and Clinical Role of the Health Sciences Librarian: Librarians are required to play a role in health science education as a result of changes in health science education, problem-based education, and information management skills. According to Bradley (1997), the requirement for new roles, new skills, and new partnerships in the library of health sciences has been a theme in the library of health sciences. New roles in the library of health sciences may include innovations in the nature of the work of library services, expanded organisational roles, expansion to new users, and out-of-library positions (Smith, 1998).

There is a lot of information available in biomedicine education, and it is constantly updated. Due to this situation, two factors affect the role of the librarian. One is that curriculum changes require students to learn information retrieval and management skills. Second, there is a need to encourage the acquisition of lifelong learning skills throughout the curriculum. (Rankin & Sayre, 1993) The technology training provided to their users in the health education environment provided by libraries has become an essential element of their new role in library operations (Hurst, 2014).

Advanced Educational Health Science Centre libraries can play a role in library information management using technology integrated with educational information resource networks.

Using the best available evidence combined with practical perspectives developed from work experiences in libraries can be a new role that libraries can play in improving evidence-based librarianship (EBL) **practice** (Eldredge, 2000).

In 2000, the term "informationist" was first used by "Florence and Davidoff" in their article about a new profession: an information scientist. He said that specialised health information services will help those involved in the informatics health sector stay together in their clinical environment. The primary function of this informaticist is to accompany their

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clinical team and provide them with the knowledge to synthesise and locate the clinical information they need. (Kelly, 2018)

“Point of care” and “just in time” knowledge for clinicians to access knowledge-based information with clinical and management information systems through computerised data collection for computer-based operations, patient clinical records, quality control, and information gathering for research knowledge-based information (KBI) should be developed. (Kelly, 2018)

4. Professional Abilities for Health Science Librarians: The Medical Library Association has set standards for enhancing the qualifications of health science librarians for life skills education, promoting professional development, and enhancing professional qualifications for career success (Medical Library, 2007).

a) Matters such as parent organisation management and business practices, core policy, programme resources, medical care, research, medical education, affiliation with various health and health related organisations, health sciences, and policies affecting the health care environment are to be considered.

b) In order to meet the information needs of library users and provide information services, it is necessary to understand the relevant principles and practices, information needs, and management of information services.

c) The ability of library users to manage health information resources in a wide range of formats, such as resource selection, editing, and control, scholarly publishing, copyright, licencing, privacy, and intellectual property issues, and develop national and international standards.

d) Fundamentals of automated systems, data standards, and system analysis techniques, including design and evaluation, evaluation of information technologies, integration of systems and technologies, technical solutions for permanent access to electronic information, communication and information infrastructure, including the Internet and web, and understanding and using systems.

e) Curriculum design, understanding of instruction, ability to teach information to use, organise, and use information such as adult learning theory and cognitive psychology, assessment of educational needs, analysis and evaluation, instructional methods, techniques, and system design are very important to know.

f) Ability to fundamentally examine and filter the kinds of research literature needed to conduct research and reporting, to disseminate research findings individually or to interdisciplinary research teams, using quantitative and qualitative scientific research methods and techniques, and using evidence-based practice principles.

5. New Technology for the Health Science Library: Health Sciences Libraries is currently striving to develop and disseminate health education information tools using appropriate technological tools to take advantage of its information environment and provide faster and better services to its library users. They provide relevant and accessible resources quickly and get maximum information. The Library of Educational Health Sciences plays an important role in facilitating the use of assistive technology for the teaching and learning of health sciences. As a technology hub for library users, it provides teachers, researchers, and students with new technology tools, techniques, and equipment.

a) Multimedia Creation (Multimedia Studio): This technology enables both students and teachers to input, process, edit, produce, disseminate, and store pieces of multimedia content for educational purposes using simple audio and visual tools and written instructions and video guides using multimedia creation software. For example, recording multimedia includes video podcasts, animated videos, and multimedia audio slideshows in a variety of formats (Multimedia, 2022).

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b) Virtual and Augmented Reality Development (Virtual Reality Lab): The various devices used in virtual environments play a vital role in creating successful virtual experiences. This type of technology can be found in a wide range of possibilities in visual devices, from the simplest or least immersive (a computer monitor) to the most immersive, such as VR glasses, helmets, HMDs, or CAVE systems (Cipresso, 2018). This technology uses virtual reality (VR) to digitally mimic the virtual environment for an immersive sensory experience using a virtual reality application. It is mostly used in the education field, engineering field, architectural and urban design field, digital marketing and activism field, virtual community field, fine art field, heritage field, archaeology field, social science field, healthcare field, clinical therapy field, etc. (Virtual reality applications, 2022)

c) Virtual Anatomy (Virtual Anatomy Lab/Anatomage Table): The position and direction of the object in the online tools available using 3-D online lab space for anatomy study in the Virtual Anatomy Lab focus on students' personal learning online or in real life. In this technology, objects are displayed with six degrees of freedom by moving their point of view, clicking on available tools, and dragging the object to change its position and direction. (Campbell & Others, 2011)

d) 3D Printing and Fabrication: This technology involves the additive process of 3D printing, in which layers of material are constructed to form a 3D part. Sintering, melting, and stereolithography are the three broad types of this technology. These technologies include a "kind of 3D printing materials, including thermoplastics like Acrylonitrile Butadiene Styrene (ABS), metals (including powder), resins, and ceramics." 3D printers and other fabrication equipment are used in this technology (TWI Limited, 2022).

In addition to the technology, the use of various technologies increases the library potential of the health sciences libraries, and its advantages make it easier for library users to access and use the services of the Digital Environment Library. Library users can be motivated to use various technologies to acquire new clinical and non-clinical information and to learn new skills in their field of health. Such as big data, blockchain technology, the internet of things, library bookmark apps, user-focused interfaces and applications, augmented reality, robotic techniques, etc. (Angadi, 2021).

e) Big data (BD): The use of big data to provide library services enables the library to be smart and user-friendly. Big data is the underlying data and information in library files. Data is often generated by library management and service processes or constructed by library users. That library processes data by classifying big data into two groups. The first group of data usually consisted of documentary, bibliographic, and fundraising data, while the latter group included log, user, and record data (Liu & Shen, 2018).

f) Blockchain Technology (BT): Blockchain technology is based on distributed ledger technology (DLT), which records reports with an enduring cryptographic signature called a 'hash'. Blockchain technology is used to store and use information in a distributed, temper-resistant library. Blockchain is used in library settings to collect, store, and share authentic information without much technical hindrance (Abid, 2021).

g) Internet of Things (IoT): The main purpose of this technology is to 'provide objects, people, or animals with unique identifiers and the ability to transfer data over a network without the need for human-to-human or human-to-computer interaction'. In this method, the IoT develops from wireless technology, micro-electromechanical systems (MEMS), and the convergence of the Internet. Simply put, it enables any natural or man-made thing to communicate with each other and transfer data using the assigned IP address, with or without human interference. The use of radio frequency identification device (RFID) technology in IoT-related technologies is now becoming more prevalent in different libraries. Other examples include wireless communication devices such as sensors, beacons, energy harvesting technology, cloud computing, and the Advanced Internet Protocol (IPv6) (Pujara & Satyanarayana, 2015).

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h) Library Bookmark Apps: This application acts as a regular bookmark to facilitate the user's activities related to finding books. This application allows the user to find the book more interactively track their lending activity, and provide them with directions (Angadi, 2021).

i) User-focused Interfaces and Applications: The digital displays displayed on the screen in this application inspire and allow users to find a simple display to provide a variety of information in libraries. In other words, there is a new way to digitally visualise library collections. Library information is constantly updated to reflect real-time searches as users search (Angadi, 2021).

j) Augmented Reality (AR): Augmented reality (AR) is widely used in various domains, ranging from medicine to gaming. This technology combines computer-generated simulations with the real-world environment. And it puts them on top of real-world objects. It combines digital components with real-world environments. In this technology, AR represents the graphics, sounds, and smells that exist in the natural world with artificial images. This technology is used by smart phones. Augmented Reality (AR) content is used for small businesses, education, etc. through apps like Google Glass 2D Images, C-Through Glasses, 3D images of Microsoft's HoloLens, Blippar, and Zappar. Popular examples are Aurasma, Layer, libARi, and Shelver in this innovative AR application to enhance the efficiency of the existing workflow of the library (Bhattacharya, 2018).

6. Opportunities for Health Science Libraries and Librarians: Focusing on new technologies for health science librarians and libraries during this period gives rise to new opportunities. Because of this, medical librarians focus on the disciplinary skills of their subjects. This has created opportunities for librarians to develop their skills as system experts or instructors. According to Martin (Director of Libraries and Services and Director, National Network of Medicine Libraries), librarians in the field of health sciences are emerging as deep generalists in the field of health sciences. (Martin, 2013)

a) Users of the Health Sciences Libraries have created opportunities for librarians to take on new roles as "informationalists."

b) Opportunities arise to increase the use of various digital tools, data sets, and different social media outlets used by health sciences librarians in library collections.

c) increases librarians' ability to evaluate and analyse information.

d) Specialised training and continuing education in the field of bioinformatics will enable health science librarians to move beyond their traditional roles.

e) The librarian's role can be further expanded by obtaining additional training for the "informationist" librarian role in the health sciences or by making new contacts in research and clinical settings.

f) Information professionals have interesting opportunities to define the role and contribution of libraries and librarians in this important area of health.

7. Conclusion: In this article, the authors discuss the factors that play a role in health science libraries, new technologies, and opportunities for health science libraries, keeping in view the present times. Librarians need to constantly update their skills to meet the challenges of the role of the library in the health sciences. This requires constant awareness of new technologies, new educational principles in the field of health, and advances in the field of health care. And librarians need to find "learning moments" to meet the instructional needs of their users (Rankin & Sayre, 1993). Scott Plack said in his AHIP lecture that "the duty of librarians and their staff is not just to build a good library but to find the best way to use librarians' skills and talents to advance the goals of communities" (Martin, 2013).

The past few years have seen a radical change in the health science library sector, and the educational role of health science libraries is expanding due to the implementation of new

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medical education models in the field of education and the increased use of technology in this field in the current fast-paced era. Teaching the librarians of health science libraries how to use new technology and how to use and manage the information required for health science professionals and other information resources is a critical survival strategy. If libraries are to be developed in health science communities, then new technologies should be used, as well as the training of the librarians, so that users can be attracted to the library.

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