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Research Article

Use And Awareness Of Artificial Intelligence Technology Tools Among LIS Professionals In Engineering Colleges Of Karnataka

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ABSTRACT

An average of 86.46% of college librarians at Karnataka's state institutions are aware of AI-based technologies, demonstrating that librarians have a favourable attitude towards AI. The purpose of this research is to investigate how Indian librarians and information science (LIS) professionals feel about the incorporation of artificial intelligence (AI) into library services. The study used a quantitative research technique, collecting data via structured questionnaires to evaluate these professionals' perceptions of the advantages, necessary AI capabilities, and awareness levels. With its ability to improve information retrieval, automate repetitive operations, and improve data analysis, the results show a significant propensity towards the adoption of AI. This research uses demographic variables including gender, age, academic standing, and work experience to ascertain the respondent libraries' knowledge and usage of artificial intelligence (AI) technology in Karnataka. For educational institutions of all ages, libraries and information centres are always important. The personnel is the key to every library system's success. Professionals in libraries have essential skills and talents that help their patrons succeed in their academic pursuits.New and developing technologies the skills of the library professionals employed by Professionals Engineering College of Karnataka are evaluated in order to identify their current level of Skills and to provide further suggestions. Professionals in libraries are shown to be more adept at using new technology.It is proposed that talents be further enhanced in a number of approaches.

Keywords: Artificial Intelligence (AI),Library and Information Science (LIS), Professional Experience, Demographic Variables, Engineering College, Karnataka, Emerging Technologies.

"There is a visible gap between technological advancements and the preparedness of LIS professionals in Indian engineering institutions to utilize AI tools."
——Reddy, C.V.

I.INTRODUCTION

Multiple sectors have been significantly influenced by artificial intelligence (AI), which has altered the way services are created and provided . From algorithms that operate professional automobiles to tailored content suggestions on digital platforms, artificial intelligence has a broad impact. As vital hubs for managing knowledge and information, libraries also investigate how AI may enhance their offerings and boost patron involvement . AI's potential to improve library services, information access, and decision-making is becoming increasingly recognised among librarians and information science (LIS) professionals in India. Numerous innovations made possible by AI technology, , like data analysis tools, recognising optical characters, and intelligent shelving systems, may enhance the operations of libraries and patron experiences.
Two significant findings may be made from this broad review of professions and professionals:professionals have specialised training and expertise, and they use their skills and knowledge to benefit others. It is true that information professionals have certain expertise and abilities .Their broad knowledge-handling skills are used to improve people's intellectual levels.

Applying knowledge and abilities to get the appropriate information from the appropriate source at the appropriate time is the most basic responsibility of an information professional. This mission is shared by almost all information professionals. For instance, when people of a certain community want information, librarians gather it from a variety of sources, often found in books, records, journals, etc.

For an information professional, technological Skills is not enough; they also need to have managerial, research, critical judgement, and human understanding and interacting skills, all of which must be developed through formal education and training. To meet their customers' informational demands, library and information science (LIS) professionals need to be aware of their social and individual requirements . There are several recent research that confirm to this.

Artificial intelligence (AI) integration with library services has become more and more popular; it has the potential to revolutionise the industry by greatly improving standard operation of libraries and offerings. Regular work carried out by library professionals, ranging from user services to technological endeavours like research and administration, include typical library functions . Even while these responsibilities are essential, they often take a lot of time, which hinders prospects for professional development and library improvement. Although many libraries have adopted information technology-based automation, these systems need a significant amount of human engagement and interaction. For example, library personnel must manually determine a collection's metadata prior to system input when arranging library material, such as categorisation and cataloguing. This procedure requires a substantial time investment.

The dynamic field of library and information science (LIS) is responsible for managing, organising, and distributing information in the digital era. Technology breakthroughs are driving ongoing changes in LIS research and education. The future of LIS professionals has been projected, alongside the new challenges, demands, and trends. Technological developments have brought about substantial changes in library and information services as well as in the public's expectations of librarians and information professionals. Information professionals, including library professionals, must thus adapt to the evolving internet and system innovations.

Additional issues arise with online learning, and LIS schools have trouble drawing in students. Lack of face-to-face interaction may negatively impact teaching and learning. There is now a thorough and widespread radical revolution in LIS education as a result of the quick development of ICT and social media platforms, as well as the globalisation of LIS courses.

LIS education has taken on a new dimension as a result of globalisation.LIS institutions worldwide have been assessing and changing their curriculum to provide their graduates with the knowledge and abilities needed to succeed in the quickly changing LIS sector. In order to provide students with more freedom, the LIS programs' curriculum have grown to include a broad range of information contexts and information issues, user-centred courses, increased IT integration, flexible computer programming, and flexible teaching delivery methods. The i-Schools program is a significant trend in the US and, for that matter, globally.

These include Convergence Science, Technology, Media and Information, Computer Science and Informatics, Mathematics and Info Sciences, and Media and Information Colleges. LIS programs have changed names, degree titles, and program offers due to their multidisciplinary character. These programs have sometimes even produced joint degrees with other schools, particularly in industrialised nations like the US. The next obvious trend is the creation of EUCLID, a cooperative platform for European language and literary colleges.

Its exclusive concentration is on standardising language and literature programs across Europe.Globally, there is also growing interest in internationalising LIS education. Numerous Library and Information Science (LIS) colleges provide a range of courses, such as digital literacy, archive imaging technology, managing knowledge, health information technology, and digital curation.

A. Emerging Technologies

Emerging technologies are often characterised as those that have not yet become well-established in their respective domains of application, seem to be promising tools for problem-solving, and provide fresh avenues for the development of the applications areas [5, 6]. New technologies are described by the World Economic Forum (WEF) as "technological breakthroughs promise innovative responses to the most pressing worldwide problems of our time."

Different geographical contexts and topic areas have different perspectives on what constitutes an emergent technology . In developing nations, many innovations that are well-established in rich nations are seen as emerging, just as certain technologies that are regarded as emerging in one field are not novel in another . The research takes into account emerging technology for libraries in the Indian setting.

B. The Knowledge and Abilities Needed by Library Professionals to Manage New Trends and Technologies

Technology adoption in libraries changed every aspect of the system, including workflow and service delivery techniques. Technology has a significant impact on library customer behaviour, information demands, and customer service standards.In addition to using technology that have arisen in line with trends, libraries must also think creatively to frame unique services. The ability of the human workforce to manage new technologies, innovative processes, or services is crucial to their success . Therefore, having human resources that are both competent and talented is essential for any library to succeed, regardless of age. However, the current set of

skills and competences is more focused on technology. To succeed in the modern day, library professionals must improve their abilities and competences in accordance with shifting trends.

II.LITERATURE REVIEW

Madhusudhan, M. (2019) The 2nd LIS Academy National Conference on Technologies in Libraries 2019 was held from June 6–8, 2019, at Visvesvaraya Technical University (VTU), Belagavi, Karnataka, in cooperation with the Department of Public Libraries. The conference's background was to develop a more comprehensive understanding of how technological advancements makes human labour and information more intelligent and accessible thereby.

Naik, R. (2013) [17] This study aims to assess the information communication and technology (ICT) and librarianship competencies of members of the engineering college libraries affiliated with Visvesvaraya Technological University, including librarians, deputy librarians, assistant the librarians, and library assistants. The research uses a technique that combines theory, fieldwork, and data collection methods such as questionnaires, observation, and interviews with library and data specialists. at the state level in Karnataka, the vast majority of library staff employed at engineering institutions selected this line of employment by chances.

Bajpai, V. K., (2021) [18] A common institution built on the foundation of democracy, the public library exists for the public, by the people, and for the people. It is entirely or partially funded by public monies, and anybody in the community, regardless of class, is allowed to utilise it.By offering services and collections,it constantly aims to satisfy the public's educational, educational, and entertainment requirements.The primary goal of a public library is to maximise the use of its materials and services by its users.

Mulla, K. R. (2023) The purpose of this study is to evaluate the information technology literacy (ITL) abilities of library employees working for engineering institutions connected with Visvesvaraya Technological University (VTU). Through the consortium, these connected colleges have access to a substantial amount of digital and print materials, as well as subscription e-resources and technological platforms that support the university's and colleges' teaching, learning, and innovation initiatives. To raise awareness and enhance the use of e-resources, VTU has sometimes offered training to all librarians.

D'Souza, F. (2024) Based on demographic factors including gender, age, educational attainment, and work experience, this research attempts to ascertain the knowledge and uptake of Artificial Intelligence (AI) technology in the Karnataka libraries that participated. To assess the knowledge and usage of AI technology among the Karnataka library professionals who responded, this study used a survey research methodology. To choose a group of 120 respondents from a broad population that included library professionals from a variety of institution types, such as engineering educational institutions, medical colleges, and degree colleges, the research used a stratified random selection technique. The data was analysed using the Chi-square test. The research found that, depending on gender, there is a statistically significant variation in awareness and use of AI technology.

Manchu, O. (2022) The breadth and size of engineering practice and associated technology have expanded globally. In addition to having a solid foundation in science and mathematics, engineering concepts, and design, today's engineering graduates also need to have a global perspective and the wider skills necessary to function in society both domestically and abroad.Therefore, engineering education has the task of producing a technically proficient graduate, as it has in the past, but also adding several facets of broadening—all within a curriculum of manageable duration. A significant factor in raising the quality of programs offered at engineering schools (ECs) is NBA accreditation.

Adav, R. P. (2024) ICT abilities are quite important in the LIS field these days. Nowadays, most library services are available to patrons online. Investigating the ICT abilities and skills of LIS professionals employed by the D.Y. Patil Institute libraries was the goal of the current research. The data gathered from the questionnaire was used to evaluate the abilities and competences of the 25 LIS experts who were selected for the current research. The study looked at LIS professionals' abilities and competencies in terms of information searching, internet usage, frequency, and purpose, as well as how they use different ICT devices, library software, and ICT applications, the difficulties they have learning ICT, and the necessary training area.

Jeyshankar, R. (2020) The objective of this chapter is to look at the gender disparities in the ICT Skills of LIS professionals employed by Tamil Nadu's institutions. Forty-seven universities were included in the study: two central universities, twenty-six deemed institutions, and 19 state universities. Simple random sample and a structured questionnaire were used in the survey approach to get data from the respondents for this investigation. Communication skills attitudes, ICT and related device use, computer software and service awareness and skill level, ICT implications opinions, ICT implications issues, and ICT skill areas that require education are all included in the questionnaire for both male and female respondents.

Raj, N. (2024) Librarians and information specialists are essential in directing people to reliable information sources. Professionals must become more knowledgeable about the methods, resources, and approaches utilised to find information in libraries. Information retrieval requires the use of search methods and procedures. You may utilise citation searching, specialised databases, advanced Google search, and other methods. Boolean operators and Medical Subject Headings (MeSH) are two components of complex search

algorithms used by researchers. Businesses use sophisticated search methods to do global market research, which helps them make strategic decisions and remain competitive.

Naik, R. R. (2018) Libraries are essential for meeting the diverse information demands of the general public. In the rapidly evolving internet age, libraries must place more emphasis on collection development strategies. In order to accomplish its primary duty of supporting teaching, learning, and research, the college library's primary goal is to provide its patrons current, relevant information. The whole situation has been altered by the growth of ICT and its uses in libraries. The purpose of the research is to determine how college librarians in the internet age seek information, specifically in Dharwad city, Karnataka. The librarians were given a well-designed questionnaire to complete in order to gather data.

Baby, M. D. (2011) Students are more motivated and have a more positive attitude towards learning and themselves when technology is used in the classroom. In order to do this, technology must be successfully incorporated into the structured teaching and learning environment of the classroom. Researchers in this study examined Keralan primary school teachers' attitudes towards the use of ICT in the classroom. The study's sample consisted of 130 Keralan elementary school teachers. Data was gathered utilising a questionnaire on ICT integration issues and an attitude scale towards ICT integration. The study's findings showed that Keralan primary school teachers had a favourable attitude towards the use of ICT in the classroom.

A. Objective of the study

- To determine how knowledgeable library and information science (LIS) professionals at Karnataka's engineering institutions are about artificial intelligence (AI) tools.
- To investigate the perceived advantages and difficulties LIS professionals have when using AI technologies in their libraries.
- To assess the degree of expertise in new technologies held by librarians at Karnataka's professional engineering college libraries.
- To research the infrastructure and institutional support available for integrating AI technologies in engineering college libraries.

III.METHODOLOGY

An investigation of the literature and conversations with librarians and library and information science specialists are used to identify emerging technologies that are relevant to Indian library as well as the skills and competences needed to manage them. Structured surveys, in-person observations, and conversations between researchers and library professionals are some of the methods used to gather data. A systematic questionnaire is used to obtain the majority of the data.

A total of 200 completed surveys were sent to library professionals employed by 21 Professional Engineering College libraries; 185 completed questionnaires were returned. There is a 92.5% sample size. Every employee with a library science degree who is identified as a librarian, assistance librarian, or library assistant is regarded as a library professional and is part of the sample.

IV.DATA ANALYSIS AND INTERPRETATION

To comprehend the structure and pattern of employment, the distribution of employees by designation and qualification has been examined. Analysis is done on the respondents' overall Skills with both individual and emergent technologies. The talents of various designations are compared and evaluated. There are suggestions for enhancing abilities in developing technologies. Data analysis methods include mean, average mean, and percentage analysis.

A. Staff details

Table 1 Staffing distribution according to designation.

Designation	Number of staff	Percentage %
Librarian	22	11.55%
Ass. Librarian	75	42.69%
Library Assistance	88	49.49%
Total	**185**	**100%**

Library assistants make up the largest percentage of workers (49.49%), followed by assistant librarians (42.69%), and librarians (11.55%).

Table 2 Staffing distribution according to qualifications.

Qualification	Number of staff	Percentage %
PhD	11	9.65%
Pursuing PhD	7	6.89%
MLISC+Phil	17	14.62%
MLISc+Other master degrees	16	14.96%

MLISc	89	49.96%
BLISc	22	11.29%
DLISc	24	12.96%
Total	**185**	**100%**

The majority of staff have master's degrees in library science (MLISc). Even though just 5.4% of PhD holders earn a prestigious degree, 48.64% of them do, 4.32% are seeking a PhD, and 8.1% have extra master's degrees in fields other than the library science field [29].Overall, staff members' educational backgrounds are in good standing.

Table 3 Staffing levels are determined by experience.

Experiences Range in Years	Number of staff	Percentage %
1 to 5	27	13.41%
6-10	56	28.64%
11-15	38	21.69%
16-20	38	22.36%
21-25	15	7.59%
26-30	5	2.96%
31-35	5	2.96%
Total	**185**	**100%**

The greatest number of staff have between 6 and 10 years of experience (28.64%), followed by 16 to 20 years (22.36%), and 11 to 15 years (21.69%). Only a small percentage of employees have more than 30 years of experience (2.96%), whereas 7.59% of employees have more than 25 years of experience.

B. Library personnel' Skills with emerging technologies

Table 4 Skills and expertise in cloud computing.

Skills	Mean	Rank
Experience with cloud computing principles and technologies	3.59	1
Experience with cloud computing services and solutions, such as Dura Cloud2, Polaris Library System8, and Libris4.	3.6	3
Skills with free cloud services	3.49	2
Avg. mean	3.89	

The most highly regarded talent (mean 3.59) is understanding cloud computing technology and ideas, whereas the least well-known competence (mean 3.6) is understanding cloud computing goods and services. Although there is certainly opportunity for progress, [30], the overall means of cloud computing abilities is 3.49, which is somewhat more than the median, which indicates greater skills.

Table 5 Skills and expertise in mobile computing.

Skills	Mean	Rank
Converting library apps to mobile platforms	2.86	3
The creation and management of a mobile library app	2.49	4
Personalise the library's mobile webpage.	3.19	2
Understanding of Mobile Networking Technologies	3.59	1
Avg. Mean	3.65	

The most highly regarded talent is knowledge of mobile networking technology (mean of 2.86), followed by the ability to customise smartphone library websites (mean of 3.19).Both abilities are above the median, indicating superior Skills [31]. However, those with incomes below the median had poor abilities in "Trans-coding library apps to mobile devices" and "Designing &Handling mobile library apps." With a mean score of 3.08, overall mobile technology abilities are wonderful, but they still need to be improved.

Table 6 Skills with web 2.0 technologies.

Skills	Mean	Rank
Creating a library wiki	3.16	3
Overseeing the library blog	3.12	2
RSS feeds for instant massage	2.59	1
Overseeing the library's social media accounts on Facebook, Twitter, and other platforms	3.69	4
Overseeing the library WhatsApp group	3.26	6
Skills in web conferencing	3.09	5
Skype-like chat services	3.09	7
Avg. mean	3.01	

With a mean score of 3.16, "Controlling library WhatsApp groups" is the most highly regarded talent. “Controlling libraries Facebook/twitter or any other social media page" follows in second with a mean score of 3.69. All web 2.0 abilities are above the median, indicating superior Skills, with the exception of "Instant message using RSS feeds," [32, 33], which requires improvement but is useful for providing consumers with prompt alerting services. With a mean score of 3.08, overall,Skills with Web 2.0 technologies is commendable; but, in order to offer user-friendly services, it must be increased.

Table 7 Understanding and Skills with web 3.0 Technology.

Skills	Experience with semantic web technologies
Excellent	9 (4.69%)
Good moderate	63 (32.69%)
poor	42 (29.69%)
Very poor	22 (16.95%)
Mean	2.69

Web 3.0 skills have a mean score of 4.69, which is lower. In the realm of artificial intelligence-induced semantics webs, Library 3.0 is quickly gaining traction and has a great chance of meeting user expectations.

Table 8 Evaluation of general skills in emerging technologies.

Skills	Mean	Rank
Expertise and Skills in cloud computing	3.59	1
Understanding and Skills with mobile technology	3.64	2
Skills in web 2.0 technologies	3.22	3
Skills and expertise in Web 3.0 technologies	2.96	2
Avg. mean		

The highest possible degree of Skills is in "cloud computing technology," which is followed by "mobile technologies" and "Web 2.0 technologies." The least proficient are in "Web 3.0 Technologies." With a mean score of 3.64, overall, Skills in new technologies is commendable; yet, it tends towards the centre, indicating that skill growth is necessary to achieve excellent and good scales.

C. Evaluation of New Technologies Skills Comparatively Across Various Library Professional Courses

Table 9 Skills and Abilities in Cloud Computing.

Skills	Librarians mean (rank)	Assistance librarian means (rank)	Library assistant means (rank)
Experience with cloud computing principles and technologies	3.96 (1)	3.96 (1)	3.39 (2)
Experience with cloud computing and its products, such as Dura Cloud2, Polaris Library System8, and Libris4.	3.59 (1)	3.48 (2)	3.41 (3)
Skills in using free cloud services	3.25 (2)	3.65 (3)	3.11 (1)
Avg. Mean	3.64 (1)	3.49 (1)	3.39 (1)

Librarians have the greatest degree of Skills in both individual and general cloud computing abilities, with an average mean score of 3.96; assistant librarians come in second with an average score of 3.25; and library assistants had the lowest average score of 3.59. All library professionals under the study's purview have strong skill levels, as shown by the average mean of abilities across all three categories being above the median.

Table 10 Skills in wireless technology.

Skills	Librarians mean (rank)	Assistance librarian means (rank)	Library assistant means (rank)
Mobile device transcoding of library software	3.96 (1)	3 (2)	2.49 (3)
Designing and Managing Apps for Mobile Libraries	3.15 (1)	3.59 (3)	2.29 (3)
Personalising the webpage of a mobile library	3.61 (1)	3.29 (2)	2.79 (3)
Experience with mobile networking technology	3.99 (1)	3.19 (2)	2.69 (2)
Avg. Mean	3.16 (1)	3.22 (2)	2.66 (3)

Librarians had the highest average mean score of 3.61 in both individual and total mobile technology abilities, followed by assistant librarians with the second-highest average score of 3.99 and library assistants with the lowest average score of 2.69. While library assistants' average skill levels are below the median, indicating a lesser level of Skills, librarians' and assistant librarians' average skill levels are above the median, indicating a strong degree of Skills.

Table 11 Awareness and Skills in Web 2.0 Technologies.

Skills	Librarian mean (rank)	Assistance librarian means (rank)	Library assistant means (rank)
Creating a library wiki	3.65 (1)	3.49 (2)	3.11 (3)
Overseeing the library blog	3.69 (1)	3.54 (2)	3.21 (3)
RSS feeds for instant massage	3.55 (1)	3.22 (2)	3.59 (3)
Overseeing the library's social media accounts on Facebook, Twitter, and other platforms	3.49 (1)	3.09 (2)	3.48 (3)
Overseeing the library WhatsApp group	3.59 (1)	3.98 (2)	3.55 (3)
Skills in web conferencing	3.49 (1)	3.49 (2)	3.66 (3)
Skype-like chat services	3.96 (1)	3.49 (2)	3.29 ()
Avg. mean	**3.19 (1)**	**3.89 (2)**	**3.88 (3)**

With an average mean score of 3.65, librarians have the greatest degree of Skills in all individual and general mobile technology abilities.Assistant librarians rank second with an average score of 3.55, while library assistants had the lowest score with an average score of 3.48. While library assistants' average skill levels are below the median, indicating a lesser level of Skills, librarians' and assistant librarians' average skill levels are above the median, indicating a strong degree of Skills

Table 12 Knowledge and Proficiency in Web 3.0 Technology.

Skills	Librarian mean (rank)	Assistance librarian means (rank)	Library assistant means (rank)
Expertise with semantic web technologies	3.59 (1)	3.09 (2)	2.59 (3)

With a mean score of 3.59, librarians have the most knowledge of semantic web technologies, followed by assistant librarians with a mean score of 3.09 and library assistants with the lowest score of 2.59. While the mean skills of library assistants are below the median, indicating a lesser level of abilities, the mean skills of librarians and assistant librarians are above the median, indicating a strong level of skills.

D. Suggestion for Enhancing Proficiency in Emerging Technologies

Table 13 Suggestion for Enhancing Proficiency in Emerging Technologies.

Suggestion	Number of staff accepted	Percentage of staff accepted	Rank
Universities updating their curricula in accordance with trends	126	69.5%	5
Setting up sessions in-house	118	62.2%	4
Assigning Employees to outside training initiatives	132	53.69%	1
Statutory authorities' efforts to set up training programs, such as AICTE and UGC	142	68.96%	3
Higher-ups' encouragement to acquire new abilities	136	16.59%	2
Motivating oneself and work	146	17.96%	6

The highest suggested point, "self-motivations and efforts," comes in at 69.5%, followed by "initiatives by statutory bodies like AICTE, UGC to arrange training programs," which comes in at 62.2%. The third option, "Motivation by higher authorities to learn new skills," received 53.69% of the vote. “Deputing staff to external training programs" came in fourth place with 68.96%. Although they fall short of the guidelines,"Universities revising their syllabus in accordance with trends" and "Organising internal training sessions" both obtained favourable ratings of 16.59% and 17.96%, respectively.

V.FINDINGS AND RECOMMENDATION

1. The largest group of employees are recognised as library assistants.
2. The majority of the employees have master's degrees in library science (Miss. Overall, staff members' educational backgrounds are in high standing.
3. The majority of the employees have between six and twenty years of experience, which suggests that they will stay with the company for longer.Libraries have the potential to use it.Libraries will benefit from the development of technical skills by encouraging and assisting staff to enhance their technical and instructional capabilities when introducing new services and technology.
4. In general Library personnel have high expertise in emerging technologies, with the exception of "Web 3.0" technology. However, they still need to hone their technical skills to enhance the quality of services and jobs made possible by technology.

1. When it comes to both individual and general emerging technology abilities, librarians have the greatest degree of Skills, assistant librarians come in second, and library assistants have the lowest rate.
2. The findings show that staff members' personal interest and efforts are crucial for the development of technical abilities. Statutory organisations such as AICTE and UGC must take the initiative to set up training courses to improve the technical Skills of library employees. Higher-ups at libraries and other institutions should be dedicated to improving the abilities of their employees by encouraging them, assigning them to training courses, and setting up internal training. Universities should also update their LIS curricula to reflect current and upcoming advancements in the library industry.

VI.CONCLUSION

Libraries and their patrons are greatly impacted by the current unstable technological environment, which is the threshold for many technologies. The statement that technology has changed the fundamental structure of the library system is not hyperbole. Library staff were compelled to improve their abilities and competences in order to serve as a liaison between new library resources, services, and patrons due to changes in the library system and tech-savvy patrons. The research concludes that library professionals employed by Karnataka's Professional Engineering College are better equipped to manage developing technology and have highly qualified educational backgrounds.Employees in libraries should take the initiative to acquire new skills so they can manage the technology that are always emerging. In order to use its employees, libraries must inspire and equip them to utilise both current and emerging technology.

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