



Original Article

Evolving Roles of Librarians in Automating Libraries: From reasonable technological isolation to innovative group effort

Gaikwad Bebi Arjun

Dr. Babasaheb Ambedkar Comm. and M.V.R.S. Arts College

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Correspondence Address:

Gaikwad Bebi Arjun
Dr. Babasaheb Ambedkar Comm.
and M.V.R.S. Arts College
Email: ashayogi8015@gmail.com

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Abstract

This manuscript discusses this historical process, and the present day metamorphosis, of the librarian's place within the ever-changing field of library automation. Initially seen as guardians of material objects, subsumed in a technological isolation, librarians have gradually reconfigured themselves as dynamic building agents of knowledge and innovators whose work is collaborative. This investigation outlines the chronological development of systems / applications from early days of Integrated Library Systems (ILS) to modern-day open-source systems and artificial intelligence powered discovery products in order to understand the larger trend of moving from closed, isolated systems towards standardised, cooperative systems. I theorise that this paradigm change has fundamentally changed the profession, requiring an integrated synthesis of technical command, user centred design and strategic leadership.

Keywords: Library Automation, Evolving Role of Librarians, Integrated Library Systems (ILS), Open Source Library Platforms; Collaborative Innovation; Artificial Intelligence in Libraries, Library Services Platforms (LSP), User Experience (UX) in Libraries, Metadata Enhancement; Digital Libraries.

Introduction

The discourse about library automation is often discussed as if it involves the hardware and software that have automated catalogue, enabled online public access systems, and adopted the internet and cloud technologies. Yet, a concomitant transformation and perhaps a much deeper one occurred in the human face of the institution.

For a number of decades the role of the systems librarian was one of the specialised niches; an isolation centre of technical activity that maintained the backend infrastructure, largely hidden from the patrons and more indirectly from the front-end services. Contemporary practise has pulled down this compartmentalisation, and automation is integrated into the very texture of library service delivery.

This article suggests that we have reached a 'post-isolationist' period of library automation. The modern librarian is no longer the operator of technology but is also involved in co-designing tools they use, working with open source ecology, consortial networks, and user experiences to inform the design. Consequently, librarians have become more active participants in the creation of new technologies from passive recipients of vendor solutions.

Phase I The Era of Technological Isolation (1970s - 1990s)

1. The Appearance of the Integrated Library System (ILS)

During the first stage of automation, the efficiency of operations was the key issue. The MARC standard was introduced in the 1960s and it was adopted in the 1970s and 1980s, however its adoption was being characterised by rigidity.

In this time period, librarians were often gatekeepers and automation moved to a backend role. The systems available were proprietary, expensive, and closed; forcing librarians overseeing early ILS systems such as Dynix or NOTIS to be forced into acquiring specialised proficiency in what was almost esoteric expertise which distanced them from their reference and circulation brethren.

2. The "Black Box" Problem

Technological solutions in this period were operated as black boxes. Librarians gave specifications to vendors, who, in turn, returned pre-configured products.

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If any desired feature was not available, the library coped with the shortfall, being devoid of the opportunity for customisation and innovations. The librarian's role was therefore characterised by adaptation - adjusting work processes to fit the limits of the machine instead of adapting the machine to fit the work process.

Key Characteristic of Phase I The librarian is an operator. Their expertise is getting through complicated, un-user friendly interfaces to complete mind-numbing tasks.

Phase II: The Transitional or the Web Era (1990s - 2010s)

1. About the Internet and Breaking the Silos

The great proliferation of the World Wide Web led to a serious break in the once insular library model. Patrons and indeed the overall academic community now had at their disposal powerful search engines - traditional library catalogues were forced to reposition themselves within an increasingly digital marketplace. Consequently, the Online Public Access Catalogue (OPAC) emerged as a localised terminal in the library lobby to a fully accessible web page, from any location.

This transition required librarians to develop competencies in order to use the World Wide Web; this includes understanding of Html, basic web design and digital literacy. The original role of "systems librarian" expanded into new areas of specialisation that included "web librarian" and "electronic resources librarian." Moreover, the distinction between the technical services and the public services began to disappear; reference librarians were expected to have a working knowledge of search algorithms in order to best serve the patrons they encountered.

2. Electronic Resource Management (ERM) Crisis

There was a massive transition in business model from print collections to digital subscriptions which exposed systemic problems in existing automation solutions. Integrated Library Systems (ILS) were designed for physical bibliographic records and much from being optimised for dynamic URL resolution or licencing

negotiations. As a result, libraries budgets were forced to roll out isolated Electronic Resource Management (ERM) platforms.

Librarians found themselves with a balkanized "Frankenstein" infrastructure - dissociated systems supporting print, digital and web content which failed to each other. This operational discord became the driver for further subsequent evolutionary requirements: the goal of interoperability and the avoidance of vendor lock-in.

Phase III: Collaborative Innovation and Open Systems (2010s- Sensemaking: Pedagogies and Technological Shift Period by 2020)

1. The Open Source Revolution

The seminal development of the past decade has been the rise of open source Library Services Platforms (LSPs), such as Koha, Evergreen and FOLIO.

In contrast to the "Black Box" days of old, these projects are thriving on the community. Scholars and librarians can no longer be just end-users but are now fully-fledged members of the community, as testers, developers and collaborators.

Koha was created by a library trust at New Zealand, and is a great example of the ability of libraries to develop their own enterprise-grade software.

FOLIO - an acronym for 'The Future of Libraries is Open' - represents a massive collaboration between vendors, libraries and developers to together create a modular platform.

2. The Librarian Developer and UX Designer

Within this contemporary paradigm the librarian's professional repertoire has been extended considerably. The adequate proficiency on using a system is not sufficient anymore, in-depth knowledge of the design principles and system enhancement processes is mandatory.

Structural priorities toward providing appropriate software for library automation and reduced upper-level management in the library are also a reason to change expectations.

Table 1: Shifting Skill Sets in Library Automation

Table with 3 columns: Skill Area, Traditional Role (Isolation), Modern Role (Innovation). Rows include Technology, Vendor Relations, User Focus, and Data.

3. Case Study: The FOLIO Project

The FOLIO project is a joint example for innovation. Specialised domain experts, i.e., librarians, take part in "Special Interest Groups" (SIGs) together with software engineers. For example, a cataloger from Cornell University or a circulation supervisor from Duke University may have direct impact on the code that is currently being written. This iterative feedback mechanism does away with the erstwhile technological silos and therefore ensures that the resulting software are a encapsulation of the subtleties which exist in the everyday praxis of library.

The Effects of the Artificial Intelligence and Data Science

1. AI in Discovery and Metadata

We are on the verge of a deep paradigm shift in library services and it has been brought on by Artificial Intelligence. Automation is moving beyond the transactional accounting, such as cheque in and cheque out of physical volumes, to cognitive inference in particular anticipating the needs of patrons.

Librarians today are faced with new responsibilities among which are:

Algorithmic Literacy: Understanding the skills through which AI systems rank the retrieval results, which



contributes to the protection of neutrality and an unintended bias.

Metadata Enhancement: Would it be possible to use Artificial Intelligence to automatically tag and classify the collection of digital archives and unhide previously-obfuscated holdings?

2. Analytics Utilization of The Learning Goals - Privacy

This proliferation of automation systems has led to the piling up of immense patron data and has made librarians as de facto custodians of user privacy. Nowadays, collaborative innovation required partnership with vendors in order to implement "Privacy by Design" principles. Librarians leverage information analytics to show the institutional value of the library with student success metrics - simultaneously advocating for a high standard of data anonymization practice - a synthesis of tech-savvy and ethically prudent institutional policy.

Impediments in the Collaborative Model

1. The Skills Gap

The move towards collaborative innovation is a huge training burden. It is impossible to expect all librarians to become fully competent programmers. Consequently, there is an ever-growing gap between technologically advanced libraries, often in a large academic institution or institution, and other poorer, public, or rural institutions that are locked into the ecosystems and libraries that support older vendors, limited by a shortage of in-house technical staff.

2. Sustainability of Open Source

Although efforts like the FOLIO are inspiring people to get excited, they require sustained institutional commitment. The naming of "free" software is a lie, as it costs a lot of resources from human labour to develop and maintain. Accordingly, the libraries must reset the balance of their personnel structures to free the time of librarians for substantive participation in these global endeavours - sometimes a difficult proposition in an age of austerity.

Future Directions the Librarian and the Architect of Knowledge

Prospectively, the librarian's role in the context of automation is set to increase further and further from the erstwhile paradigm of custodianship. The librarian of the future will take the position of being a Knowledge Architect.

Interoperability Standards: Librarians will lead the movement for Linked Data frameworks, most prominently BIBFRAME, ushering in the library as a repository of bibliographic records rather than a library in the traditional sense, becoming an integral part of the Semantic Web and in which library data coherently interlaces with the rest of the digital world.

Platform Independence: Anticipated is a solid move towards "headless" library architectures in which the center data layer works independently from the use interface. Such an architectural decomposition lets librarians build software tailored front ends - be they applications, web portals or interactive kiosks - built over the top of the

underlying data to basically craft customised experiences for their unique constituencies.

Conclusion

By reclaiming their control of their technological apparatus - through open source platforms, API integration, and user experience design, for example - librarians have ensured that technology is serving the mission of the library rather than the other way around. The "Automated Library" has moved past its former position of being an inert building block of computers to become a livid, adaptable ecosystem of code and community, something written in collaboration with librarians themselves.

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Conflicts of interest

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