Trends in Graduate Education for Library and Information Science Abroad in the Era of Big Data and Artificial Intelligence: Postprint

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Abstract

[Purpose/Significance] Through analyzing graduate talent cultivation models in Library and Information Science (LIS) programs at foreign universities, this study aims to promote transformation in talent cultivation paradigms for LIS education in Chinese universities, thereby meeting enterprise talent demands in the big data and artificial intelligence era.

[Method/Process] Utilizing research methods of web-based investigation, literature collection, and comparative analysis, this study selected ten U.S. universities from the iSchools alliance as research samples. It examined their theoretical curriculum frameworks, practical teaching components, and talent cultivation models. Addressing talent demands for LIS disciplines in the artificial intelligence context, the study proposes recommendations for graduate talent cultivation in Chinese LIS programs to advance educational reforms in China's LIS discipline.

[Results/Conclusion] Under the precondition of meeting societal demands, emphasizing the cultivation of graduate students' data literacy competencies, interdisciplinary integration capabilities, and the capacity to integrate theory with practice constitutes the future trend in graduate talent cultivation for the LIS discipline.

Full Text

Preamble

Research on Development Trends of Graduate Talent Cultivation in Foreign Library and Information Science Programs Under the Background of Big Data and Artificial Intelligence

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Abstract

[**Purpose/Significance**] By analyzing graduate talent cultivation models in foreign library and information science (LIS) programs, this study aims to promote transformation in talent cultivation models for Chinese LIS education to meet enterprise demands in the era of big data and artificial intelligence. [**Method/Process**] Using online investigation, literature collection, and comparative analysis, this research selected 10 American universities from the iSchools Alliance as study samples to examine and analyze their theoretical curriculum systems, practical teaching components, and talent cultivation models. Based on talent demands for LIS disciplines in the AI context, the study proposes recommendations for graduate talent cultivation in Chinese LIS programs to promote educational reform in the discipline. [**Result/Conclusion**] Under the premise of meeting social demands, the future trend of graduate talent cultivation in LIS should focus on developing students' data literacy capabilities, interdisciplinary integration abilities, and the capacity to combine theory with practice.

Keywords: big data; artificial intelligence; library and information science; talent cultivation; development trends

1. Introduction

The fourth industrial revolution is approaching, and big data and artificial intelligence have gradually transitioned from science fiction to reality. McKinsey predicted that in 2018, the United States would need 140,000-190,000 deep data analysis experts and 1.5 million data managers. With big data and AI permeating all aspects of social production and life, this forecast has become reality, with industries urgently demanding talent in these fields. To cultivate professionals with relevant expertise for various social sectors, foreign universities have begun establishing AI schools, adding majors in big data management and applications, revising talent cultivation plans, and reforming curriculum systems from different disciplinary perspectives. Therefore, how to cultivate high-level professional talent to meet the demands for LIS professionals in the big data and AI era has become a new issue requiring urgent attention in Chinese LIS education.

Current research both domestically and internationally has examined the transformation of LIS talent cultivation models under the background of big data and AI. L. Si et al. conducted reform research on data literacy courses in LIS curricula based on market demand for data science talent [1]. V. Ortiz-Repiso et al. performed cross-institutional analysis of data science-related courses in American iSchools, discussing the impact of data-driven environments on the

iSchool community and finding that information science schools emphasize the cultivation of data science and big data analysis literacy, gradually transitioning toward interdisciplinary data literacy competency development by adding data management courses [2]. M. Landon-Murray discussed the application and challenges of big data in the intelligence field, analyzed the nature of work for data scientists in the intelligence community, and examined disciplinary system reforms in intelligence studies according to the era's demands [3]. J. Bronstein surveyed staff at libraries and information centers in different countries to understand industry demands for professional skills and competency types among LIS graduates [4].

Domestic research has primarily focused on curriculum characteristics, curriculum system transformation, and concept changes in intelligence talent cultivation under new era backgrounds. Su Xinning et al. [5-6] analyzed opportunities and challenges for intelligence studies in the big data era, proposed ideas for theoretical reconstruction, defined core issues in intelligence studies, and re-examined the match between intelligence education and intelligence work. Cao Shujin et al. [7] systematically investigated graduate education curricula related to big data in iSchools across Europe, America, and the Asia-Pacific region. Huang Ruhua et al. [8] compared concepts of information literacy and data literacy, analyzing data literacy cultivation models. Si Li investigated the number, content, and characteristics of big data courses in American iSchools [9]. Drawing on the "Excellent Engineer Education and Training Program," some scholars proposed ideas for cultivating intelligence engineers in the big data era [10].

Existing research shows that foreign scholars have recognized the necessity of transforming LIS talent cultivation models in the big data era, focusing on analyzing curriculum content and teaching model adjustments in iSchools. Domestic scholars have primarily conducted comparative studies on specific aspects or components of iSchools talent cultivation. However, relatively few studies have analyzed iSchools members' curriculum systems in the context of big data and AI, or examined graduate talent cultivation methods from the perspective of real social development demands. This study addresses three questions: (1) What are the real social demands for LIS talent cultivation in the big data and AI era? (2) How do iSchools Alliance members construct corresponding curriculum systems and practical components under this background? (3) How should Chinese LIS disciplines promote high-level talent cultivation work under big data and AI?

2. Talent Demand for LIS Disciplines in the AI Era

2.1 Sample Acquisition and Research Methods

Based on position keywords from graduate employment introductions on official websites of foreign iSchools LIS programs and two industry reports from the China Academy of Information and Communications Technology (CAICT)—

"Analysis of AI Development Paths of Internet Technology Giants" [11] and "2018 World AI Industry Development Blue Book" [12]—this study selected 20 American AI enterprises for data collection and analyzed their talent demands for LIS disciplines. The talent demand situation is shown in Table 1 .

Through online investigation, the researchers collected and organized job positions related to the LIS field from these enterprises. Positions were categorized into three types: technical support, product operations, and management support. As shown in Table 1, in the development of big data and AI industries, the LIS discipline has cultivated irreplaceable professionals with unique data literacy capabilities. Enterprise demands for LIS talent concentrate primarily on technical positions, with fewer product operations or management support roles. Companies like Google DeepMind and Microsoft provide no management support positions, focusing mainly on technical staff needs.

2.2 Position Demands from AI Industry

Technical Support Positions: The 20 enterprises primarily sought talent for data collection, processing, and analysis. Every surveyed AI company required data analysts and data scientists. Some enterprises emphasized statistical analysis capabilities, such as Apple Siri's natural language processing research engineer, senior data scientist, and senior data organization engineer positions; SoundHound's analysis engineer; and H2O.AI's customer data scientist positions. From these industry demands, LIS talent should possess strong data processing and analysis capabilities as the foundation for working in big data and AI-related industries.

Product Operations Positions: Enterprises focus on user product acceptance and usage effectiveness, establishing specialized analysis teams to collect and analyze user feedback for timely product improvements. For example, H2O.AI established a senior user experience designer position responsible for developing and optimizing evaluation standards to meet dynamic assessment needs for new products while evaluating data to enhance user experience. Amazon Alexa established a business analyst position to collect and manage performance data from multiple sources, present operational data and analysis results at relevant meetings, and provide improvement measures for existing products and services based on user feedback.

Management Support Positions: Enterprises set different management support positions according to their needs. Amazon Alexa established an information governance manager; IBM established information security expert/advisor/manager positions; and Clarifai established customer success manager and account manager positions to assist product operations through customer service management and control, strengthen information construction, improve overall administrative efficiency, and enhance corporate and departmental image.

2.3 Competency Demands for LIS Talent

Enterprise talent demand descriptions include detailed explanations of position roles, job responsibilities, and qualification requirements. Analysis reveals that competency demands focus on three aspects.

2.3.1 Educational Requirements: Educational requirements are divided into basic qualifications and preferred qualifications. Positions listed in Table 1 require a master's degree in relevant fields as basic qualifications, while preferred qualifications include a doctorate in the field or related technical areas. Enterprises no longer seek merely professional knowledge backgrounds but specialized depth in relevant technologies. Master's education in LIS should not cultivate simple information data collectors but rather specialized and comprehensive technical talent with high-level professional competencies.

2.3.2 Professional Skill Demands: Professional skill demands concentrate on theoretical and practical professional skills. Theoretical skills include information collection, data processing, and programming capabilities. Practical professional skills have become mandatory requirements. For data analysts, data engineers, and data center technicians, candidates must be proficient in database queries and programming; capable of using Python, Go, or SQL to analyze datasets; possess database editing, management, and updating capabilities; be able to read scripting languages and analyze/modify program scripts; and master statistical analysis methods and tools such as regression analysis, cluster analysis, and statistical testing.

Practical experience and capabilities are also strictly required, with practical experience in technical fields becoming a necessary option in virtually every position description. For example, Amazon's senior data assistant position requires over one year of work experience; data engineers require more than three years of relevant experience in analytics, data engineering, business intelligence, or related fields, or over two years of experience implementing big data processing technologies. Microsoft's data center technician position requires at least two years of experience supporting IT equipment or related technologies; service engineers (such as data engineers) require over five years of professional software design and development experience and over five years of client-facing or project management experience.

2.3.3 Additional Skill Demands: Position descriptions reveal demands beyond professional skills, particularly in preferred qualifications, demonstrating that enterprises seek diverse rather than singular skill sets. Additional skill assessment is becoming an important talent screening component. Future LIS education should cultivate talent with multi-domain knowledge backgrounds, multilingual capabilities, report writing skills, communication abilities, analytical skills, and teamwork capabilities.

Multi-domain knowledge background demands arise from the expanding applications of big data and AI in daily life. While AI enterprises initially focused on

voice assistant and AI product development, mature products now apply to diverse fields including intelligent voice assistant phones, smart cars and intelligent transportation, and personalized education tutoring. Consequently, demands for multi-domain background knowledge have emerged. For example, Google's information governance manager position requires legislative background knowledge about health records, human rights, and equality; its data analyst position requires healthcare domain knowledge; and Wealthfront's senior applied scientist and senior data scientist positions require financial domain knowledge.

Enterprises also emphasize report writing and communication skills, requiring employees to interpret product expertise for both technical and non-technical audiences. For instance, Google's information governance manager and data analyst positions require high-level written and communication skills; Betterment's data analyst and Amazon Alexa's knowledge engineer positions require excellent presentation skills, including PowerPoint development and oral presentation capabilities.

3. Current Status of High-Level Talent Cultivation in Foreign LIS Disciplines

3.1 Sample Selection and Research Methods

Based on the U.S. News & World Report rankings of American library and information science schools, 15 universities were initially selected as sample schools. After investigating LIS discipline construction information, some schools lacked comprehensive curriculum data for comparison, leading to sample screening. The final 10 selected universities were: University of Illinois Urbana-Champaign, University of Washington, University of North Carolina at Chapel Hill, Syracuse University, University of Michigan-Ann Arbor, University of Texas at Austin, Rutgers University-New Brunswick, University of Maryland, Indiana University-Bloomington, and University of Pittsburgh.

This study employed online investigation, literature analysis, and comparative analysis to examine talent cultivation models. First, official websites were browsed to collect information on three aspects: theoretical curriculum system construction, practical teaching component construction, and education model settings in foreign LIS graduate programs. Second, domestic and international literature on LIS talent cultivation models and curriculum systems was analyzed to understand current research status and development trends.

3.2 Theoretical Curriculum System of iSchools Alliance

3.2.1 Large Total Course Volume: iSchools universities offer a large total number of LIS courses, providing diverse and varied elective courses. As shown in Table 2 , among the top ten LIS schools in U.S. News & World Report rankings, only Syracuse University and University of Pittsburgh have fewer than 100 total courses, while the rest exceed 100 courses (including doctoral

courses). The University of Illinois Urbana-Champaign and Rutgers University-New Brunswick even exceed 200 courses, with 329 and 207 respectively. Compared with 2013 statistics, total course offerings have increased to varying degrees. Elective courses account for over 90% of total courses—for example, the University of Illinois Urbana-Champaign offers 329 elective courses with only two required courses: Information Organization and Access, and Libraries, Information and Society. The University of North Carolina's SILS school offers 140 elective courses, with electives comprising 92% of the total.

In recent years, iSchools have increasingly emphasized curriculum diversity and comprehensiveness, providing graduate students with rich, broad, and varied elective courses. Each graduate can develop personalized study plans based on credit requirements and personal interests, emphasizing diversity and specialization in graduate cultivation.

3.2.2 Diverse Course Categories: iSchools universities offer diverse LIS course categories. Beyond professional competency cultivation and core courses such as information foundation and information resources, they also offer courses addressing social hotspots. For example, the University of Illinois Urbana-Champaign [15] offers not only data science courses like Data Science Basics, Data Science Fundamentals, and Advanced Data Science, but also real-time courses related to social hotspots such as Global Health Informatics and Bioinformatics Issues and Research.

Scholars have conducted multiple investigations into course type classifications in foreign iSchools LIS programs. For instance, Si Li [14] divided courses across multiple iSchools into 12 categories: information theory and methodology, information technology support, information organization and analysis, information retrieval and preservation, information resources and services, information institution management, information policy and regulation, information education and careers, competency development, interdisciplinary information applications, seminars/self-directed learning, and internships/practice. Wang Xiwei et al. [16] divided iSchools curricula into seven modules: information foundation, information resources, information technology, information organization, information services, information management, and other courses. Syracuse University, University of Pittsburgh, and University of Washington also categorize courses into major groups—for example, University of Washington [17] divides professional courses into six core areas: data, development, design, discovery, ethics, and organization. Although classification results vary among scholars, all reflect curriculum diversity and richness. iSchools emphasize both professional competency cultivation and connecting current events and social focus points to update graduate course content in real-time, cultivating high-level technical talent adapted to contemporary trends.

3.2.3 Real-Time Curriculum Updates: Foreign iSchools LIS graduate curricula are not only abundant in quantity and diverse in types but also timely and practical. Based on big data and AI development trends, iSchools have rapidly adjusted by adding numerous relevant courses in the past two years, as

shown in Table 3 .

The analysis of big data and AI-related courses in foreign iSchools LIS programs reveals that big data course offerings have matured with numerous and systematic course types. AI-related course offerings remain in the exploratory construction phase. Most universities have recognized the necessity of introducing AI courses into current curricula. Among the ten surveyed universities, data science methods [15], data science introduction [17], data mining, big data analysis [18], data visualization, and data management analysis courses were added to meet industry demands for data analysis and management capabilities. AI-related additions include conceptual popularization courses such as cloud computing introduction, machine learning concepts, neural network introduction, and AI introduction, as well as technical application courses like machine learning applications, deep learning systems, and machine learning signal processing. Currently, foreign universities emphasize general education on AI theories, with relatively fewer technical application courses.

3.3 Practical Teaching Components in iSchools Alliance

3.3.1 Integration of Practical Courses into Teaching Plans: The concept of practical teaching is fully embodied in foreign iSchools LIS talent cultivation. Official course descriptions show practical courses as a separate category occupying a certain proportion of credits. Different schools have different requirements—some count practical courses as required credits that students must complete according to cultivation plans, emphasizing that practice is a degree requirement. Others count practical credits as elective credits in teaching plans. Compared with theoretical courses, practical courses lack flexibility and selectivity, representing mandatory completion items. Theoretical talent is no longer what society demands; practical skills have become essential competencies for high-level talent.

For example, University of Washington offers a Directed Fieldwork course, historically one of iSchools' most popular electives. Students gain practical experience through entry-level professional tasks and projects in library or information science environments. Syracuse University requires at least three practical credits to obtain the LIS degree, offering different off-campus internships and information research internships for different degree programs. Internships include 150 hours of fieldwork, which can be completed domestically or internationally, but must be supervised by professional librarians or information managers. Most internships involve specific research directions in certain fields or special projects conducted by companies.

3.3.2 Master's Level Practical Teaching: Master's practical teaching primarily involves integrating research and teaching by involving master's students in research projects, through which students gradually acquire practical skills. Some universities arrange for students to participate in library and information literacy teaching programs to cultivate practical abilities, or conduct practi-

cal teaching based on research topics while requiring students to select courses related to their participation. American information schools highly advocate classroom experiments as a practical teaching method, with courses containing experiments accounting for 20%-50% of offerings, actively encouraging student participation. Project-based approaches attract student participation in practice, cultivating abilities through data collection, topic data analysis, experimental surveys, and other components. Syracuse University provides multiple practical models where students can voluntarily choose cooperative teams to conduct project research with libraries or information centers, developing personal practical abilities while advancing research.

3.3.3 Doctoral Level Practical Teaching: Doctoral talent cultivation models differ little from master's models in practical teaching approaches but vary significantly in key courses and practical content. American universities emphasize learning LIS-related disciplines in key course settings, stressing the enhancement of interdisciplinary research and application abilities. Investigations found few specific descriptions of doctoral practical ability cultivation in foreign iSchools, typically providing doctoral training module compositions for applicants to complete through elective project types. Seminar components represent a unique aspect of doctoral talent cultivation in iSchools, crucial for enhancing doctoral students' scientific research abilities, professional literacy, and presentation skills.

3.4 Education Models of iSchools Alliance

3.4.1 Independent Cultivation: Independent cultivation is the traditional education model in foreign iSchools LIS talent cultivation, where schools independently undertake all training tasks. This remains the main component of iSchools education models but not the only one. With rapid big data and AI industry development, iSchools have recognized that single-discipline talent cannot meet enterprise demands for high-skilled and composite talent. Therefore, in recent years, iSchools have gradually transformed cultivation models by adding types including joint cultivation and career-oriented cultivation.

3.4.2 Joint Cultivation: Joint cultivation involves schools and other institutions jointly undertaking student training tasks. In LIS, this means acquiring and applying professional knowledge while using LIS techniques to obtain and apply information from other fields. Joint cultivation models mainly have three forms:

(1) **Inter-college joint cultivation within universities:** Specific cultivation plans produce interdisciplinary fusion talent possessing both LIS information analysis/processing capabilities and other professional backgrounds. For example, University of Maryland's College of Information Studies offers a History/Library Science (joint program) jointly undertaken with the History Department, providing professional courses and knowledge backgrounds from both colleges to cultivate interdisciplinary

talent with multi-disciplinary backgrounds. Syracuse University's School of Information offers an e-government management and leadership advanced studies program in collaboration with the College of Citizenship and Public Affairs, establishing a 12-credit cross-disciplinary graduate cultivation curriculum.

(2) **Inter-university joint cultivation among iSchools:** Most foreign iSchools provide inter-university exchange programs for graduate students, deepening understanding of relevant professional knowledge and broadening perspectives on the LIS field. For example, University of Illinois' School of Library and Information Science and University of Tennessee's School of Information Sciences Knoxville cooperate with the world-renowned National Center for Atmospheric Research to offer the Data Curation Education in Research Centers (DCERC) program, enabling students to learn advanced data management and practice methods. Syracuse University's School of Information also provides diverse inter-university exchange programs, allowing students to spend one or more semesters overseas at partner institutions including the IT University of Copenhagen, Singapore Management University, and Sungkyunkwan University in South Korea.

(3) **University-enterprise joint cultivation:** This model transforms theoretical knowledge into professional competency through highly relevant work environments, simplifying the transition from university to enterprise and enabling talent to identify technical shortcomings for targeted learning. In University of Illinois' community engagement courses, the school cooperates with relevant organizations to provide opportunities for students to visit library communities, exploring work patterns and user service models of information professionals in libraries and other environments.

3.4.3 Career-Oriented Cultivation: Foreign iSchools highly value talent contributions to society and commit to cultivating discipline-career matching talent. iSchools websites indispensably introduce employment prospects for the discipline, allowing prospective students to preview main skills graduates obtain and knowledge domains they can apply. For example, University of Illinois Urbana-Champaign [23] provides main skills and knowledge domains of 2017 MS/LIS graduates on its LIS program homepage; Syracuse University [24] introduces key application areas of the discipline on its LIS master's program homepage, recommending different courses for different fields—such as data mining, data management concepts, database management, metadata, and information visualization for students aspiring to become data librarians. University of Washington [25] groups courses by specific career directions on its program homepage, dividing them into data science, human-computer interaction, information architecture, and information assurance/cybersecurity, allowing students to select courses from corresponding groups based on career preferences to deepen professional skills in specific fields.

4. Analysis of Graduate Talent Cultivation Trends in LIS

4.1 Curriculum System Development in LIS Under Big Data and AI Background

The rise of big data and AI industries has brought interdisciplinary talent demands. Leading international AI enterprises like Facebook, Google, and Amazon are globally recruiting AI talent. Consequently, LIS disciplines should seize this historical opportunity, conduct educational reforms according to industry demands, deliver needed talent to enterprises, create distinctive talent cultivation features, and establish the discipline's important position in social development.

Current LIS curriculum systems domestically and internationally have improved in response to big data and AI demands. Wang Shiwei et al. [27] discussed innovative transformation issues for LIS talent cultivation in the data-driven era, proposing reform suggestions for cultivating big data leaders, excellent engineers, and innovation teams. Li Yang et al. [28] discussed intelligence studies' research objects, disciplinary positioning, and goals, arguing that future intelligence system construction should transform with the big data era background. Su Xinning et al. [29] proposed establishing a "Grand Intelligence Concept" theoretical system where LIS research objects should encompass data science capabilities and machine language learning capabilities, constructing a grand intelligence curriculum concept including big data and AI characteristics.

4.2 Emphasizing Data Literacy Cultivation in LIS Curriculum Systems

In the rapid development context of big data and AI, enterprises increasingly focus on technical personnel's data processing capabilities, including data analysis, processing, and database management. Data literacy capabilities are becoming increasingly important. Data literacy extends from information literacy in the big data context, focusing on analyzing and extracting data elements from information, mainly comprising data awareness, data capability, and data ethics [7].

Data literacy cultivation is essential for LIS disciplines responding to the big data and AI era. Wang Xiwei et al. [30] compared information literacy cultivation models between Chinese and American universities in big data environments, providing references for Chinese universities. Si Li et al. [13] conducted online investigations of data literacy course offerings in 38 iSchools, analyzing their content and settings. Foreign iSchools have recognized the importance of data literacy capabilities in big data and AI environments, improving course content in recent years by adding numerous data capability cultivation courses. However, domestic big data curriculum system adjustments have been slow, urgently requiring educational reforms. The primary step in perfecting LIS graduate talent cultivation curriculum systems is adding data literacy courses.

4.3 Emphasizing Interdisciplinary, Multi-Domain, and Diversified Talent Cultivation

Deep analysis of AI enterprise position descriptions reveals that interdisciplinary talent has become competitively sought-after across social sectors. Healthcare and financial expertise are highly demanded. Beyond basic requirements, enterprises prefer LIS graduate talent with interdisciplinary backgrounds in economics, management, healthcare, and computer science. Additionally, strengthening case studies and group discussions in theoretical learning cultivates innovation and critical thinking abilities, enlivening classroom atmosphere to improve knowledge comprehension and enhance student initiative and creativity. In this regard, foreign iSchools' graduate talent cultivation models are relatively mature and worthy of reference.

Foreign iSchools cultivate interdisciplinary knowledge and skills through joint cultivation models, producing fusion talent. Chinese universities can draw on iSchools' joint cultivation models by establishing inter-college joint programs within universities to cultivate multi-disciplinary composite talent, and providing domestic and international university exchange opportunities for multi-domain cultivation. University-enterprise cooperation helps talent understand future work models and research directions, identify technical shortcomings, and conduct targeted learning or training to become specialized talent needed by enterprises.

4.4 Emphasizing Theory-Practice Integration in LIS Talent Cultivation

Enterprise recruitment information analysis reveals that enterprises focus more on talent's information and data analysis capabilities, demonstrating demands for LIS graduate professional technical abilities. For professional technical practice capabilities, enterprises mainly examine two aspects: first, graduates must produce research achievements during their studies; second, candidates must have internship experience and work experience in the field. Statistics show nearly 100% of positions require internship or work experience, highlighting the importance of practical components.

Foreign iSchools highly emphasize practical components, stressing that practice is a degree requirement. Wang Xiwei et al. [30] analyzed characteristics and differences in theoretical and practical curriculum systems between Chinese and American LIS programs in the big data era, providing excellent cases for domestic LIS practical teaching system construction. Chinese universities insufficiently implement practical teaching components, leaning more toward basic theoretical learning and research. However, current industry situations demand renewed emphasis on practical components in graduate talent cultivation to bridge the gap between university-trained graduate abilities and enterprise demands, ultimately cultivating innovative LIS talent suited to era development.

Conclusion

The rapid development of big data and AI industries brings new opportunities and challenges to LIS education. Society's demands for LIS professionals are increasing—merely possessing solid professional knowledge can no longer satisfy social needs. This requires Chinese LIS disciplines to promptly adjust talent cultivation goals, scientifically design curriculum systems and practical components according to social development, and re-examine theoretical curriculum systems in LIS talent cultivation with emphasis on practical teaching components and talent cultivation.

This study began with enterprise position and competency demands in the big data and AI era, clarifying real social development needs. Based on this foundation, it analyzed theoretical curriculum systems, practical teaching components, and talent cultivation models of foreign iSchools Alliance members, proposing that Chinese LIS talent cultivation should strengthen graduate data literacy capabilities, interdisciplinary integration abilities, and theory-practice integration. This study did not investigate and compare representative Chinese LIS programs, which will be expanded in future research to conduct more in-depth analysis combining Chinese LIS development realities and social/industrial demands.

References

[1] SI L, ZHUANG X, XING W, et al. The cultivation of scientific data specialists: development of LIS education oriented to e-science service requirements[J]. Library hi tech, 2013, 31(4): 700-724.

[2] ORTIZ-REPISO V, GREENBURG J, CALZADA-PRADO J. A cross-institutional analysis of data-related curricula in information science programmes: a focused look at the iSchools[J]. Journal of information science, 2018, 44(6): 768-784.

[3] LANDON-MURRAY M. Big data and intelligence: applications, human capital, and education[J]. Journal of strategic security, 2016, 9(2): 92-121.

[4] BRONSTEIN J. An exploration of the library and information science professional skills and personal competencies: an Israeli perspective[J]. Library & information science research, 2015, 37(2): 130-138.

[5] Su Xinning. Reflections on the Rise of Intelligence Science in the Big Data Era[J]. Journal of the China Society for Scientific and Technical Information, 2018, 37(5): 451-459.

[6] Yang Guoli, Su Xinning. Toward Intelligence-Oriented Modern Intelligence Science[J]. Journal of the China Society for Scientific and Technical Information, 2018, 37(5): 460-466.

[7] Cao Shujin, Wang Zhihong, Liu Huiyun. On Library and Information Science Education in the Big Data Era: Based on Investigation and Reflection

on “Big Data” Related Courses in iSchools[J]. Information Studies: Theory & Application, 2017, 40(12): 17-22.

[8] Huang Ruhua, Li Baiyang. Data Literacy Education: An Extension of Information Literacy Education in the Big Data Era[J]. Library & Information, 2015(6): 84-91.

[9] Si Li, He Yi. Analysis of Big Data Related Curriculum and Characteristics in iSchools[J]. Library and Information Service, 2016, 60(1): 12-18, 25.

[10] Zhang Jianian. The Competency Structure and Training Model of Intelligence Engineers in Big Data Environments[J]. Document, Information & Knowledge, 2016(1): 21-29.

[11] China Academy of Information and Communications Technology (CAICT). Analysis of AI Development Paths of Internet Technology Giants (2018)[EB/OL]. [2018-08-07]. http://www.caict.ac.cn/kxyj/caictgd/201808/t20180807_{181398}.html.

[12] China Academy of Information and Communications Technology (CAICT). 2018 World AI Industry Development Blue Book[EB/OL]. [2018-09-18]. http://www.caict.ac.cn/kxyj/qwfb/bps/201809/t20180918_{185384}.html.

[13] Si Li, Yao Ruifei. Analysis of Data Literacy Curriculum and Characteristics for Graduate Students in Library and Information Science: Based on a Survey of iSchool Alliance Institutions[J]. Library & Information, 2018(1): 28-36, 101.

[14] Si Li, Wang Simin. Investigation and Analysis of Curriculum and Competency Development in American iSchools[J]. Journal of Academic Libraries, 2014, 32(1): 102-109.

[15] University of Illinois Urbana-Champaign. Course Explorer[EB/OL]. [2018-08-11]. https://courses.illinois.edu/.

[16] Wang Xiwei, Guo Yu, Shi Jing, et al. A Comparative Study of Graduate Curriculum Systems in Library and Information Science between China and the United States in the Context of Big Data[J]. Library and Information Service, 2015, 59(23): 30-37.

[17] University of Washington. UW Tacoma Course Descriptions[EB/OL]. [2018-08-11]. https://www.washington.edu/students/crscat/lis.html.

[18] Syracuse University. Course Catalog[EB/OL]. [2018-08-11]. https://www.syracuse.edu/.

[19] University of Maryland. The Graduate School[EB/OL]. [2018-08-11]. https://gradschool.umd.edu/information-studies/hils.

[20] Syracuse University. School of Information Studies[EB/OL]. [2018-08-11]. http://ischool.syr.edu/egov.

[21] University of Illinois Urbana-Champaign. DCERC program gives students hands-on experience at National Center for Atmospheric Research[EB/OL]. [2018-08-11]. https://ischool.illinois.edu/.

[22] Syracuse University. global experience[EB/OL]. [2018-08-11]. https://ischool.syr.edu/academics/experienti learning/global-experience/.

[23] University of Illinois Urbana-Champaign. School of information sciences[EB/OL]. [2018-08-11]. https://ischool.illinois.edu/degrees-programs/ms-library-and-information-science.

[24] Syracuse University. School of Information Studies[EB/OL]. [2018-08-11]. https://ischool.syr.edu/academics/graduate/masters-degrees/ms-library-and-information-science/.

[25] University of Washington. Information School[EB/OL]. [2018-08-11]. https://ischool.uw.edu/programs/mlis.

[26] Hu Renfeng. The Tacit Knowledge Sharing Mechanism in Industry-University-Research Collaborative Innovation[M]. Beijing: Guangming Daily Press, 2017.

[27] Wang Shiwei. Characteristics of the Data-Driven Era and Innovative Transformation of Library and Information Science Education[J]. Document, Information & Knowledge, 2016(1): 15-20.

[28] Li Yang, Li Gang. Reform and Development of China's Intelligence Science: "Aggressive" Thinking, Paradigm Evolution, and System Construction[J]. Library and Information Service, 2016, 60(22): 5-11.

[29] Su Xinning. The Return of Intelligence Science and Intelligence Work in the Big Data Era[J]. Journal of the China Society for Scientific and Technical Information, 2017, 36(4): 331-337.

[30] Wang Xiwei, Zhang Changliang, Cai Jiaming, et al. A Comparative Study of Information Literacy Training Models in Chinese and American Universities Under Big Data Environments[J]. Library and Information Service, 2016, 60(11): 29-35.

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Wang Xiwei: Responsible for main content writing and paper revision;
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Research on the Development Trend of Graduate Cultivation in Library and Information Science in Foreign Schools Under the Background of Big Data and Artificial Intelligence

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Abstract: [Purpose/significance] This paper aims to provide guidance for Chinese universities to transfer the talent cultivation model in order to satisfy the demand of enterprises in the era of big data and artificial intelligence. [Method/process] With online investigation, literature collection and comparative analysis, 10 American universities in the iSchools union were selected as samples. This paper studied and analyzed the theoretical curriculum system, practice education and talent cultivation model of foreign iSchools members and put forward some suggestions on graduate training model in our country, to promote the reform in our library and information science education. [Result/conclusion] In order to satisfy the social demand, it is the trend to pay attention to the ability of data literacy, the ability of subject fusion and the ability of combining theory with practice in LIS education.

Keywords: big data; artificial intelligence; library and information science; talent cultivation; development trend

2019 Topics for *Library and Information Service*

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Note: Figure translations are in progress. See original paper for figures.