International Journal For Advanced Research In Science & Technology
A peer reviewed international journal
www.ijarst.in
ISSN: 2457-0362

Design and Development of Smart library in Academic Libraries in India

Mrs. Shilpa N. Hirekhan
Research Scholar & Librarian
Seth Kesarimal Porwal College of
Arts & Science & Commerce, Kamptee
Nagpur

Dr. Veena A. Prakashe
Information Scientist (Professor)
Campus Library, Rashtrasant Tukadoji
Maharaj Nagpur university, Nagpur

Abstract: - This paper gives a brief discussion on the development of smart library in academic libraries in India. It also discusses some important technology uses in libraries for giving the best library services to its users. This paper also shows the importance of smart library. A smart library is a library which is designed to provide advanced and special services to the users making use of electronic and communication technology. The technology enables remote access of library using RFID supported automatic controlling gates, self-service kiosks, public access computers, scanners. This article highlights the best practices need to be adopted to design the college library smart and the best practices suggested by the NAAC. In a very nutshell, the present article describes the application of smart technologies along with the smart campus library system. It is also suggested the design of art library which provides smart services to their users.

Keywords: - Smart Library, Development of smart library, Academic libraries, ICT, RFID

Introduction: - One significant aspect of smart libraries is their ability to provide seamless access to a vast repository of digital resources, including e-books, online journals, and multimedia content. They enable remote learning and research, ensuring inclusivity for users who cannot access physical spaces. Smart libraries also support interactive and immersive experiences through technologies like augmented reality (AR) and virtual reality (VR), making learning more engaging and multidimensional. Additionally, smart libraries foster collaboration and innovation by integrating co-working spaces with digital tools and connectivity. Advanced data analytics inform collection development and space optimization, ensuring resources meet user demands effectively. As the world becomes more interconnected, smart libraries will serve as bridges between physical and digital knowledge realms, promoting lifelong learning and adaptability. Their role will extend beyond information access to nurturing creativity, critical thinking, and digital literacy, empowering communities in an ever-changing world. By embracing technology while preserving the core values of learning and inclusivity, smart libraries are set to redefine how knowledge is accessed, shared, and utilized in the future. Moreover, smart libraries integrate with cloud services, enabling remote access to resources, e-books, and online journals. Advanced analytics help librarians understand user behavior, optimize collections, and improve space utilization. Interactive technologies such as augmented reality (AR) and virtual reality (VR) further enrich the learning experience. Smart libraries are pivotal in fostering a tech-savvy culture of learning, adapting to the evolving needs of digital-age learners. They not only expand accessibility and inclusivity but also reduce manual workloads, allowing librarians to focus on curating knowledge

and offering specialized guidance. By blending the physical and digital realms, smart libraries transform traditional spaces into dynamic, innovative hubs for knowledge and collaboration.

Recent Models for the Development of Libraries

In coping with new social and technological challenges, library and information sciences developed new concepts for the marketing and advocacy of public and academic libraries. There is an abundant corpus of literature, surveys, case studies, etc. about how public and academic libraries move forward and adapt to new technologies, new communities, new user needs and information behaviors, and new public policies. Some of these concepts had impact, and were successful insofar as they shaped the core values, and mission and vision statements of a new generation of libraries. They are also relevant for another reason: main components have affinities with the core features of the smart city. A short overview.

Information Commons

In the context of social media, the concept of efficient communal ownership and control of resources has been applied to libraries, based on the sharing of information in online communities and opposed to profit-dominated markets with their specific forms of enclosure

Commons are resources or facilities shared by communities of producers or consumers. Their basic ideas are collaboration, interaction, networking, shared governance, and non-profit business models. The value of the resources is determined by participation and sharing, not by rarity. Sharing of information is part of the core values of libraries: “Librarians and other information workers’ interest is to provide the best possible access for library users to information and ideas in any media or format (…). They promote the principles of open access, open source, and open licenses”.

In library sciences, the term “information commons” has been used to describe specific services and tools, e.g., library-based open access journals and free available digital libraries, as well as the underlying core values and organizing principles, like openness, unrestricted access and non-discrimination, non-profit, and so on. Libraries, as a public institution, build on the participation of local or academic communities, and on the protection of intellectual freedom, i.e., freedom of expression and information.

Information commons have been (and still are) a powerful concept for the marketing and promotion of public and academic libraries, for nearly 15 years now. In the United Kingdom, public libraries have been transformed into idea stores with several learning, informative, entertaining, and cultural opportunities. Regarding smart cities, two elements make the link: the community, and the shared resources and facilities.

2.2. Learning Centres

Other models have emerged to increase the academic libraries' attractiveness and performance on campus, like learning commons, media commons and, above all, learning centres. These models shift the library focus away from holdings and silent reading, to modular learning spaces, smart technologies, and "great good place" features which put students at the heart of the library. The focus is on learning. Pedagogy has become a major driver for library design that should facilitate learning processes centred on autonomy, self-monitoring, and personal knowledge management. Some of them integrate elements from innovation and co-working spaces.

Design and architecture play a major role. What should an academic library do with its space? What kind of building, physical environment, and technical equipment fits best to support and improve the quality of student learning?

Again, sharing resources and facilities are essential components of the concept. Other interesting aspects are the attention paid to usage, experience, learning and cognition, and the role of social and mobile technologies.

2.3. Green Libraries

How can the library contribute to the protection of the natural environment? Compared to power plants, chemical industry or road transport, libraries are relatively clean, and their carbon footprint is smaller than a coal plant or a blast furnace. Yet, libraries consume energy and water, buy chemicals, and produce waste. As any other service, they are concerned by questions of environment and pollution. The concept of the green library tries to provide an answer to the challenge of ecology.

The model of the green library offers the framework for a large range of actions in favor of waste reduction, recycling, saving energy, and so on. Some actions are linked to new buildings or important renovations (green roof); others can be implemented at any time (use of energy-efficient light bulbs, recycling of paper). Other levels of action are education, awareness raising and advocacy, and access to specialized information. Additionally, the model provides checklists and standards for the evaluation of the libraries' ecological impact.

The model of green libraries is not limited to academic libraries, but applicable to all kinds of libraries. Buildings and "clean" technologies and equipment play a central role, but they are embedded in training, education, and everyday environmental actions. Also, the model introduces the concept of sustainability into the field of library sciences.

2.4. Global Library

Insofar as the green library model puts the focus on environmental issues, it remains a somewhat reducing concept, at least as long as it does not include the other dimensions of sustainable development, as defined by the UN (Agenda 21) and other international bodies. Libraries are

cultural institutions, supporting education and research, but they are more than that—they are also part of the local community, sometimes as a kind of social agency; they are, like any other service, potential contributors to the sustainable development of society and mankind, and they should be evaluated within this framework. This means that library management and marketing should develop a holistic approach ("global library") and adapt the principles of corporate and organizational social responsibility to the specific environment of public and academic libraries.

2.5. Convergent Features

Information commons, learning centres, and green and global libraries, represent different responses to the same technological and societal challenges. Their concepts provide frameworks for the marketing and management of libraries. They share the conviction that the present context offers sufficient opportunities for the future development of libraries, and that the libraries, as "opportunity institutions" , possess enough potential and flexibility to adapt and survive.

The strength of these models can be summarized by seven convergent features:

- The epistemic framing as a cultural infrastructure in an ecosystem of knowledge institutions.
- The strong connection with the community and the attention paid to the users' needs, behaviors, experiences, and information literacy.
- The attention paid to the social and societal impact of the institution, with new social functions (social responsibility).
- The care for sustainability and environmental issues as criteria for strategic choices.
- The principles of resource sharing, collaboration, networking and openness.
- The importance of innovative technologies.
- The vital role of the building.

These convergent features create a new and original conceptual environment for the development of library services, organizational structures, and functioning. Also, in comparison with the recent evolution of urbanism, there are obvious affinities with the concept of the smart city. Thus the smart city may offer a new, inclusive approach to library science.

The best practices suggested by the NAAC (i) Library induction for new users (ii) Library user education through information literacy, teaching methods (using A-V Materials and Computer assisted learning), contents, evaluation studies (iii) Information Support Services (iv) Course module (Lecture module, tutorial and training module) on LIS (v) User survey (vi) Library book-use statistics (vii) Best library user award (viii) Suggestion Box for timely user feedback (ix) Computerization of library with standard format (x) Internet browsing facilities to different user communities (xi) Displaying newspaper clippings periodically (xii) Displaying new arrivals and circulating a list of those to academic departments (xiii) Inclusion of sufficient information about the library in the college prospectus and website (xiv) Organizing book exhibitions and book talks.

International Journal For Advanced Research In Science & Technology
A peer reviewed international journal
www.ijarst.in
ISSN: 2457-0362

Design of Smart Library

Nowadays, many intelligent devices are used in library to improve efficiency. Robot help readers some basement questions, auto-machine can borrow and return books by reader self, intelligent devices cannot change librarian duty but only change the way of our service. These intelligence devices improve the efficiency of library's services and works, we may name it intelligent library. However, the procedure of intelligent library must be short because of AI high-speed application, so that the development of library will go into smart stage after experience the momentary intelligent procession. Some literatures pose their opinions about what smart library is. Smart library is a mobile library, it can provide services for readers stride across times and spaces, but the duty of library is not change. Smart library should give more special and precise services to readers. 5G technology is the best hot one in present; it can provide more services program than before, such as cloudy course, cloudy platform, and AV studio and so on. In a word, smart library must base on technology, and the same point is better service. Thus, I propose my strategy about smart library construction from more overall situation; give the main route of construction. In my opinion, smart library not only is a body with high technologies, but also is a smart man, it is able to do some analysis and decisions, and the goal is provide the best services. Following diagram shows smart library.

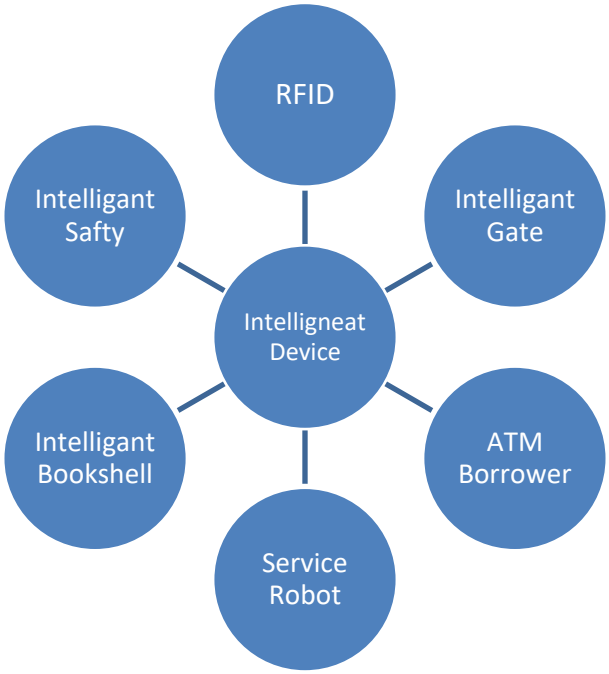

Fig. Smart Library

Application of Smart Technologies

The cutting-edge technology is the basic foundation of smart library and can range from artificial intelligence, cloud deployment, Internet of Things (IoT), enhanced ICT environment, augmented reality, wearable technology, smart bookmarking apps, RFID support system, electronic resource management, overhead document scanner, robots in libraries. The technology enables smooth control of library routine activities and easy access of its resources including self-service kiosks, automatic doors, lighting, and user-interactive terminals. This allows us to prolong library visiting hours so as to more users can utilize the library resources at times that are convenient for them. One of the important advantages of making a library smart is to reduce maintenance overhead cost and save time. Apart this, use of newly emerged technologies enables paperless use and encourages to create productivity. There are some applications of recent technologies for smart libraries which are mentioned below:

- Integrated Library Software (ILS): Koha, Evergreen, NewGenLib
- OpenBiblio, WEBOPAC D-Space, Greenstone, Drupal, Joomla, Wordpress
- Cloud computing, Application Programming Interface, E-Granthalaya 4.0
- Greenstone, RFID Bibliographic reference tools: mendeley, EndNote, Reference Manager, Zeter
- Artificial Intelligence
- Information retrieval through AI
- Expert System
- Use of broadband internet connectivity

Smart Library Services

- E- Document Delivery Services (E-DDS), institutional portals
- Institutional Digital Repositories (IDR) and aggregator services
- RSS (Really Simple Syndication) for web feed formats allows one to receive
- Updates from web sites, library databases and other online resources all in one location. Open Access Publishing
- Metadata Standard and Interoperability (Dublin Core Metadata Initiative)
- Resource Discovery (smarter interactions and communications between
- Different IoT artifacts) which enables libraries to explore seamlessly across a wide range of information content. Streaming Media Services (subscription based third party streaming services)
- Dataset linking and information mashups (remixing of data from different
- Sources to create new hybrid services such as combination, visualization and aggregation with the help of APIS) Ask a librarian/Virtual Reference Service/(virtual worlds, internet messaging,
- E-mails, web forms etc. and video podcasting (podcasting with a video element like static or motion graphic images) Library Web Home Page (promotional tool for advertising electronic web
- Resources and in-house library services i.e. newsletter services) E-SDI
- Bulletin Board Service

Conclusion: -

Smart libraries will also play a pivotal role in addressing the challenges posed by misinformation and the digital divide. In an era where misinformation spreads rapidly, libraries will act as bastions of credible information. The future role of smart libraries extends beyond their technological capabilities; it encompasses their mission to inspire, educate, and unite communities. Libraries have always been more than just repositories of knowledge; they are spaces where ideas converge, cultures intersect, and innovation thrives. By embracing the possibilities of technology while staying true to their core values, smart libraries will continue to shape the intellectual and social fabric of society.

References: -

- Bansode, S., &Pujar, S.M. (2008). Scholarly Digital Library Initiatives: World Versus India.DESIDOC Journal of Library & Information Technology, 26(6), 21- 26.
- Anil Kumar, H. (2014). Open-Source Software solutions in Indian libraries. Library Hi Tech, 32(3), 409–422.
- Gul, S., & Bano, S. (2019). Smart libraries: an emerging and innovative technological habitat of 21st century. The Electronic Library, 37(5), 764-783.
- Aithal, P.S. Smart Library Model for Future Generations. Int. J. Eng. Res. Mod. Educ. 2016, 1, 693–703.
- Technological Habitat of this Century. In International Journal of Library and Information Studies (Vol. 10, Issue 2)
- Chan, H. C., & Chan, L. (2018). Smart library and smart campus. Journal of Service Science and Management, 11(6), 543-564.
- He, Duyi. (2020). A Strategy of Smart Library Construction in the Future. Journal of Service Science and Management, 13(2).

.