INDIGENOUS KNOWLEDGE MANAGEMENT IN DIGITAL ERA

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Abstract :

Indigenous knowledge (IK) is the knowledge which exists among the people in a given community and its beneficial towards sustainable development cannot be over-emphasized because of its importance in every society. This paper examines Indigenous knowledge management process in academic libraries. As we live in a technological age, digital libraries are one of the blessings we have to save this knowledge system. The swift adoption of digital media in today's fast-paced world presents excellent opportunities to speed up the process of preserving, managing, and disseminating knowledge that is particular to our communities. By utilizing technology to digitize and share traditional materials, digital libraries help to ensure that indigenous knowledge systems are not lost and that they are transmitted to future generations. As indigenous knowledge is on the verge of extinction, the paper discusses the wonderful role that digital libraries can play in its preservation and dissemination.

Introduction:

Indigenous knowledge is a holistic, multigenerational body of wisdom, practices, and beliefs held by Indigenous peoples, deeply connected to their environment and culture, and passed down through generations, often orally. It includes various practices like traditional medicine, sustainable agriculture, crafts, and storytelling, offering valuable, locally-rooted solutions and perspectives for a variety of challenges, such as environmental stewardship and cultural continuity. This knowledge can be called Indigenous Knowledge (IK) or Traditional Knowledge encompassing a holistic system of practices, wisdom, and spirituality derived from a community's long-term relationship with their environment and passed down through generations, primarily via oral traditions. It is deeply contextual to its local culture and environment, covering areas like sustainable resource management, medicinal practices, agricultural techniques, and storytelling. The advent of digital technologies provides an unprecedented opportunity to preserve and propagate this wealth of knowledge for future generations. Various institutions and researchers are actively integrating computer science with historical preservation efforts. The application of Optical Character Recognition for text extraction, Natural Language Processing for translation, and AI-driven classification systems has opened new possibilities for making these texts available to a global audience. Innovation is all about introducing essential and pertinent ideas and practices that are new

and are likely to bring beneficial change in libraries. These propositions could lead to effective management of long-established and online resources, digitizing and changing information resources and bringing in of local collections in libraries

Digital libraries help ensure that indigenous knowledge systems are not lost and passed down to future generations by leveraging technology to digitize and share traditional materials. By digitalizing and archiving traditional materials such as manuscripts, audio and video recordings, and photographs, digital libraries can effectively preserve indigenous knowledge. Members of the indigenous community, as well as researchers and scholars interested in studying these knowledge systems, can then access these materials. Digital libraries also allow for the formation of online communities in which indigenous peoples can share and exchange knowledge. Furthermore, digital libraries can help to disseminate indigenous knowledge to a wider audience. Indigenous knowledge can be shared with people from all over the world by making these materials available online. This can aid in promoting greater understanding and appreciation for various cultures and ways of life. Indigenous communities can also use digital libraries to communicate with policymakers and other stakeholders, ensuring their voices are heard, and their perspectives are considered in decision-making processes. (Zulu, 2010)

The Role of Digital Technologies in Preserving IKS :

Digitization and Digital Libraries :

Digitization of ancient manuscripts and texts using Optical Character Recognition and Natural Language Processing enables their preservation and accessibility. Institutions like the National Digital Library of India and the Digital Library of India play a key role in this effort. Digital repositories ensure that valuable texts are not lost and can be accessed by scholars and the public alike. Furthermore, the use of metadata and indexing enhances searchability, making knowledge retrieval more efficient. (Greyling, 2007)

Artificial Intelligence and Machine Learning :

AI and Machine Learning techniques can be employed to render ancient Indian texts understandable to a broader audience by translating, interpreting, and analyzing them through Natural Language Processing (NLP) and semantic network analysis, which maps word and concept relationships. These tools provide powerful ways to access and study the complex structures and meanings within these historical documents. Artificial Intelligence I-driven algorithms can reconstruct missing portions of texts, classify knowledge domains, and provide contextual understanding. Machine translation models, developed using ancient Indian languages as a foundation, are employed to render historical texts into contemporary languages, thereby increasing accessibility. AI-powered tools such as chatbots and virtual assistants can improve education by explaining and clarifying intricate concepts found in ancient texts, thereby fostering better understanding for students. These intelligent systems offer personalized, on-demand assistance and resources, making complex subject matter more

accessible.

Blockchain for Authenticity and Security :

Blockchain technology guarantees that digital manuscripts are trustworthy by using an unchangeable, shared record-keeping system that makes tampering impossible, thereby protecting the knowledge stored within them. Decentralized storage safeguards data from single-point failures, while blockchain-based smart contracts can protect intellectual property by automating the recognition and compensation of creators through tamper-proof records and self-executing agreements. Essentially, data is dispersed and more resilient, and intellectual property rights are more transparently and automatically managed.

Cloud Computing and Big Data Analytics :

Cloud storage makes vast quantities of digital documents globally available for academic use, while Big Data analytics helps uncover patterns, make connections, and reveal correlations across various Indian knowledge systems. AI-powered analysis allows for the sorting of large volumes of historical data, the identification of shared themes, and the discovery of connections between ancient writings and contemporary scientific breakthroughs. Alternatively, you could say, "By applying AI to extensive historical datasets, we can classify information, find recurring patterns, and bridge the gap between historical texts and modern science. Cloud-based platforms enhance interdisciplinary research by giving both traditional scholars and technologists a shared online environment to collaborate and work together. These platforms enable more efficient teamwork and knowledge sharing between different fields, overcoming traditional barriers by providing a centralized digital space.

Metadata and Semantic Technologies :

Advanced metadata standards and semantic technologies are vital for making Indian Knowledge System (IKS) resources easier to find and use, as they help organize and connect information, allowing for deeper insights and broader understanding of India's intellectual heritage. LIS professionals can improve access to historical materials by meticulously organizing them with detailed metadata, making it easier to find and use ancient texts, manuscripts, and other traditional knowledge. This structured data, known as metadata, describes these resources, enabling faster organization and more effective retrieval. This structured approach fosters collaboration across different academic fields and enhances the understanding of various cultures by creating connections between the Indian Knowledge System (IKS) and other worldwide knowledge systems. Semantic technologies can map conceptual, thematic, and historical relationships within India's intellectual heritage, providing deeper insights and a more complete understanding of its knowledge systems. This process involves creating structured, interconnected data to make complex information discoverable and analyzable, which can be visualized through semantic graphs and used to facilitate interdisciplinary research and cross-cultural studies.

Virtual World and Augmented Reality (VR/AR) :

Virtual and Augmented Reality (VR/AR) offer novel methods to revitalize ancient Indian knowledge by enabling users to step into immersive, interactive environments, such as virtual tours of historical sites like Nalanda or AR-enhanced experiences of traditional crafts and rituals. These technologies allow learners to explore complex concepts, engage with historical information, and experience cultural practices in ways that foster deeper understanding and retention than traditional methods. Virtual Reality can enable virtual tours of historical libraries, ancient universities like Nalanda, or recreated Vedic villages, allowing users to explore these spaces in a dynamic and engaging manner. Similarly, Augmented Reality can be used to create interactive simulations of Vedic rituals, traditional crafts, or astronomical practices, making complex concepts more accessible and relatable for modern learners. By using Virtual and Augmented Reality in the Indian Knowledge System (IKS) curriculum, educators and Library and Information Science (LIS) professionals can create more immersive and interactive learning experiences, leading to deeper understanding and engagement from students while connecting ancient Indian wisdom with modern teaching methods. These technologies make complex IKS concepts more accessible and relatable by offering virtual tours of historical sites and interactive simulations of traditional practices. (Suryawanshi, 2025)

Technologies for Knowledge Management of Libraries :

Libraries are currently undergoing a profound transformation of their operational environment due to increased global interconnectedness, intensified economic competition, and the rapid evolution of Information and Communication Technologies (ICT). These global forces are compelling libraries to adapt by expanding their services, embracing digital resources, and fostering new competencies to meet the demands of a changing world. ICT tools and techniques, knowledge management systems, internet, web resources, digital libraries have made a significant change in the existing library systems and services. It is a major challenge for the library professionals. Information Technology (IT) expands access to knowledge, accelerating the speed of learning and reducing the cost of acquiring information and skills. By leveraging digital platforms and interactive tools, IT makes knowledge more accessible, allowing for deeper understanding and quicker integration of new concepts, ultimately making the learning process more efficient and effective. It is impossible to accomplish such important tasks by using man's brain only in the modern society in which the knowledge changes with each passing day. It will be possible that through computer networks, we can easily connect libraries' information resources with the people who use them, thereby creating a more interconnected and efficient system for knowledge sharing within libraries. This is achieved by making all library information accessible from a single point, leading to a digital infrastructure that links users and knowledge more effectively. Data wise technologies developed the following list of technologies for the knowledge management. (Rao, 2016)

- Document management systems

- Information retrieval systems
- Relational and object databases
- Electronic publishing
- Groupware and work flow systems
- Push technologies
- Help desk applications
- Brain storming applications
- Data warehousing and data mining

The Roles of Libraries in Indigenous Knowledge Management :

Libraries can increase access to indigenous knowledge by providing physical spaces and opportunities for direct community engagement, such as workshops, cultural events, and dialogue sessions where indigenous knowledge holders can share and discuss their traditions and expertise. Librarians have to adopt new roles to capture and preserve IK. Librarians are responsible for more than just acquiring new knowledge; they must also organize, store, and maintain information to ensure it is accessible to all users. This involves carefully curating collections, planning acquisition strategies, and implementing modern management systems for both physical and digital resources. Ultimately, their goal is to effectively deliver relevant information to users at the right time, fulfilling the library's role in society. The first step would be to teach the management of IK to librarians in library schools. Another strand would be for world organizations to involve indigenous people in this task. Indigenous individuals can contribute to developing frameworks and providing guidance on appropriate conduct for interviews within Indigenous contexts, ensuring that cultural protocols and values are respected and that research benefits the community. This collaborative approach recognizes Indigenous peoples as equal partners and emphasizes their autonomy in shaping research that affects them, moving beyond purely extractive practices to foster mutual understanding and respectful engagement. Libraries should work in partnership with library schools to create indigenous knowledge collections, which can be repackaged and made accessible. (IFLA, IFLA, 2008)

According to the International Federation of Library Associations' statement on indigenous traditional knowledge (International Federation of Library Associations [IFLA]), libraries can help in the following ways: (IFLA, 2014)

- In the collection, preservation and dissemination of IK.
- To inform the public on the contribution and importance of IK.
- To involve indigenous people in the community with collection, dissemination and preservation of IK.
- To support efforts aimed at ensuring that indigenous people and their IK are protected by intellectual property laws.

Importance of Indigenous Knowledge for Libraries and Librarians :

Librarians are exceptionally suited to preserve and manage indigenous knowledge due

to their proven ability to expertly organize, share, and promote engagement with information. Their skills in information management are crucial for documenting indigenous knowledge for future generations, as these vital traditions are vulnerable and often rely on oral transmission, not written records. To improve information and basic literacy skills, it is essential to increase library services in remote areas to provide community members with the necessary tools, resources, and training. These efforts empower individuals with the skills to critically access, evaluate, and use information to enhance their lives and contribute to societal development. A library with content of local relevance will encourage communities to make use of library services, hence, libraries are using social software technology and IK is preserved through establishing a community web portal using Web 4.0 technology. (Scholastica, 2020)

Indigenous knowledge provides invaluable, irreplaceable solutions for environmental issues, health, and cultural understanding, but this vital resource is diminishing due to factors like modernization, land displacement, and the loss of cultural practices. To address this, modern conservation efforts must integrate and respect indigenous wisdom, ensuring the preservation of unique ecological knowledge and sustainable livelihoods for Indigenous communities. Digital libraries can be a powerful opportunity to preserve and disseminate this knowledge for future generations. To preserve indigenous knowledge for the future and share it globally, libraries can digitize cultural materials, create open-access platforms for easy access, implement metadata standards for effective searching and cataloging, and collaborate with traditional knowledge holders. This ensures that the knowledge is not only saved from loss but also made available to a worldwide audience, fostering a deeper appreciation for diverse cultural heritage. In order to effectively preserve and share indigenous knowledge digitally, it is crucial to actively involve indigenous communities in the process, ensure their intellectual property rights are respected, prioritize the inclusion of diverse languages and cultures, and establish long-term plans for safeguarding this knowledge digitally.

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