Coverage of ICT in Library and Information Science Education: A Comparative Analysis of the syllabi in Universities of West Bengal

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Abstract:

This article explores the impact of Information and Communication Technology (ICT) on Library and Information Science (LIS) education, focusing on the role of ICT in equipping LIS students for future library environments, assessing its impact on digital literacy, and exploring open access awareness in LIS education.

This study conducts a qualitative content analysis of syllabi and departmental websites from selected universities, which emphasize hands-on experience with library management software and digital resource management, equipping students with practical skills for modern library roles. ICT in LIS education enhances students' digital competencies and ethical awareness, preparing them for roles in digital libraries and supporting open access initiatives. However, challenges remain, including infrastructure limitations and the need for continuous curriculum updates. Overall, the study highlights the transformative impact of ICT on LIS education in West Bengal, where students are trained to meet evolving technological demands and uphold the principles of equitable information access.

Keywords: *Information and Communication Technology (ICT), Library and Information Science (LIS) education, University library, West Bengal, Library Automation*

1. Introduction:

In the modern age, Information and Communications Technology (ICT) has become a fundamental driver of change across all fields, significantly influencing Library and Information Science (LIS) education. Libraries are no longer static repositories of information but dynamic environments that leverage ICT to support knowledge dissemination, service innovation, and global connectivity. This article compares the LIS curricula at West Bengali universities, looking at how each one uses ICT to develop the skills needed for the quickly changing information landscape of today, including digital resource management, information retrieval systems, and library automation. It also emphasizes how ICT helps prepare future librarians to be flexible and agile in a technologically advanced society. This study adds to our understanding of how well these programs are preparing students for the demands of the digital age by examining the current situation.

2. Literature Review:

2.1 ICT Skills Deficiency:

LIS students lacked ICT skills due to outdated curricula and traditional teaching methods, not meeting job market demands (Buarki, H., Hepworth, M., & Murray, I. -2009)[1]. ICT competencies were limited to basic skills; infrastructure challenges like low bandwidth affected ICT training (Kamila, K. 2008)[2]. Insufficient ICT content and hands-on training hindered students' readiness for the job market (Kavulya, J. M. 2007)[3] and (Minishi-Majanja, M. K. 2007)[4]. ICT curriculum varied internationally; critical ICT skills, such as library management systems, digital content management, were lacking (Jain, P., 2010)[5] and (Rehman, S. U., & Al-Awadhi, S., 2011)[6]. Many library professionals lacked necessary ICT skills, impacting job readiness (Buarki, H., Hepworth, M., & Murray, I., 2011)[7].

2.2 Curriculum and Teaching Methods:

More ICT modules and modern teaching methods were recommended; introductory ICT courses Needed regular updates (Ebrahimi, N. A., 2009)[8]. Students had basic ICT tool knowledge but limited experience with emerging Web 2.0 tools like wikis and blogs (Hanson-Baldauf, D., & Hassell, S. H., 2009)[9]. Traditional teaching methods fell short in preparing students for technology-driven roles (Jain, P., 2010)[5]. The need for adapting curriculum to include digital skills was emphasized to keep up with ICT trends (Joint, N., 2003)[10].

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2.3 Infrastructure and Resource Issues:

Lack of resources hindered effective ICT teaching; instructors needed training for ICT course delivery (Buarki, H., Hepworth, M., & Murray, I., 2011)[7]. Limited infrastructure, like high-speed internet and digital storage, affected ICT adoption in libraries (Jain, P., 2010)[5] and (Rehman, S. U., & Al-Awadhi, S., 2011)[6]. Resource constraints, especially in developing regions, restricted practical ICT training (Hanson-Baldauf, D., & Hassell, S. H., 2009)[9] and (Minishi-Majanja, M. K., 2007)[4]. Inadequate infrastructure limited the effectiveness of LIS programs in teaching ICT skills (Al-Ansari, H., 2002)[11] and (Joint, N., 2003)[10].

2.4 Job Market Relevance:

ICT skills in LIS programs did not align with job market needs; collaboration with employers was suggested (Buarki, H., Hepworth, M., & Murray, I., 2009)[1]. Curricula lacked coverage of essential areas like website development and digitization (Kavulya, J. M., 2007)[7]. Market demands emphasized digital skills, including data analytics and virtual reference services (Jain, P., 2010)[5] and (Rehman, S. U., Mahmood, K., & Alam, S., 1997)[12]. ICT skills like automation and information systems became essential for entry-level library roles (Buarki, H., Hepworth, M., & Murray, I., 2009)[1] and (Rehman, S. U., Mahmood, K., & Alam, S., 1997)[12]. Educators needed to adapt curricula to meet evolving job market requirements (Joint, N., 2003)[10].

2.5 Teachers and Instructional Challenges:

Many instructors lacked ICT skills, affecting the integration of ICT in teaching (Kamila, K., 2008)[2]. Although enthusiastic, instructors faced limitations due to inadequate infrastructure and their own ICT skill gaps (Minishi-Majanja, M. K., 2007)[4]. Continuous professional development was needed to enable instructors to teach modern ICT skills effectively (Khiste, G. P., Maske, D., & Veer, D. K., 2011)[13] and (Jain, P., 2010)[5].

3. Research Gap:

Previous research highlights the need to modernize LIS curricula with advanced ICT skills. Limited practical training, outdated methods, and resource constraints, especially in developing regions, hinder progress. Further study should focus on curriculum reform, sustainable resources, industry collaboration, and faculty training to prepare graduates for modern library roles.

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4. Research Question:

This article explores the syllabi of ICT in LIS education in Universities of West Bengal. To analyze the importance of ICT, the study aims to address the following research questions (RQ):

RQ 1. How are ICT components integrated into the LIS curricula of Universities in West Bengal?

5. Rationale of the Study:

The study highlights ICT's transformative role in LIS education in West Bengal universities, focusing on digital skill development, fostering digital literacy, and supporting open access. It identifies gaps in infrastructure and practical training while stressing the need to align curriculum with job market demands. The findings demonstrate how ICT equips future librarians to navigate modern information systems and promote equitable knowledge access.

6. Methodology:

This theoretical paper uses a qualitative content analysis approach to examine the syllabi and departmental websites of LIS programs in selected West Bengal universities. Publicly available syllabi are analyzed to identify key areas such as digital literacy and IT integration, while web content review provides insights into online engagement. This combined methodology offers a comprehensive overview of LIS education in the region.

7. Study Conducted:

This study is conducted to outline the ICT skills and competencies that each university prioritizes in training future library and information science professionals. The ICT practice part typically covers essential skills such as digital cataloging, database management, content management systems, and the application of metadata standards, which are fundamental for modern library management.

8. Data Collection:

For this study, data collection focuses on gathering information from the websites of selected universities, including Jadavpur University (JU), University of Calcutta (CU), Kalyani University (KU), Vidyasagar University (VU), Rabindra Bharati University (RBU), Visva-Bharati (University) (VBU), University of North Bengal (NBU) and The University of Burdwan (BU). Specifically, the data is sourced from the ICT practice components within the Bachelor of Library and Information Science (BLIS) and Master of Library and Information Science (MLIS) syllabi.

9. Analysis of Information:

From the LIS syllabi of the Universities in West Bengal, the following key points are focused to analyze the enabling of ICT among students-

9.1. Fundamental ICT Topics: The study of operating systems is a core part of the syllabus across all universities, providing foundational knowledge about how computer systems function. Character encoding standards like ASCII, which encodes English characters using numeric codes, are included in the syllabus of BU and JU. ISCII, which specializes in Indian scripts, is also taught at BU and JU. Additionally, EBCDIC, primarily used in IBM mainframes, and UNICODE, which supports multilingual character encoding, are part of the ICT curriculum at BU and JU.

9.2. Retrieval Engines: Indexing and search engines like Apache Solr, Lucene, MGP, and Index Data Zebra are taught at BU. These technologies focus on efficient information retrieval processes. The concept of Linked Open Data, aimed at making research data openly accessible, is also discussed. Furthermore, TemaTres and MultiTes, two online thesaurus management tools for controlled vocabulary creation and maintenance, are introduced at BU.

9.3. Library Automation Software and Digital Repositories: Universities like JU and RBU cover automation software such as Koha, NewGenLib, Evergreen, and SOUL. The LAMP is taught at KU), JU, and RBU. OPAC and WEBOPAC, which provide digital access to library catalogs, are part of all universities' syllabi, focusing on enhancing accessibility to library resources. Digital repository systems like DSpace, used for managing digital resources, are included in the syllabi of JU, KU, and BU. Additional platforms such as EPrints and Fedora are discussed at RBU and NU.

9.4. Markup Languages: Markup languages are widely taught in library science programs. SGML, XML for structured data representation, and HTML for web development are included in the curriculum of JU, KU, BU, and NBU.

9.5. Programming and Scripting Languages: Programming languages are integral to ICT education. C is taught at RBU, while C++ is included in the syllabi of JU, KU, BU, and VBU. Scripting languages such as Perl and PHP are introduced at NBU, JavaScript is covered at JU and KU, and CSS is part of the curriculum at RBU and VU.

9.6. Metadata Encoding and DBMS: Libraries rely heavily on metadata standards for resource management. CCF, used for bibliographic data exchange, is studied at BU, along with MARC XML for metadata encoding. FRSAD, introduced by IFLA in 2010, and ETD standards are also part of BU’s curriculum. RDBMS such as MySQL, PostgreSQL, and MariaDB are part of the curriculum at JU, KU, and RBU. Traditional database systems like WINISIS, a Windows-based tool for library database management, are taught at CU, KU, and BU. Similarly, CDS/ISIS, a bibliographic database management system, is studied at JU and RBU.

9.7. Open Knowledge Systems: Several open-access platforms are studied to encourage open knowledge dissemination. SHERPA/RoMEO, which focuses on archiving rights metadata, is taught at CU and KU. OpenDOAR and COAR are included in CU and KU syllabi. Platforms like DMOZ, a multilingual open-content directory, and directories like DOAB and ROAR are part of RBU's curriculum. Additionally, open access gateways such as SSRN and PLOS are emphasized at RBU.

9.8. Knowledge Management Software: Content management platforms such as Drupal and Joomla are taught at JU and CU. Similarly, WordPress and Moodle, used for web and e-learning content, are introduced at JU. RSS, an XML-based format for content distribution, is studied at BU. Content Management Tools like blogs and wikis are covered in the syllabi of JU and CU. Knowledge organization software, such as XMind and FreeMind, is taught at JU to develop skills in mind-mapping and conceptual organization. Zotero, a reference management tool, is introduced at JU, while VuFind, a discovery software for library resources, is also part of JU's curriculum.

9.9. Graphics and Image Retrieval Tools: GIMP, an open-source image editing tool, is included in the syllabus at JU. Additionally, open-source search engines like Lucene and Solr are studied for advanced indexing and search capabilities.

10. Interpretation of Results/ Findings revealed from the Data Analysis:

(i) **ICT in LIS Education:** The study found that ICT integration in LIS education significantly enhances students' readiness for modern library roles. Core courses like library automation, DBMS, and web technologies build essential digital competencies for managing both physical and digital collections.

(ii) **ICT for Future Libraries:** ICT skills are vital for future librarians to handle digital preservation, open access, and content management. Training in semantic web technologies and knowledge representation equips students to improve resource discovery and adapt to advanced information systems

(iii) **Digital Literacy and Open Access:** Emphasis on digital literacy prepares students to use digital tools effectively, while Open Access modules align education with principles of equitable information access, fostering responsible information management.

(iv) **Challenges and Opportunities:** Challenges include outdated infrastructure and limited practical resources, but most syllabi address contemporary needs, equipping students for the evolving LIS profession.

11. Suggestions:

To equip library professionals for modern information management, training should focus on emerging technologies and ethical practices. This includes quantum computing for advanced retrieval systems, cloud computing for secure resource management, and AI tools like Dimensions AI for enhancing literature reviews. Professionals should also be skilled in guiding users to open access platforms like DOAJ, promoting ethical use of Creative Commons licenses, integrating Open Educational Resources, and utilizing plagiarism detection tools like Turnitin to uphold academic integrity. These measures ensure adaptability to technological advancements while fostering accessibility and ethical information use.

12. Conclusion:

Universities in West Bengal have demonstrated significant strides in incorporating ICT into their LIS curricula, reflecting the broader shift toward digital libraries, open access, and information management in the field. With robust training in computer fundamentals, database management, content management, and semantic web technologies, these programs equip students to address the evolving demands of library science. As ICT continues to advance, the LIS departments across West Bengal will likely further refine their curricula, ensuring that students remain at the forefront of technological progress in library and information science.

13. The Limitations of the Scope of the Study:

The study focuses only on the ICT components in the Library and Information Science (LIS) curricula of eight universities in West Bengal, India. It uses publicly available syllabi and departmental websites as data sources, excluding other LIS areas, direct stakeholder interactions, and long-term or historical trends. This ensures a focused analysis of the current state of ICT integration in LIS education.

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