

A Comparative Study on Digital Literacy Subjects in the Library and Information Science Department Curriculum in Colombian and Korean Universities*

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ABSTRACT

The purpose of this study is to obtain implications to improve the digital literacy competences within Colombian Library and Information Science curriculum. For the study, all 5 universities operating a LIS department in Colombia and 5 out of 32 universities operating similar departments in Korea were selected as the target universities, the number of subjects opened within the LIS curriculum in the target universities from 2012 to 2022 was established; the number of digital literacy-related subjects within the curriculum was identified, and differences between these subjects were derived by using NVivo software. The findings illuminated that Korean universities LIS curriculum showed a greater increase in digital literacy-related subjects compare with the LIS curriculum in Colombian universities. Additionally, many digital literacy-related subjects were associated to the understanding of digital technology and the use of digital technology in both Korean and Colombian LIS departments. This study contributes to research on providing basic data to the research on improving the digital literacy capabilities of Colombia's future librarians.

초 록

이 연구의 목적은 콜롬비아 문헌정보학과와 디지털 리터러시 역량 향상을 위한 시사점을 도출하는 것이다. 이를 위해 콜롬비아에서 대면으로 문헌정보학과를 운영하는 5개 대학 전체와 한국의 32개 대학 중 5개 대학을 선정하였다. 그리고 2012년부터 2022년까지 해당 대학들의 문헌정보학과 교육과정에 개설된 교과목 수를 분석하고, 디지털 리터러시 관련 교과목의 수를 파악한 후, NVivo 소프트웨어를 이용하여 대학 간 교과목 분포의 차이를 분석하였다. 연구 결과, 한국 대학의 문헌정보학과 교육과정이 콜롬비아 대학의 교육과정에 비해 디지털 리터러시 관련 교과목의 증가폭이 더 큰 것으로 나타났다. 그리고 콜롬비아와 한국의 문헌정보학과 교육과정 모두에서 디지털 리터러시 관련 교과목들이 디지털 기술에 대한 이해와 활용 능력을 향상시키는 데 중점을 두고 있는 것으로 나타났다. 이 연구는 콜롬비아 미래 사서들의 디지털 리터러시 향상 연구에 필요한 기초자료를 제공하는 데 기여할 것으로 기대된다.

Keywords: Digital literacy, Librarian Education, Bachelor curriculum, Library and Information Science, Colombia, South Korea

디지털 리터러시, 사서교육, 학사 교육과정, 문헌정보학, 콜롬비아, 대한민국

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1. Introduction

The development of Information and Communication Technology (ICT) has had important effects in the operation and services provided within the library environment, including citizens' demands for libraries. Library and Information Science (LIS) curriculum are also changing in line with these effects in the Information Society, as library-related institutions like Association of College and Research Libraries (ACRL), International Federation for Library Association (IFLA), and American Library Association (ALA) have recognized the need for strengthen the education and capacity of librarians should include fields such as learning analysis, data analysis, data visualization, big data management, and digital literacy.

This context describes a current trend in librarianship education. According to the National Occupational Code provided by the Labor Vocational Observatory of the Ministry of Education and the Ministry of Employment and Labor of Colombia, the role of librarians includes strategic planning of libraries, user service provision and user education, information access strategy development, information policy application, and marketing. However, the Study by Choi and Rasmussen (2009) on job advertisements in academic libraries shows that the demand for librarians with competency in digital libraries is increasing. This is because digital libraries are becoming increasingly important to store, organize, share, and access knowledge in the Digital and Information Society. Therefore, education in the LIS departments

should not only be centered on information technology (IT), but also improve the IT capabilities of librarians (Joseph & Aneesh, 2018).

As an IT powerhouse, academic libraries in South Korea are equipped with various technologies like guidance robots, artificial intelligence (AI) that recommend books to users, RFID and the Internet of Things to manage collections, virtual and augmented reality, realistic media, metaverse to engage and community outreach, and 3D scanning and printing. This change in the library field can be related to the continuous renewal and development of digital literacy-related subjects within LIS curriculum in Korean universities. On the other hand, digital literacy curriculum in LIS in Colombian universities, is not as updated and developed as Korean universities.

The author, who has experience working as a librarian in Colombia, felt that Colombian libraries lacked the environmental and policy efforts to improve citizens' digital literacy that Korean libraries do. To improve the digital literacy of Colombian citizens, a digital literacy curriculum must be operated in the university curriculum. Therefore, the purpose of this study is to understand the status of digital literacy-related subjects in the LIS curriculum in universities in Colombia and Korea and analyze possible differences to improve the digital literacy content within the LIS departments in Colombian universities. The study purpose is guided by the following research questions:

- Research Question 1. What is the status and content of digital literacy subjects in the LIS

curriculum in Colombian and Korean universities?

- Research Question 2. How have digital literacy subjects changed in the LIS curriculum in Colombian and Korean universities?
- Research Question 3. What are the differences between digital literacy subjects in the LIS curriculum in Colombian and Korean universities?

2. Literature review

This study focuses on Colombia and aims to identify differences in digital literacy subjects offered in LIS departments at universities in Colombia and Korea. Previous studies on LIS curricula in Colombia, Korea, and other national contexts show that librarian education has gradually shifted from traditional library-centered training toward technology-integrated, competency-based, and field-oriented education.

The literature can be reorganized around four major research trends and issues: the transformation of LIS curricula in response to digital change, the need for curriculum standardization and professional relevance, the expansion of digital literacy into multi-dimensional competencies, and the methodological limitations of existing curriculum studies.

2.1 From Traditional Library Education to Technology-Integrated LIS Curricula

Early research on LIS education was primarily

concerned with defining the basic structure and essential content of library science curricula. In the Colombian context, Molina and Pérez (1988) emphasized the importance of both cultural and professional educational areas in librarian training. Their discussion of core and elective subjects—such as library history, research methods, book selection, catalog preparation, and the social role of libraries—reflects a curriculum model grounded in the traditional functions and social responsibilities of librarianship.

However, as libraries entered the information and digital age, the focus of LIS curriculum research began to move beyond traditional library operations. In Korea, Han (1998) argued that the changing vision and operation of libraries required the incorporation of information and multimedia technologies into LIS education. While fundamental areas such as information retrieval, classification, library management, and information services remained important, digital libraries and technology-based information services began to emerge as essential curricular components. Oh and Chang (2006) also identified IT education as a major direction for improving librarian education in Korean universities, linking curriculum development to the broader historical development of library science teaching and research.

This shift was not limited to Korea. Chu (2010), examining LIS curriculum development in the United States, showed that librarian education in the digital age had expanded to include subjects such as digital libraries, knowledge management, information architecture, digital image management, and e-govern-

ment services. These studies collectively indicate that LIS education has moved from a model centered on traditional library skills toward one that combines professional foundations with information technology, digital content, and new forms of information service.

In contrast, Colombian LIS curriculum research reveals a slower and less explicit engagement with digital transformation. Zapata Cárdenas (2007) analyzed the characteristics and trends of the Colombian library sector, focusing on the occupational and educational conditions of librarians in the labor market. The study showed that the development of library science educational programs differed significantly from other professional fields and that formal academic programs were concentrated in major cities. However, it did not examine how technological advances or digital transformation affected librarian education. This omission suggests an important gap in Colombian LIS research: while the professional and institutional characteristics of library education have been addressed, the curricular implications of digital change remain insufficiently explored.

2.2 Standardization, Core Curriculum, and Field-Oriented Education

A second major issue in the literature is the need to standardize LIS curricula while ensuring their relevance to professional practice. As library work becomes more complex and technology-dependent, curriculum reform is increasingly discussed not only in terms of academic content but also in relation

to field adaptability, professional competencies, and employability.

In Colombia, Vallejo Sierra (2016) addressed this issue through a diagnostic comparative study of librarian education in Colombia and Spain. By identifying similarities and differences between Colombian library science departments and Spanish LIS departments, the study sought to determine common content that could function as core curriculum in Colombian librarian education. This reflects a concern with establishing shared curricular foundations, developing standardized educational content, and creating opportunities for curriculum collaboration.

Korean studies have approached standardization with stronger emphasis on field needs and professional practice. Noh et al. (2012) examined domestic and overseas LIS programs and surveyed practicing librarians in various types of libraries in order to propose core and optional courses for an LIS curriculum operating model. Their study positioned curriculum development as a practical response to the needs of the library field.

Cha (2016) further developed this field-oriented approach by proposing an empirical model of a practical LIS curriculum based on Korea's National Competency Standards (NCS). By examining NCS implementation in the library field and surveying students' satisfaction with field practice, the study aimed to strengthen the practical skills of LIS students and establish more systematic educational standards for practical training. Jang et al. (2022) also emphasized the importance of field adaptation by analyzing university lecture plans, conducting

surveys with organizations related to the Korean Library Association, and using FGI, IPA, and Borich demand analysis to identify priorities for standardized LIS subjects. Their findings indicate that librarian education must secure external reliability by responding to the demands of the knowledge society and the professional field. And, Yoo (2018) research results indicated that digital basic competencies such as digital content analysis, information ethics, data analysis, data statistics analysis, and academic research should be included in Library Science curriculum.

Taken together, these studies show that standardization is not merely a matter of organizing course lists. Rather, it is closely connected to the question of how LIS programs can prepare graduates who possess both academic knowledge and practical competencies required in changing library environments.

2.3 Digital literacy within the LIS curriculum

A third and increasingly central trend is the incorporation of digital literacy into LIS curricula. Earlier discussions of technology in librarian education focused mainly on the introduction of technical subjects, but later studies have expanded this concern into broader competencies such as digital content analysis, data literacy, information ethics, research skills, user support, and lifelong learning.

Koo (2000) argued that since the educational experience prepares students for professional practice, technological, digital and informational components

in various Library Science curriculum were introduced in the early 2000s to present a balanced version of the essential digital education in librarian curriculum in Korean universities. The study also highlighted the increase in technical subjects and user-centered education.

Chu (2010) explained the development process and concentration of the Library Science curriculum in the United States and examined the development, evolution and related problems of librarians' education in the digital age. Subjects like digital library, knowledge management, and information structure were identified, and contents such as digital image management and e-government in government services and administration were also noted.

Goodsett and Koziura (2016) conducted a comprehensive survey among 575 respondents to investigate their perspectives on educational and employment challenges for graduates of the Library Science departments in United States universities. As a result, the study presented key areas for improvement, including the importance of a balanced integration of practical experience, technological proficiency, theory and practice. The study also suggested the importance of technology education in preparing librarians to support users in accessing, using and understanding digital resources, improving digital literacy and information literacy skills.

Yadav (2022) study conducted a survey of graduates of 10 Library Science departments at Indian universities to determine the knowledge, skill, and ability (KSA) required by library professionals in India. The results defined five major KSA areas:

research technology, computing technology, data management technology, soft technology, and traditional library technology. The study emphasized that in the digital age, librarians must have the ability to understand digital technologies to meet the changing needs of library users and adapt to the ever-changing information management environment.

According to ALA (2023), librarian education should include competencies in information resources, lifelong learning and lifelong education, reference and user services, research and evidence-based practice, social justice, technical knowledge and skills, recorded knowledge and information organization, as well as a basic understanding of the legal structure that governs libraries, including copyright and fair use, privacy, freedom of expression, and intellectual property.

2.4 Methodological Limitations and the Need for Comparative Content-Level Analysis

Although previous studies have contributed significantly to understanding LIS curriculum development, they also reveal several limitations. One major limitation concerns the level of curriculum analysis. Mo et al. (2020), for example, investigated LIS subjects in Korean universities by collecting data from university homepages and applying text analysis, frequency analysis, and network analysis. The study responded to important challenges in higher education, including declining student enrollment and the need for demand-oriented convergence education.

However, because the analysis was based mainly on course titles, it did not examine the detailed content of the curriculum. This limitation is especially important in digital literacy research because course titles alone may not reveal whether digital literacy is addressed superficially or systematically.

A similar limitation can be observed in the Colombian literature. Studies on Colombian LIS education have examined traditional curriculum composition, professional formation, and labor market characteristics, but they have paid relatively little attention to how digital literacy is actually incorporated into LIS programs. Molina and Pérez (1988) provided an important foundation for understanding the traditional structure of library science education, Vallejo Sierra (2016) contributed to curriculum standardization through comparative analysis, and Zapata Cárdenas (2007) analyzed professional and educational conditions in the library sector. Nevertheless, these studies do not sufficiently explain the position, content, or development of digital literacy subjects within Colombian LIS curricula.

Therefore, the existing literature points to a clear research gap. Korean LIS curriculum research has increasingly addressed IT education, practical competencies, meta-literacy, standardization, and field adaptation. International studies also show that digital literacy has become central to librarian education, encompassing technical skills, data-related competencies, ethical judgment, user support, and lifelong learning. By contrast, Colombian LIS curriculum research has not yet sufficiently examined digital literacy as a specific and systematic component of

librarian education.

Overall, previous research demonstrates a broad transition in LIS education from traditional library-centered curricula toward curricula that integrate professional foundations, digital literacy, technological proficiency, data-related competencies, and field-oriented standards. The key issue is no longer whether digital literacy should be included in LIS education, but how it is structured, how deeply it is embedded in curricula, and how its development differs across national contexts. This provides the rationale for the present comparative study of digital literacy subjects in LIS departments at universities in Colombia and Korea.

3. Methodology

3.1 Scope definition

The curriculum of the LIS departments in Colombian and Korean universities was collected from 2012 to 2022, and the status of digital literacy-related subjects was analyzed. The scope was defined according to:

The information available in the National System for Universities Information of Colombia Ministry of Education (referred as SNIES) about LIS departments in Colombian universities.

Over the past decade, Colombia has implemented several policies related to digital capacity building, information technology, data protection, and information society, so digital literacy subjects within

the LIS curriculum were investigated.

This study explores the possibility of future collaboration between LIS departments in Korean universities for the implementation of the results and discussion of this study.

Since the digital literacy components are defined as areas instead of single separated abilities or other types of literacy components by UNESCO (Law et al., 2018) and the Korea Education and Research Information Service-KERIS (Kim Soohwan et al., 2017). In this study the digital literacy components were defined as an integrated concept applying a similar definition to facilitate the coding parameters of the analysis tool as shown in Table 1.

3.2 Study subjects

According to National System for Universities Information of Colombia Ministry of Education, five out of 89 universities in Colombia have established four-year LIS departments, these universities have been traditionally located in Bogota and Medellin. And recently more universities are opening LIS departments in both virtual and face-to-face methodologies. However, this study excluded non-4-year bachelor programs and other bachelor programs centered on archives management.

In the case of Korean universities, with the change and reform of university education in Korea, as of 2023, a total of 32 universities have been confirmed to have opened and operated a four-year LIS department operating nationwide (Mo et al., 2020). There are a total of 5 universities in Colombia that operate

〈Table 1〉 Digital Literacy defined areas

Title	Definition
Understanding of digital technology (Law et al., 2018)	The ability to navigate, search, filter, evaluate, analyze, manage and process information, data and digital content
Use, share and collaboration of digital technology (Kim et al., 2017)	Ability to solve various problems in the digital society, create original content, and manage digital identity and copyright
A wareness, attitude and safety in digital technology (Law et al., 2018)	Ability to protect personal data and citizens' personal data in a digital environment and understanding of information ethics for a secure use of digital technology
Digital Thinking (Kim et al., 2017)	The ability to identify the skills, knowledge and attitudes required to operate in a digital society, including digital competency gaps; and the ability to understand public policies for the development of an information society

〈Table 2〉 List of universities in Colombia and Korea selected as study subjects.

University	Country	Region/Type
UnInpahu University	Colombia	Bogota / Private
Quindío University		National / Public
De La Salle University		Bogota / Private
Antioquia University		Medellin / Public
Pontifical Javeriana University		Bogota / Private
University	Country	Region/Type
A University	Korea	Jeolla-do / Public
B University		Seoul / Private
C University		Gyeongsang-do / Public
D University		Chungcheong-do / Private
E University		Seoul / Private

offline Library and Information Science departments, of which 2 are public. Therefore, considering the region, a total of 5 universities in Korea were selected, including the 2 public ones. The target universities are shown in Table 2.

3.3 Data collection

Since this study focuses on the Department of LIS in Colombia University, the period up to 2022,

when information on the regular curriculum of the Department of LIS in Colombia Universities was available, was selected as the subject of analysis. Accordingly, this study analyzed the curriculums of LIS in Colombian and Korean Universities from 2012 to 2022.

To collect the subject's information included in the LIS curriculum at universities in Colombia and Korea, a detailed file containing the request was used. This file was sent to each department at the

10 universities in Colombia and Korea, selected as study subjects. The total number of subjects in the LIS curriculum was determined by the unique names of each subject. If additional subjects were identified in the collected data, their names and years were added to the subject name list.

As a result, 693 subjects related to digital literacy were identified. 343 subjects were collected within the LIS curriculum in Colombian universities, while 350 subjects were collected within the LIS curriculum in Korean universities (see Table 3).

3.4 Data analysis

Since the nature of the study is mainly qualitative, Computer-Assisted Qualitative Data Analysis Software (NVivo) was used to identify patterns in present and past curriculum subjects' description. Furthermore, NVivo is designed to facilitate general qualitative methods based on the iterative process of qualitative research and the concepts of workflow and transparency and combine them with the researcher's analytical expertise without favoring any specific methodology. Therefore, it supports system-

atic and consistent management of data analysis through hierarchical coding to support thematic analysis of texts (Gibbs, 2011), divided in three main interconnected and sequential phases: 1. Gather the curricular datasets (693 subjects in total), 2. Content and textual analysis of the identified DL subjects (92 DL-related subjects) and 3. Structure the visual relational representation for structural comparison (Universities separated project map).

According to the data collected from each LIS department, the content of the subjects included in the curriculum was organized in a text file (.docx or .pdf) and to systematically identify, investigate and compare the integration of digital literacy subjects within the LIS curricula of Colombia and Korea Universities, a structured, multi-stage workflow analysis using NVivo was performed as follows.

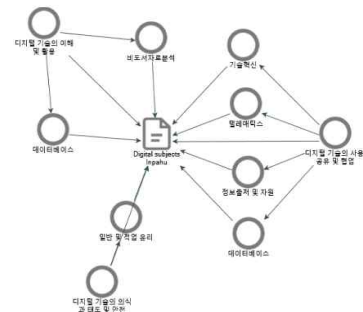
Each file was imported into NVivo creating a case for each university, and text content language composition was performed in each file. Each subject's content was coded and classified according to the digital literacy area previously defined, as shown in fig. 1, this sequential approach was designed to transition methodically from macro-level

<Table 3> Number of subjects collected within the LIS curriculum (2012-2022) at the study subjects

University (Colombia)	Number of subjects		University (Korea)
UnInpahu University	63	71	A University
Quindio University	68	75	B University
De La Salle University	104	77	C University
Antioquia University	34	69	D University
Pontifical Javeriana University	74	58	E University
Total	343	350	



<Fig. 1> NVivo coding results screen



<Fig. 2> Digital literacy subject project map

data filtering (LIS curricula) to micro-level textual identification (digital literacy subjects' content), ultimately translating qualitative curricular data into meaningful comparative visualizations based on the content analysis.

After the content analysis was applied to each text file, 92 subjects were identified with content related to digital literacy among the 693 subjects included in the LIS curriculum at Colombia and Korea universities. Then, word frequency queries and text search queries were applied, and project maps for each university were created. The digital literacy subject project map derived from this analysis is shown in fig. 2.

To identify differences between digital literacy-related subjects within LIS curriculum in universities in Colombia and Korea, the content and quantity of digital literacy-related subjects were identified, and three criteria were considered to analyze the content of the digital literacy-related subjects: content trend, content focus, and preferred digital literacy area. To enhance the validity of the study, two researchers and one doctoral student in LIS conducted

a triangulation test focusing on inter-research agreement, and items with inconsistencies were coded after discussion among three people.

Finally, the percentage of digital literacy-related subjects within the total subjects opened in the LIS curriculum was calculated by applying the arithmetic formula between the total number of subjects in the curriculum and the number of digital literacy-related subjects identified after content analysis.

4. Findings

Once the correspond analysis was performed, the final phase of the analysis workflow synthesized the separate DL-related subject data within the LIS curricula into a structural graphical representation through the generation of university-specific project maps (fig. 2.). This was used for visualizing the data through project graphs serving two analytical purposes:

- ① Structural Synthesis: It maps the non-linear

relationships between the defined digital literacy areas, subjects' contents, and LIS curricula development over the analyzed time.

- ② Comparative Clarity: It allows for immediate cross-institutional comparison, highlighting distinct architectural differences in how Colombian and Korean universities conceptually organize and integrated digital literacy subjects within their LIS curricula.

Therefore, by linking systematic data reduction, computational text mining, and relational visualization, this workflow ensures a transparent, replicable, and rigorous methodology that moves from raw curricular text to actionable comparative insights.

4.1 Digital literacy-related subjects in the LIS Curriculum at Colombian universities

The study's findings demonstrate that digital liter-

acy-related subjects have been stagnant in LIS curriculum for nearly four years in the case of Colombian universities. This means that there were no changes to the digital literacy-related subjects offered in the LIS curricula between 2012 and 2015, while the number increased from 25 subjects to 31 between 2016 and 2022. As a result, digital literacy-related subjects in Colombian universities were primarily upgraded between 2016-2021 (see table 4).

Below are some of the findings based on the content analysis applied to the curricula of five LIS departments in universities in Colombia.

4.1.1 UnInpahu University

Between 2012 and 2022, 6 out of 63 subjects (10%) opened in the LIS curriculum at UnInpahu were related to digital literacy. As shown in fig. 3, not only did the number of digital literacy-related subjects in the LIS curriculum in UnInpahu increased from 2012 to 2022, but also all subjects in the curriculum. However, the proportion of digital



<Fig. 3> Digital literacy-related subjects' ratio in the LIS curriculum in UnInpahu university

literacy-related subjects in the curriculum was found to be less than 10%.

4.1.2 Quindio University

Between 2012 and 2022, 4 out of 68 subjects (6%) opened in the LIS curriculum at UnInpahu were related to digital literacy. As shown in fig. 4, the LIS curriculum at Quindio University decreased from 51 to 33 subjects opened in 2022, but the number of digital literacy-related subjects also decreased to 3. This led to a ratio of less than 10% of digital literacy-related subjects in the curriculum as shown in fig. 4.

4.1.3 De La Salle University

Between 2012 and 2022, 10 out of 104 subjects (9%) opened in LIS curriculum at De La Salle University were digital literacy-related subjects.

The number of subjects offered in the LIS curriculum decreased from 52 to 39 in 2022, however, the number of digital literacy-related subjects increased to 7 subjects. In this way, the ratio of digital literacy-related subjects in the LIS curriculum increased

to 18% as shown in fig. 5.

4.1.4 Antioquia University

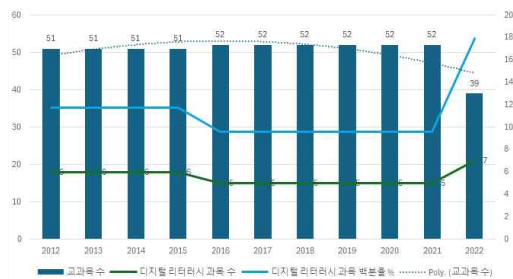
During the study period, 7 out of 34 subjects (21%) opened in LIS curriculum at Antioquia university included digital literacy content. The number of subjects within LIS curriculum increased from 26 to 29 between 2012 to 2022. However, the number of digital literacy-related subjects remained at 7 during the same period, this led to a ratio of 24% being the highest among the studied Colombian universities, as shown in fig. 6.

4.1.5 Pontifical Javeriana University

Between 2012 and 2022, 8 of the 74 subjects (11%) offered by the LIS curriculum at Pontifical Javeriana University were digital literacy-related subjects. The number of subjects opened in the LIS curriculum decreased from 48 to 32 subjects in 2022, and the number of digital literacy-related subjects remains at 5 subjects. As a result, the ratio of these subjects in the curriculum was 6% as shown in fig. 7.



〈Fig. 4〉 Digital literacy-related subjects' ratio in the LIS curriculum in Quindio university



〈Fig. 5〉 Digital literacy-related subjects' ratio in the LIS curriculum in De La Salle university



<Fig. 6> Digital literacy-related subjects' ratio in the LIS curriculum in Antioquia university



<Fig. 7> Digital literacy-related subjects' ratio in the LIS curriculum in Pontifical Javeriana University

4.2 Digital literacy-related subjects in the LIS Curriculum at Korean universities

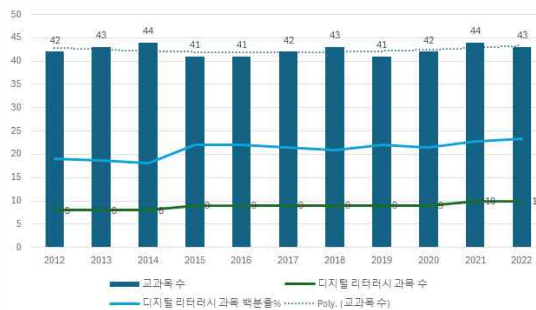
In the case of the universities in Korea, the findings show that the number of digital literacy-related subjects within the LIS curricula increased from 29 in 2012 to 35 in 2015, and then raised to 40 in 2022 (see table 4). This demonstrates a continuously updating and upgrading in the digital literacy-related subjects within the LIS curricula in the studied universities in Korea.

Next, some of the findings based on the content

analysis applied to the curricula of five LIS departments in universities in Korea are presented.

4.2.1 A University

During the study period, 10 of 71 subjects (14%) opened in the LIS curriculum at A University were digital literacy-related subjects. The number of subjects in the curriculum has been constant with 43 subjects opened from 2012 to 2022. The number of digital literacy-related subjects was also constant with 10 subjects, representing a ratio of 23% of the number of subjects offered within the curriculum as shown in fig. 8.



<Fig. 8> Digital literacy-related subjects' ratio in the LIS curriculum in A National University

4.2.2 B University

Between 2012 and 2022, 16 of the 75 subjects (21%) opened in the LIS curriculum were digital literacy-related subjects. The number of subjects offered in the LIS curriculum decreased from 28 to 19 subjects, and digital literacy-related subjects increased by one in 2022. The ratio of digital literacy-related subjects also increased to 21% the same year as shown in fig. 9.

4.2.3 C University

Between 2012 and 2022, 10 out of the 77 (12%) subjects opened in the LIS curriculum were related to digital literacy. The number of subjects in this curriculum maintained a constant state from 2012 to 2022. However, the number of subjects related to digital literacy slightly increased from 5 subjects in 2012 to 8 in 2022. The ratio of digital literacy-related subjects was 15%, being the lowest ratio in the studied universities in Korea, as shown in fig. 10.

4.2.4 D University

During the study period, 9 of the 69 (13%) subjects



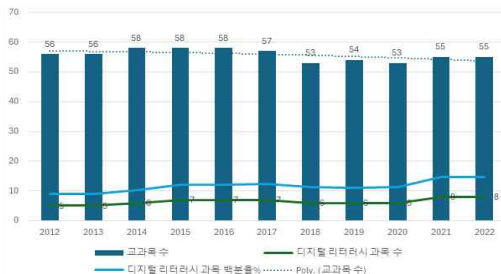
<Fig. 9> Digital literacy-related subjects' ratio in the LIS curriculum in B University

opened in the LIS curriculum were related to digital literacy. In this university, the number of subjects offered in the LIS curriculum increased from 31 subjects in 2012 to 40 in 2022, and the number of subjects related to digital literacy increased from 5 subjects in 2012 to 8 in 2022. As a result, the ratio of subjects related to digital literacy in the curriculum was 20% as shown in fig. 11.

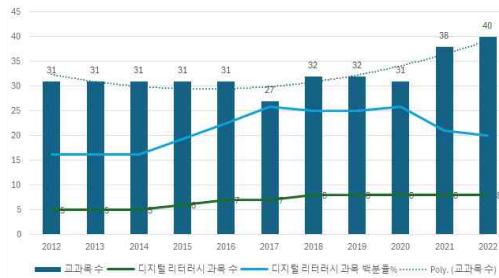
4.2.5 E University

Between 2012 and 2022, 13 of the 58 subjects offered in the LIS curriculum were related to digital literacy. One subject was opened from 2013 to 2022, two were opened from 2014, one was opened from 2015, two from 2017, two from 2018, and three were opened from 2019.

The number of subjects included in the LIS curriculum steadily increased from 41 subjects in 2012 to 57 in 2022. The digital literacy-related subjects also increased from 9 subjects in 2012 to 13 in 2022. As a result, the ratio of subjects related to digital literacy was 25% within the LIS curriculum as shown in fig. 12.



<Fig. 10> Digital literacy-related subjects' ratio in the LIS curriculum in C University



<Fig. 11> Digital literacy-related subjects' ratio in the LIS curriculum in D University



<Fig. 12> Digital literacy-related subjects' ratio in the LIS curriculum in E University

4.3 Content of the digital literacy-related subjects in the LIS Curriculum at Colombian and Korean universities.

As a result of dividing the identified digital literacy subjects in the LIS curricula into four digital literacy areas, in the case of universities in Korea 23 out of 57 subjects (40.35%) corresponded to 'understanding

of digital technology', 21 (36.84%) to 'use of digital technology', 5 (8.77%) to 'awareness, attitude and safety in digital technology', and 8 (14.04%) to 'digital thinking'. In the case of universities in Colombia, 13 out of 35 subjects (37.14%) corresponded to 'understanding of digital technology', 11 (31.43%) to 'use of digital technology', 5 (14.29%) to 'awareness, attitude and safety in digital technology', and 6 (17.14%) to 'digital thinking' (see table 5).

<Table 4> Digital literacy-related subjects in the LIS curriculum at universities in Colombia and Korea (2012-2022)

Year	Subjects' number (Korea)	Subject's name	Subjects' number (Colombia)	Subject's name
2012	29	<ul style="list-style-type: none"> ○Special problem of library information service ○Digital library theory ○Information ethics in the digital age ○Digital content ○Social Information studies ○Digital content theory ○Web system development ○Humanities content construction theory ○Information management theory ○Information technology and people ○Information literacy ○Information criticism ○Information user theory ○Information ethics ○Information user education theory 	24	<ul style="list-style-type: none"> ○Science, Technology and Social Studies (CTS) ○Semiotics ○Digital Document Expression of knowledge in digital systems ○Ethics ○User education ○Ethics and information ○Ethics ○Information users ○Ethics ○Expert systems and artificial intelligence ○Basics of information science ○Information and knowledge management ○Information and knowledge society

Year	Subjects' number (Korea)	Subject's name	Subjects' number (Colombia)	Subject's name
		<ul style="list-style-type: none"> ○Information user theory ○Information policy theory ○Information users' theory ○Public opinion on the provision of information research ○Textual information processing theory ○Information education theory ○Information Society theory ○Theory of the construction of the Semantic Web ○Information users research ○Patent information practice ○Introduction to information studies ○Digital content development theory ○Theory of Digital Library ○Digital library 		<ul style="list-style-type: none"> ○Information analysis and search ○Information architecture ○Information users ○Information rights ○Information users ○Transfer of information ○Sources of information ○Sources and resources of information ○Knowledge management ○Knowledge democratization plan
2013	27	<ul style="list-style-type: none"> ■ Added subjects ○Information Literature ○Social Network Service theory ○Metadata ■ Suspended subjects ○Information education theory ○Information Society theory ○Theory of the construction of the Semantic Web ○Introduction to information studies ○Digital content theory 	24	No change in DL subjects compared to 2012
2014	31	<ul style="list-style-type: none"> ■ Added subjects ○Analysis of data of social media ○Digital library creation theory ○Data curation and information ○Search of digital information 	24	No change in DL subjects compared to 2013
2015	35	<ul style="list-style-type: none"> ■ Added subjects ○Legal and patent information practice ○Understanding information behavior ○Understanding intellectual property rights ○Library service for vulnerable groups of knowledge information ○Understanding the information society ○Semantic web practice ■ Suspended subjects ○Information User Research ○Patent information practice ○Information user theory 	24	No change in DL subjects compared to 2014
2016	38	<ul style="list-style-type: none"> ■ Added subjects ○Information and communication technology ○Data mining practice ■ Reopening subject ○Introduction to information studies 	25	<ul style="list-style-type: none"> ■ Added subjects ○Database ○Telematics ○Information management ■ Suspended subjects ○Information and knowledge management

Year	Subjects' number (Korea)	Subject's name	Subjects' number (Colombia)	Subject's name
				<ul style="list-style-type: none"> ○ Knowledge democratization plan ■ Change in subject name Information rights ---> Information access rights
2017	38	<ul style="list-style-type: none"> ■ Added subjects ○ Visualization of information ■ Suspended subjects ○ Data mining practice 	29	<ul style="list-style-type: none"> ■ Added subjects ○ Information language, analysis and search ○ Information semiotics ○ Information user education ○ Expression of knowledge and information in digital systems
2018	37	<ul style="list-style-type: none"> ■ Added subjects ○ Visualization of data ○ Digital content development theory (Capstone Design) ○ Information resources and new media ■ Suspended subjects ○ Digital content development theory ○ Ubiquitous Information and Future Society ○ Understanding the information society ○ Digital library creation theory 	30	<ul style="list-style-type: none"> ■ Added subjects ○ Technological innovation
2019	36	<ul style="list-style-type: none"> ■ Added subject ○ Next generation system design theory ■ Suspended subjects ○ Introduction to information studies ○ Metadata theory 	30	No change in DL subjects compared to 2018
2020	36	<ul style="list-style-type: none"> ■ Added subject ○ Semantic web creation practice ■ Reopening subject ○ Metadata theory 	30	No change in DL subjects compared to 2019
2021	39	<ul style="list-style-type: none"> ■ Added subjects ○ Introduction to information case design ○ Overview of Data Science ○ Data curation ○ Digital curation ○ Analysis of social problems and data with R ■ Suspended subjects ○ Information literacy ○ Digital library 	30	<ul style="list-style-type: none"> ■ Added subjects ○ Semiotics and taxonomy ○ Information responsibility ○ Social use of information and knowledge ○ Intellectual property rights ■ Suspended subjects ○ Expressing digital system information and knowledge ○ Ethics and Information ○ Users ○ Expert systems and artificial intelligence
2022	40	<ul style="list-style-type: none"> ■ Added subject ○ Information structure design ■ Suspended subject ○ Introduction to Information case design ■ Reopening subject ○ Information literacy 	31	<ul style="list-style-type: none"> ■ Added subject ○ Fundamentals of Information Science ○ Science and technology policy ■ Suspended subject ○ Information management

Source: prepared by the author.

〈Table 5〉 Summary of digital literacy-related subjects in the LIS curriculum per digital literacy defined areas

Areas		Colombia	Korea
1. Area of 'Understanding of digital technology'	N	11	23
	K&I	Frequently used words for describing the subject's content were efficient information management, information production and management, social and digital environments, information interpretation, and knowledge representation and management. This indicates that the development of social "participation" skills is a key focus of the curriculum in the curriculum.	Frequently used words for describing the subject's content included metadata, natural language processing, information handling, information design, metadata creation and management, data management, text mining, and multimedia data management. These results indicate that Korean university LIS departments prioritize the development of technical skills as a key component of their curriculum.
2. Area of 'Use, share and collaboration of digital technology'	N	13	21
	K&I	Frequently used words for describing the subject's content were information provision, communication technology, computers and digital media, information integration, scientific data, social media, collaborative environments and social participation, information integration and utilization, and problem-solving facilitation. This indicates that LIS departments in Colombia treat social "participation" competencies as a key educational focus.	Frequently used words for describing the subject's content included legal information, cloud computing, the Internet of Things, intellectual property rights, the era of convergence, content creation, information security, data visualization technology, the digital content industry, and the implementation of digital technologies. These results demonstrate that Korean LIS departments prioritize the development of technical and "information literacy" competencies as key educational content.
3. Area of 'Awareness, attitude and safety in digital technology'	N	5	5
	K&I	Frequently used words for describing the subject's content were fair information processing, privacy protection, secure digital environments, social responsibility, ethical standards, inclusivity and data management, intellectual freedom, inclusivity and privacy, information literacy, social responsibility, and social responsibility regarding information. This indicates a reliance on the development of technical "social responsibility" competencies.	Frequently used words for describing the subject's content include appropriate use of social networks, personal information protection, ethical considerations, information ethics, information ethics in the digital age, codes of ethics, the information environment and intellectual property, access to knowledge/censorship, intellectual assets, and copyright law. These results demonstrate that Korean university LIS departments treat the development of technical and "information-related responsibility" competencies as a key educational focus.
4. Area of 'Digital thinking'	N	6	8
	K&I	Frequently used words for describing the subject's content identified the social dimension, social information connectivity, challenges of social media, barriers to information access, critical thinking, the skills gap, information equity and censorship, the right to information, the spread of misinformation, and the digital divide as the most frequently used terms, indicating that it also relies on the development of social 'action' competencies.	Frequently used words for describing the subject's content include cultural phenomena, the social construction of technology, information literacy, quality of life, changes in the information society, the knowledge-based society, the ubiquitous society, ubiquitous information, the flood of changing information, human-centered ICT environments, and factors of social inequality. These results demonstrate LIS departments treat the development of social "action" competencies as a key educational focus.

N: Number of Digital Literacy subjects, K&I: Keywords & Implications

5. Discussion

Traditional literacy refers to the combination of reading, writing, and mathematics skills. In today's quickly information-rich changing world, literacy is defined as the ability to identify, analyze, understand, interpret, generate, and communicate information and digital content. Literacy is a continuum of learning and proficiency in reading, writing and using numbers throughout life and is part of a larger set of skills, which include digital skills, media literacy, education for sustainable development and global citizenship as well as job-specific skills (UNESCO, 2024).

Researchers have provided a deep definition of the concept of digital literacy in various ways, but it is generally defined as the synthesis of ICT, information, visual, and multimedia literacy (Bawden, 2001; Cha Hyunjin & Lee Gayoung, 2025; Eshet-Alkalai, 2004; Jolls, 2008; Martin, 2006). Nowadays, digital literacy includes the ability to use digital tools and the understanding of different types of information in a digital environment, it also emphasizes the use of critical thinking and evaluation of information, including attitudes, values, problem-solving skills, ethical dilemmas, communication, collaboration, and civic participation (Law et al., 2018; OECD, 2019; Park Juhyeon, 2018).

Considering the broader scope of the digital literacy concept, this study examined the differences in digital literacy-related subjects in universities in Colombia and Korea.

First, there is a difference in the ratio of digital

literacy-related subjects between the curricula. In the case of universities in Korea, 57 out of 350 subjects were related to digital literacy content, this meant about 17% of the LIS curriculum has digital literacy-related subjects. In the case of universities in Colombia, 35 out of 343 subjects were identified as digital literacy-related subjects, therefore the ratio of digital literacy-related subjects in the LIS curricula decreased to 9%.

Second, LIS curriculum at universities in Colombia and Korea differs in the perspective of 'Understanding of digital technology'. For Colombian universities digital literacy-related subjects focus on participatory or social skills, but in the case of Korean universities they seem be centered on digital skills and possibilities in the digital age. For the area of 'Use, share and collaboration of digital technology' the analysis found that in Colombian universities, digital literacy-related subjects value social skills, while the content of these subjects in universities in Korea seems to value technological skills.

Third, in 'Awareness, attitude and safety in digital technology', the content of digital literacy-related subjects in the LIS curriculum of universities in Colombia and Korea focuses on technological skills and information responsibility. However, digital literacy-related subjects' content in Korean universities approached with a broader perspective on digital literacy concept. And, for 'Digital thinking', the content of digital literacy-related subjects in the LIS curriculum of universities in Colombia and Korea emphasizes behavioral and social ability in the digital age.

Fourth, the use of project mapping by universities as the final stage of the analytical workflow pretends to give an interpretive perspective that exposes the pedagogical approaches of the LIS curricula in Colombia and Korea Universities. While the initial text queries provided isolated, quantitative fragments of data for analysis understand as the keyword counts, the relational networks materialized in project mapping reveal how these concepts are structurally related, clustered, and expressed within their respective academic and social ecosystems.

6. Implications

In Colombian universities case, this study found that due to less updated subjects, students in LIS departments may lack competitiveness in adapting to the changing digital environment compared to other disciplines like data science and engineering. Also, students from these departments may be less prepared to seize opportunities in the field of Library Science, like big data management or artificial intelligence applications in libraries. Thus, adopting a more IT-centered, practical, and technical approach to the digital literacy content within the LIS education can develop and improve the understand of digital technology in Library Science and contribute to establish a digital literacy education and innovation in Colombian LIS education.

In the case of universities in Korea, digital literacy subjects were constantly updated and reviewed around digital technology use, understanding and

application skills. Providing LIS students with more opportunities related to digital literacy education, leading to a better development of the ability to quickly adapt to changes in the digital environment, new information needs, digital competencies, innovative thinking and job-needed skills.

7. Conclusion

This study explored the status of digital literacy-related subjects within the LIS curricula in universities in Colombia and Korea and analyzed the differences to obtain implications for improvement of the digital literacy contents in the LIS curricula at universities in Colombia.

A key finding of this research is the differences in the contents of the digital literacy subjects between the LIS curricula at universities in Colombia and Korea. In Colombian LIS curricula the contents were centered on efficient information management, social and digital environments, information interpretation, knowledge management, information provision, scientific data, social media and social participation. In Korean LIS curricula, the contents were centered on metadata, natural language processing, information processing, information design, big data management, text mining, cloud computing, IoT and IT convergence.

Also, librarians have the responsibility for improving citizens' digital literacy abilities. In this regard, digital education in LIS curricula at universities in Korea focused on the use and functional improvement of digital tools, while digital education in LIS curricu-

la at universities in Colombia focused on social participation through digital technology.

With the widespread adoption of digital technology, the methods librarians use to enhance citizens' information literacy are changing. In the past, searching for information in databases required extensive learning, but now, information retrieval has become much easier through the web, apps, and AI. Therefore, librarians need to possess not only information literacy but also digital literacy to improve citizens' access to both information and digital skills. In response to these technological and societal changes, Korea is modifying its curriculum to ensure librarians acquire digital literacy. Just as Korea is undergoing changes in LIS, Colombia also needs to incorporate

digital literacy into its curriculum to enhance the digital literacy of prospective librarians.

Although this study analyzed the Korean literature and informatics curriculum until 2022, these findings provide a basic data in a lack of research stage for the improvement of digital literacy education in LIS curricula in Colombian universities and contribute to suggest future pathways in LIS digital literacy education research for Latin American complex digital society context.

To promote the development of the Department of LIS in Colombia University and to strengthen the capabilities of Colombian librarians, further research should be conducted on Korea's librarian qualification system and librarian training process.

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