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Article

Education for sustainable library infrastructure in the digital age: Analysis of library and information science curricula in South Korea

Haklae Kim

Chung-Ang University, Seoul 06974, Republic of Korea; haklaekim@cau.ac.kr

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Abstract: This study aims to analyse the current state of library and information science (LIS) education in South Korea and identify educational challenges in building a sustainable library infrastructure in the digital age. As libraries' role expands in a rapidly changing information environment, LIS education must evolve. Using topic modelling techniques, this study analysed course descriptions from 37 universities and identified 10 key topics. The analysis revealed that, while the current curricula cover both traditional library science and digital technology topics, focus on the latest technology trends and practical, hands-on education is lacking. Based on these findings, this study suggests strengthening digital technology education by incorporating project-based learning; integrating emerging technologies, such as data science and artificial intelligence; and emphasising community engagement and soft skills development. This study provides insights into improving LIS education to better align with the digital era's evolving demands.

Keywords: library and information science education; library infrastructure; topic modelling; latent dirichlet allocation (LDA); curriculum analysis

1. Introduction

The field of Library and Information Science (LIS) addresses the theory and practice of information production, organisation, management, preservation, and use. In the current era of rapidly changing digital environments, its role and importance are becoming increasingly prominent. As libraries' roles and functions have evolved dramatically in recent years (Arif et al., 2022), LIS education faces new challenges. Modern libraries no longer serve solely as information providers but have become cultural hubs for local communities, centres for lifelong learning, and digital information hubs. Here, infrastructure encompasses physical facilities as well as digital resources, service systems, and the human resources that manage them.

These changes in libraries have created new requirements for LIS education. In addition to traditional library science knowledge, a growing need exists to understand and utilise advanced technologies. Furthermore, soft skills, such as user experience design, community engagement, and cultural program planning, have become essential components of the LIS skillset (Yoon et al., 2021). Education is the key to building a sustainable library infrastructure. As the information environment continues changing rapidly, it has become increasingly important to train professionals who can adapt to these shifts and realise the vision of future libraries (Hickok, 2020). In particular, LIS education is at the forefront of this transformation. Initially a field focused on traditional library science, it is now expanding to incorporate advanced technologies, such as data science, artificial intelligence, and digital curation (Dobreski et al., 2022). However, systematic analysis on whether this educational shift

adequately reflects the current needs of libraries and the future outlook is still lacking. Concerns exist regarding whether the current LIS curriculum in Korea sufficiently addresses these changes. Some studies have suggested that the curriculum remains predominantly focused on traditional library science and fails to fully reflect the digital age's demands. For instance, according to Mo et al. (2019), courses related to information technology account for approximately 20% of the curriculum in LIS departments across Korea. Additionally, there is a growing need to address environmental sustainability, legal and ethical issues, and emerging interdisciplinary roles within the LIS field.

Against this backdrop, this study aims to analyse the Library and Information Science (LIS) curriculum in Korea, exploring its current state and the challenges it faces in building a sustainable library infrastructure for the digital age. By employing topic modelling techniques, this research objectively examines the curriculum's content to identify its strengths, weaknesses, and areas for potential improvement. The study's scope extends beyond mere curriculum analysis; it delves into the broader context of libraries' evolving social importance and their role in fostering sustainable communities. By scrutinizing the alignment between current educational practices and the changing needs of libraries, this research seeks to uncover ways to enhance the curriculum to better prepare future professionals for their pivotal roles in society. This comprehensive analysis not only contributes to the advancement of LIS education but also provides policy recommendations aimed at strengthening Korea's library infrastructure. These recommendations are geared towards improving the quality of knowledge and information services, while also addressing the sustainability challenges faced by modern libraries.

This paper is structured as follows: Section 2 elucidates the theoretical background and reviews previous research to explore the relationship between the changing library infrastructure in the digital age and LIS education. Section 3 details the data collection process and topic modelling analysis methodology. Section 4 presents the key educational topics and their characteristics identified through topic modelling analysis. Section 5 discusses the results' implications, including the current curriculum's strengths and weaknesses and directions for improvement. Finally, Section 6 summarises the findings and proposes educational policy directions for building a sustainable library infrastructure.

2. Related work

Studies examining the sustainability of libraries and LIS education have gained momentum in recent years. These efforts reflect a response to the rapid changes precipitated by the digital era and an attempt to redefine libraries' social roles. Scholars have explored various aspects of this topic, emphasising LIS education's importance and examining libraries' sustainability in an evolving information environment (Chung et al., 2022; Maceli, 2019; Tait and Pierson, 2022).

Jankowska and Marcum (2010) suggested strategies for academic libraries' sustainability, advocating for a holistic approach that includes environmental, economic, and social sustainability. Additionally, they highlighted the importance of professional education in addressing the opportunities and challenges of digitalisation.

Recent studies have also highlighted the importance of incorporating environmental sustainability into LIS education. Chowdhury (2016) proposed a comprehensive framework addressing the sustainability of library and information services from economic, environmental, and social perspectives. This work identified key challenges to the sustainability of digital library services, highlighting the importance of strengthening information professionals' capacities to build sustainable information systems.

Moreover, the legal and ethical implications of information management have gained increased attention in LIS research. Bertot et al. (2016) explored public libraries' changing roles and the corresponding shifts in LIS education, underscoring the need for skills in digital literacy and community engagement. Saunders (2015) identified gaps between the current LIS curriculum in the United States and the competencies required for the digital age, underscoring the need to strengthen education in emerging areas, such as data management, digital curation, and information visualisation. Audunson et al. (2021) examined LIS education programmes in Europe and assessed their alignment with digital age competencies. Their findings emphasised the integration of emerging fields, such as data science, artificial intelligence, and digital humanities, signalling the need for educational reform at a global level.

Curriculum analysis and course content evaluation have played key roles in assessing the appropriateness of educational programmes in response to changing information environments (Pawley, 2019; Singh, 2018; Yadav, 2022). Chu (2006) focused on identifying trends in LIS courses and assessing how effectively they aligned with industry demands. Rafiq et al. (2021) comparatively analysed LIS education programmes across 10 Asian countries, evaluating their curricula against International Federation of Library Associations and Institutions guidelines and focusing on the inclusion of new subjects, such as digital libraries, knowledge management, and information literacy. These comparative studies have been instrumental in highlighting LIS education's global evolution. Abels et al. (2016) explored U.S. LIS programmes, focusing on the integration of emerging fields, such as data science and digital humanities, and emphasised the need for interdisciplinary collaboration and curriculum innovation.

Research on the curriculum and education in the field of LIS in Korea has been conducted to some extent, but it has not been actively pursued (Noh and Satija, 2016; Nor and Ahn, 2015; Park, 2004). Noh et al. (2012) analyzed changes in Korea's Library and Information Science curriculum and evaluated course practicality through a survey of librarians. Over 20 years, courses have become more specialized, with faculty influencing offerings. Mo et al. (2019) conducted a comprehensive review of South Korean LIS curricula from 33 universities into six domains (library science, information science, bibliography, records management, practicum, and general). These findings indicate a growing emphasis on information science and a relative decline in traditional library science.

Recently, text mining and topic modelling techniques have been applied in the LIS field (Figuerola et al., 2017; Karami et al., 2021; Li et al., 2019; Sugeno and Koizumi, 2024). Miyata et al. (2020) analyzes 1648 LIS articles from 2000–2002 and 2015–2017 using Latent Dirichlet Allocation (LDA) and visualizes the transition of

knowledge structures. It found that the Internet became central to LIS research by 2015–2017, while topic diversity decreased. Han (2020) examines 14,035 LIS articles from 1996 to 2019, revealing that library science has declined in relevance, while citation analysis and information retrieval have remained dominant. These methods have been effective in uncovering meaningful patterns from large datasets and have been particularly useful in trend analysis and enhancing library services.

Collectively, these studies highlight the close relationship between libraries' sustainability and LIS education's evolving landscape, emphasising the need for educational innovation in the digital age. Despite the insights gained, much of this work has been Western-focused or limited to specific countries, leaving a gap in comprehensive analyses in the Korean context. This study aims to fill this gap by examining how LIS education in South Korea can contribute to building a sustainable library infrastructure.

3. Research methods

3.1. Data collection

This study systematically gathered course data from LIS departments at four-year universities in South Korea to analyse LIS curricula's current state. Using the list of universities offering LIS programmes in 2023, 37 universities were selected for analysis. Course information was obtained primarily from the official websites and departmental pages of each university. For universities whose information was not publicly available, course catalogues and curriculum guides were used to supplement the data. The collected dataset included details such as university name, course title, course description, credits, semester offered, and course classification, providing a comprehensive overview of each course's characteristics and place within the curriculum.

Overall, 854 course descriptions were collected. However, only 796 courses with clear and complete descriptions were included in the final analysis to ensure reliability and accuracy. Courses with insufficient descriptions were excluded to maintain high data quality. The data collection process was conducted from 1 July to 31 July 2023 and reflected the most recent curriculum information available. After collection, the data were organised using Microsoft Excel and converted to the CSV format for ease of analysis.

3.2. Data preprocessing

The collected LIS course data underwent a series of preprocessing steps to prepare for topic modelling analysis, including text cleaning, morphological analysis, stopword removal, and key term extraction.

The text-cleaning phase involved removing special characters, numbers, and English letters to retain only Korean text. Regular expressions were used to eliminate unnecessary elements and white space. Morphological analysis was performed using the Okt class from the KoNLPy (Park and Cho, 2014), a widely used tool for Korean natural language processing. This step helped identify word parts and allowed for the extraction of nouns that were deemed most relevant for topic identification in this

context.

Stopword removal involved two steps. First, a widely recognised Korean stopword list (GitHub Gist, 2016) was employed to remove common terms such as '것' (thing), '등' (etc.), and '및' (and). Subsequently, a custom stopword list was created with approximately 90 terms frequently found in course descriptions but not useful for topic extraction. Words such as '학습' (learning), '이해' (understanding), '수업' (class), and '교과목' (course) were removed to further refine the data. Moreover, the process excluded single-syllable words, which generally lack clear meaning or relevance.

Following this preprocessing step, each course description was converted into a set of meaningful nouns. The cleaned data served as the input for topic modelling, enabling a focused exploration of key themes within the LIS curriculum. Automation of the preprocessing steps using Python ensured consistency and efficiency in data handling.

3.3. Data analysis and visualisation

To conduct topic modelling, this study used the Latent Dirichlet Allocation (LDA) model (Blei et al., 2003), a probabilistic approach that uncovers abstract topics within a collection of documents. The LDA model assumes that each document comprises a mixture of multiple topics. The model was implemented using the LdaMulticore class from the Gensim library, which is designed for large-scale text processing and supports parallel computations to accelerate the training process. The optimal number of topics was determined by testing models with topic counts ranging from 2 to 20 and evaluating each with a coherence score. Based on these results, the 10 topics with the highest coherence scores were selected for the final model.

To visualise and interpret the LDA results, the pyLDAvis library (Sievert and Shirley, 2014), which provides an interactive web-based visualisation of topic modelling outputs, was used. This tool enables a clear understanding of the size and relationships between topics and highlights the key terms characterising each topic. The visualisations generated by pyLDAvis helped effectively analyse the main thematic areas within the LIS curriculum, providing detailed insights into the structure and focus of the current education programmes.

4. Results

4.1. Application of LDA model

To analyse the course descriptions in Korean LIS programmes, topic modelling was conducted using the LDA model—a probabilistic generative model that assumes that each document is a mixture of several latent topics, based on the distribution of words within the text. In this study, 10 latent topics were extracted to identify the themes present in the course descriptions.

In the data preprocessing phase, the Okt morphological analyser from the KoNLPy library was used to process the text data. Nouns were extracted from the course descriptions, and only words with two or more characters were selected to reduce noise. Additionally, special characters and numbers were removed to minimise

noise in the analysis. A stopwords list was employed to filter out common but contextually insignificant words, such as ‘and’ and ‘but’. These preprocessing steps ensured that the model focused on meaningful information in the data.

The preprocessed text data were converted into a document-term matrix (DTM) using the CountVectorizer from the scikit-learn library. Further, n-Gram analysis was applied to capture meaningful phrases, allowing the model to account for both single-word and two-word combinations (bigrams). This step was crucial to effectively capture compound terms such as ‘information retrieval’ and ‘database management’, thereby more accurately reflecting the contextual meaning of the text. The n-gram range was set to (1, 2), and the maximum number of terms was limited to 1000 for an efficient analysis.

The LDA model was trained using the LdaMulticore class of the Gensim library. Gensim is well-suited for handling large-scale text data and supports parallel training, which helped speed up the learning process herein. The number of topics was set to 10, and the model was trained with 10 passes, meaning that the text data were iterated through 10 times. The use of 2 workers enabled parallel processing, further reducing the training time. The model employed a probabilistic approach to assign each document to one or more topics based on word distribution.

After the model was trained, the results were visualised using the PyLDAvis tool, with the λ (lambda) value set to 0.7. The λ value plays a key role in balancing the terms’ frequency and exclusivity when selecting keywords for each topic. The λ value was set to 0.7 to strike a balance between the frequency of terms appearing in a topic and their uniqueness to that topic. This setting allowed for more accurate identification of the primary keywords representing each topic.

After training the model, the top 10 keywords for each topic were extracted. These keywords represented the main themes of each topic. For instance, if keywords such as ‘library’, ‘information’, and ‘resources’ were extracted for a topic, it could be interpreted as related to library information management. To evaluate the model’s performance, the coherence score was used as a metric to measure the generated topics’ contextual consistency. The coherence score was 0.389, indicating that the model had learned relatively coherent topics.

4.2. Findings from LDA topic analysis

The LDA model was applied to analyse the 10 topics derived from the course descriptions of LIS programmes in Korea. Each topic reflects varied subject areas covered in the curriculum, revealing the key themes in the field. The top keywords for each topic illustrated the core concepts, enabling us to identify important areas within LIS education in Korea. In this section, the major keywords associated with each topic are interpreted academically, and the results are classified into traditional LIS subjects and those related to digital technologies.

In the realm of traditional LIS subjects, core areas—such as library management, resource management, and information services—continue playing vital roles. Topics 1, 3, and 7 highlight these traditional themes.

- Topic 1: Keywords such as ‘library’, ‘culture’, ‘management’, ‘fieldwork’, and ‘operations’ suggest that this topic focuses on the overall management of libraries, including policies, budgeting, and service evaluation.
- Topic 3: Keywords such as ‘resources’, ‘reading’, ‘cataloguing’, and ‘classification’ indicate a focus on resource management and the organisation of library materials, emphasising the importance of cataloguing and classification.
- Topic 7: Keywords such as ‘collection development’, ‘classification’, ‘resources’, and ‘operations’ point to the management of library collections, strategic development, and the operational aspects of resource services.

These traditional topics focus primarily on resource management, collection development, and the provision of essential library services. Emphasis is placed on the systematic management of library resources and services for users.

As libraries increasingly operate in digital environments, integrating information technology and new tools has become crucial to LIS education. Topics 2, 6, and 10 reflect these themes’ growing importance.

- Topic 6: Keywords such as ‘technology’, ‘digital’, ‘future’, and ‘curriculum’ highlight the importance of incorporating emerging technologies into library systems, reflecting how digital innovation shapes library services’ future.
- Topic 9: Keywords such as ‘metadata’, ‘information’, ‘data’, and ‘systems’ suggest that this topic pertains to managing digital information resources, with a focus on metadata and the infrastructure needed for efficient data management.
- Topic 10: Keywords such as ‘database’, ‘digital’, ‘information’, and ‘search’ indicate a strong focus on the management of digital resources and information retrieval, particularly in the context of building and maintaining databases.

Digital technology topics encompass themes such as database management, information retrieval, and metadata processing, highlighting digital tools’ critical role in modern LIS education. This reflects the ongoing need to prepare future professionals to effectively manage digital resources.

Traditional LIS topics are primarily centred on core library functions, such as library operations, resource management, and collection development. These topics emphasise maintaining the essential role of libraries in providing access to organised resources and services for users. By contrast, digital technology topics focus on the integration and utilisation of information technologies, such as database management, digital resource organisation, and metadata processing. These topics highlight the need for libraries to adapt to new technological demands and expand their roles beyond traditional services using digital tools and innovations. Comparing these two categories clearly reveals that, while traditional library functions remain foundational, a growing need exists for LIS education to address technological advancements and prepare future professionals to navigate the digital age’s challenges.

Table 1 summarises the key topics identified through LDA analysis of the course descriptions in the LIS curricula; each topic is categorised according to the subject encapsulating the main theme, followed by the most relevant keywords associated with that topic. The keywords presented in **Table 1** were extracted by conducting an LDA analysis of course description data from Korean LIS programmes. The original

analysis was performed on Korean-language data, while the resulting keywords were translated into English for presentation purposes.

Table 1. Topics and main keywords in library and information science curriculum.

Topic	Topic Subject	Main Keywords
Topic 1	Library Management and Cultural Programmes	Library, Culture, Management, Knowledge, Information, Field, Operation, Learning, Evaluation, Class, Budget, Policy, Library and Information Science, Education, Role, Future, Technology, Expertise, Big Data, Automation, Evaluation
Topic 2	Resource Management and Children's Library Services	Materials, Reading, Cataloging, Education, Learning, Children, Organisation, Classification, Service, Youth, Programme, Curriculum, Seminar, Records Management, Record, Evaluation, Multimedia, Activities, Tools, System
Topic 3	Digital Resource Management and Library Services	Digital, Materials, Operation, Technology, Evaluation, Service, Course, Information, Organisation, Change, Collection, System, Support, Education, Information Society, Preservation, Librarian, Record, Digital
Topic 4	User Services and Information Accessibility	Service, Library, Library and Information Science, User, Librarian, System, Education, Information, Record, Support, Network, Materials, Role, Record, System, Search, Information Processing, Technology, Evaluation
Topic 5	Records Management and Preservation Strategies	Preservation, Records, Cataloging, Reading, Education, Methodology, Format, Humanities, Human, Record, Transition, Records, Format, Data, Framework, Analysis, Production, Formation, Evaluation
Topic 6	Information Technology and Digital Innovation	Library, Technology, Digital, Future, Curriculum, Information, Data, Knowledge, Analysis, Transformation, Network, Knowledge, Curriculum, Infrastructure, Application, Data, Digital
Topic 7	Collection Development and Library Operations	Classification, Materials, Library, Collection, Service, Tasks, Operation, Institution, Policy, Equipment, Composition, Materials, Collection, Planning, Subject, Learning, Programme, Realisation, Execution
Topic 8	Digital Resources and Information Management	Field, Cataloging, Metadata, Information, Education, Technology, Library, Rules, Institution, Programme, Knowledge, Service, Education, Evaluation, Standard, Information, User
Topic 9	Databases and Information Retrieval	Field, Classification, Metadata, Information, Education, Technology, Library, Rules, Institution, Service, Database, Search, Information, System, Information, Operation
Topic 10	System Management and Learning Programmes	System, Information Retrieval, Database, Search, Data, Information, Learning, Analysis, Programme, System, Information, Reading, Planning, Materials, Design

Figure 1 presents the results of the LDA model visualisation for Topic 10. On the left side, the Intertopic Distance Map presents the relative distances between the 10 identified topics, represented by circles. The distance between the topics (represented by each circle's centre) indicates how similar or distinct the topics are. For instance, Topic 10, depicted in red, seems distinct from the other topics, as it is located further away from the cluster of Topics 1, 2, 3, 6, and 9.

The Top-30 Most Relevant terms for Topic 10 are listed on the right side, indicating the most important words defining the topic. The blue bars represent each

term's overall frequency in the entire dataset, while the red bars indicate each term's relevance to a specific topic. Terms such as '알고리즘 (algorithm)', '데이터베이스 (database)', '검색 (search)', and '시스템 (system)' are strongly associated with Topic 10, suggesting that this topic is related to data management, algorithms, and database systems. The λ (lambda) value at the image's top right is set to 0.68, balancing the terms' relevance based on both their frequency and exclusivity in the topic. A higher λ value focuses more on terms that are frequent across multiple topics, while a lower λ highlights terms that are more exclusive to a particular topic. In this case, the setting helps provide a balanced view of terms that are both frequent and relevant to Topic 10.

It's worth noting that the LDA analysis did not reveal significant emphasis on topics related to environmental sustainability, legal and ethical issues in information management, or preparation for emerging interdisciplinary roles. This absence suggests potential areas for curriculum improvement to better align with contemporary challenges in the LIS field.

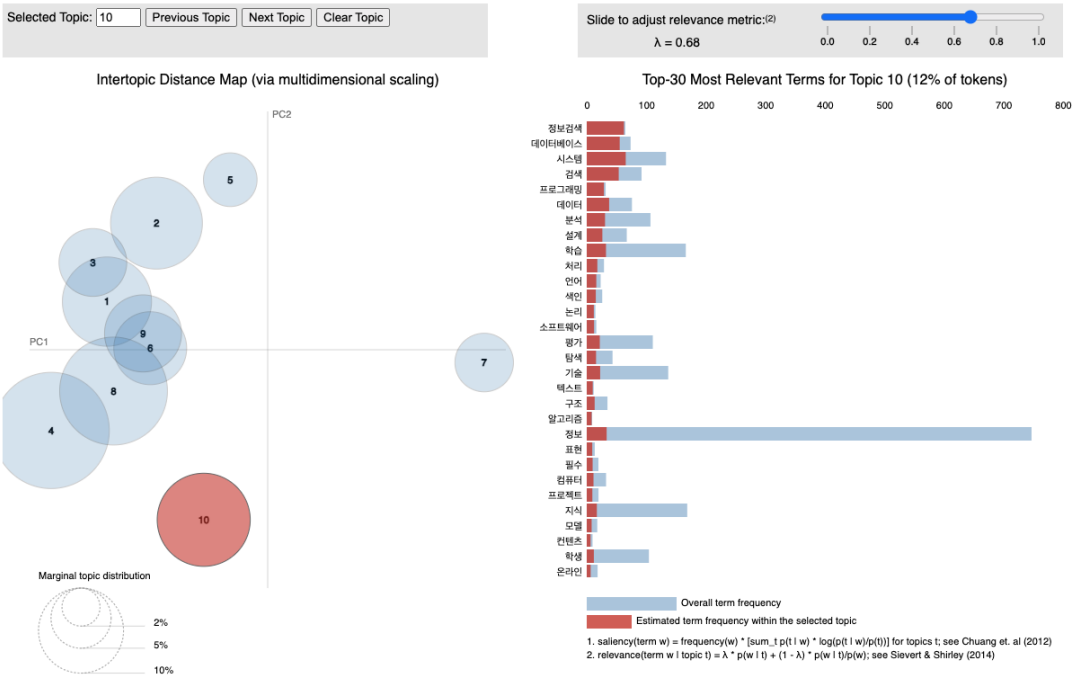

Figure 1. Intertopic distance map and Top-30 most relevant terms for topic 10 in the latent dirichlet allocation model.
Note: The keywords have been translated into English, and the terms are as follows: Information Search, Database System, Search, Programming, Data, Analysis, Design, Learning, Processing, Language, Indexing, Logic, Software, Evaluation, Exploration, Technology, Text, Structure, Algorithm, Information, Expression, Mandatory, Computer, Project, Knowledge, Model, Content, Student, Online

5. Discussion

5.1. Educational challenges for building sustainable library infrastructure

The LDA analysis results provide significant insights into the educational challenges necessary for building a sustainable library infrastructure in the digital age. Libraries are evolving beyond their traditional role as information providers to include data management, digital curation, and acting as community hubs, thus necessitating corresponding educational reforms.

This analysis highlights the need for a stronger focus on digital technology education. For instance, for Topic 10, keywords such as 'database', 'search', 'algorithm', and 'system' were prominent, indicating that digital technologies and data management are key components of modern library infrastructure. However, the current curriculum lacks practical, hands-on training in these areas. A pressing need exists for project-based learning that offers students opportunities to apply digital resource management, database design, and information retrieval techniques in real-world contexts.

Moreover, this study's analysis underscores the importance of expanding education to address emerging roles beyond traditional librarianship. Topic 1 revealed keywords such as 'library', 'management', 'culture', and 'knowledge', reflecting a continued emphasis on traditional library operations and information services. However, a noticeable gap exists in courses addressing newer roles, such as information scientists and data managers. As libraries increasingly require the integration of information technology and data science, LIS education must evolve to prepare students for these new roles and foster interdisciplinary knowledge and skillsets. Alternatively, environmental sustainability has emerged as a critical area requiring further integration into the curriculum. The absence of keywords such as 'environment' or 'sustainability' in the major topics suggests that the current educational focus does not sufficiently address the need for sustainable library practices. To support the development of libraries that not only function as information centres but also uphold environmental responsibility, courses on sustainable library design, green technology adoption, and environmental policy development must be enhanced.

These findings underscore the need for educational reform in response to libraries' evolving roles and advancements in digital technology. Strengthening practical education in digital skills, expanding curricula to include new professional roles, incorporating environmental sustainability, and addressing legal and ethical issues are essential steps towards building a sustainable library infrastructure. Addressing these challenges will ensure that LIS education will contribute meaningfully to libraries' future development.

5.2. Recommendations for curriculum improvement

As libraries and information services evolve rapidly with advancements in digital technology, the LIS curriculum must continuously adapt to fulfil these new demands. The recommendations based on the keywords extracted from each topic in the LDA analysis are outlined subsequently.

First, a need exists to strengthen hands-on practical education in digital technologies. Although Topic 10 includes keywords such as 'database', 'algorithm', and 'system', the current curriculum tends to focus more on theoretical concepts rather than practical applications. To enhance digital technology education, project-based learning should be introduced, enabling students to implement and apply technologies such as database design and information retrieval algorithms. By incorporating practical tasks, students will gain first-hand experience with technologies that are

essential in the evolving information environment, ensuring that they are better prepared to fulfil the field's demands upon graduation.

Additionally, the curriculum should incorporate the latest technological trends. Topic 8 includes keywords such as 'digital', 'data', and 'technology', indicating that emerging technologies (e.g., generative AI, natural language processing, and blockchain) are becoming vital in the library field. However, the current curriculum tends to focus on basic digital skills without considering these cutting-edge technologies' practical use. To address this gap, the curriculum should integrate courses on generative AI, data analytics, and cloud computing, providing students with the necessary skills to effectively utilise these technologies in professional settings.

Furthermore, expanding opportunities for field-based experience is crucial. Topic 5 comprised keywords such as 'field', 'evaluation', and 'program', underscoring the importance of providing students with practical, real-world experience in libraries and information organisations. Increasing the availability of internships and fieldwork opportunities could enable students to apply the theoretical knowledge that they gain in the classroom to real-world settings. These experiences are essential for helping students develop the skills required to address the practical challenges that libraries face during digital transformation.

To address the gap in environmental sustainability education, new courses should be introduced focusing on sustainable library design, green technology adoption, and environmental policy development. These courses would not only raise awareness about environmental issues but also equip future professionals with the knowledge and skills to implement sustainable practices in library operations. Moreover, the curriculum should be expanded to include courses on legal and ethical issues in information management. Topics such as information privacy, intellectual property rights, data security, and ethical considerations in AI and big data should be integrated into the curriculum.

Lastly, to better prepare students for emerging interdisciplinary roles, the curriculum should incorporate courses that bridge traditional library science with other fields such as data science, digital humanities, and information technology. This could include courses on data management for librarians, digital curation, and the application of AI in library services.

6. Conclusion

This study applied the LDA model to analyse key topics in the descriptions of LIS courses in Korea, identify the curriculum's current state, and propose directions for improvement. The analysis resulted in the extraction of 10 major topics, which revealed that the curriculum addressed both traditional information management topics and digital technology-related subjects.

The findings revealed that the LIS curriculum still focuses heavily on traditional library management and information provision services. Keywords such as 'materials', 'collections', 'information', and 'libraries'—appearing in Topics 1 and 3—clearly reflect this emphasis, indicating that the curriculum continues prioritising materials management and library operations, which form the foundation of LIS education in Korea. Simultaneously, new topics addressing the evolving digital landscape were

identified. Topics 8 and 10 comprised keywords such as ‘digital’, ‘database’, and ‘system’, which reflected the inclusion of digital-related subjects in the curriculum, though these are largely confined to conceptual education, thus highlighting the need for more practical, hands-on instruction. However, the analysis also revealed significant gaps in the curriculum, particularly in areas such as environmental sustainability, legal and ethical issues in information management, and preparation for emerging interdisciplinary roles. These findings underscore the need for curriculum reform to better align with contemporary challenges and future demands in the LIS field.

This study’s main contribution lies in its objective analysis of the LIS curriculum, identifying its strengths and weaknesses, and offering directions for improving it to fulfil the digital age’s demands. The LDA model provided a novel approach to supplement traditional subjective methods of curriculum analysis, enabling a more nuanced understanding of the balance between traditional library science and digital technology education. Additionally, this study proposed concrete improvements, such as enhancing practical digital technology training, incorporating the latest technology trends, integrating environmental sustainability, and preparing students for interdisciplinary roles, which could serve as a foundational resource for future curriculum development aimed at fostering professionals for sustainable library infrastructure.

To address these limitations, future research should collect and analyse more comprehensive data, including actual course materials and learning activities, to assess the curriculum’s relevance and practicality more accurately. Further, conducting in-depth interviews and surveys with library managers and field professionals would be valuable to gain a clearer understanding of the specific digital skills and information service competencies required in practice. Based on this input, the curriculum should be further developed to include practical applications of cutting-edge technologies, such as generative AI, big data analytics, and metadata management, in library operations. Furthermore, international comparative studies and longitudinal analyses of the LIS curriculum in Korea could provide insights into global trends and guide future curriculum development.

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