Curriculum Development of Library and Information Science Study Program in 4.0 Industrial Revolution Era

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ABSTRACT
The existence of the Library and Information Science Study Program is expected to be able to meet the need for library professionals, who are can answer the challenges of librarian competence in 4.0. industrial revolution era. The curriculum is expected to meet the needs of librarians for the government, private sector, and society in the current era of information and openness. This study aims to see the feasibility of the curriculum applied in the learning process in the Library and Information Science Study Program in the face of the 4.0 industrial revolution which affects intense competition and fast information flow in all sectors. This research method uses a qualitative approach. Data collection was carried out using observation, interviews, Focus Group Discussion (FGD), and document analysis. Based on the results and discussion, several things require a curriculum curve for the Library and Information Science Study Program by the development of the 4.0 industrial revolution as follows: technology adoption, digitization, digital libraries, social librarians, public knowledge, knowledge sharing, knowledge transfer, public knowledge, preservation, knowledge, cyberspace aspects, and connectivity in data utilization. To improve the quality and quantity of innovation in the era of the 4.0 industrial revolution, the study program needs to reconstruct the curriculum so that it remains relevant to the times. The data obtained from the research is expected to contribute to the development of curricula and materials that can support the learning process in the study program.

Keywords: *librarian competence, curriculum, 4.0 industrial revolution*

1. INTRODUCTION

Curriculum 4.0 is a mixture of curriculum and industrial revolution 4.0 that will become a set of plans, aim rules, content, learning materials, and recommendations for incorporating technology-based learning practices that focus on enhancing education relevance. The curriculum is a collection of plans and arrangements concerning objectives content, and learning materials, as well as the methods used to direct the execution of learning activities to achieve those educational goals[1]. On the other hand, the industrial revolution 4.0 incorporates exponential technical and human capabilities through self-learning algorithms, self-driving vehicles, human-machine interconnections, and big-data analytics[2].

Education 4.0 is a movement that has arisen as a response to the needs of the 4.0 industrial revolution, where people and machines are aligned to find solutions, solve different problems faced and discover various potential technologies that can be used to enhance the quality of modern human life[3]. Factory learning here focuses on providing students, factory workers, and laboratory researchers with the opportunity to understand, analyze and apply new manufacturing methods such as Industry 4.0, the Internet of Things, the Industry Internet of Things, and additive manufacturing[4]. Artificial intelligence, mobile computing, machine learning, and the automation of every trade have become a necessity today. Many people believe that this change is rare [5].

Students with the capacity to interpret knowledge (big data) in the industrial era 4.0 need to grasp and appreciate the technology success named (artificial intelligence), and finally the potential of soft skills and sustainability programs to make graduates better equipped to compete in the global marketplace. It is hoped that not only will the reform of the curriculum into curriculum 4.0 generate qualified human capital in their fields. That can, however, guarantee the quality of higher education in line with the 4.0 industrial era. Another change that we need to make for this is to continue reviewing and improving the learning material in our curriculum, so that we can always respond to the needs and changing times, especially in the age of 4.0 industrial revolution [6]. This paper contributes to the literature and managerial advice in the development of integration-based curricula and line with industry 4.0.

2. BACKGROUND

Librarian as a career in the modern age of 4.0 industrial revolution, needs to respond rapidly to all models of transformation that exist around him and adjust to the library's highly dynamic demands. In an attempt to increase the efficiency and quantity of creativity in the 4.0 industrial revolution period, research programs ought to play a part in reorienting the curriculum in an endeavor to change and stay pace with the times. The study program has the aim of transforming society into innovative and adaptive human resources. Therefore, the study program can produce a competent workforce who is ready to face the challenges of preparing a competent workforce who is ready to face the world of work which is constantly evolving along with technological developments, work skills, adaptability, and an increasingly dynamic mindset.

The Library and Information Science Study Program seek to meet the demands of the ever-developing 4.0 industrial revolution so that the existence of this study program is expected to meet the need for professionals in the field of libraries and information. The presence of the Library and Information Science Study Program at the Faculty of Languages and Arts, Universitas Negeri Padang is an institution that disseminates knowledge in the field of library and information science, so that it is can support the industrial world which requires good relations between companies, government, and society.

The librarian's transformation to face the era of the 4.0 industrial revolution is something that must be faced. Librarians must transform with smart thoughts and actions towards library 4.0 and librarian 4.0 and web 4.0. Libraries are not just a place to find information, but libraries are now working spaces innovations emerge and become virtual offices. Librarians in the 4.0 era are currently faced with the presence of Artificial Intelligence (AI), big data, Internet of Things (IoT), and cloud-based services.

The curriculum development in the Library and Information Science Study Program is expected to be able to meet the needs of professional librarians for government, private and public libraries which are expected to improve library management in this era. In the era of 4.0 industrial revolution, graduates of this study program are faced with new challenges, demands, and needs that have never existed before. So it needs human resources, facilities, and infrastructure, culture, work ethic, curriculum, and learning methods which are expected to give birth to concrete steps for the study program to be able to remain competitive in this era of disruption.

The curriculum can be interpreted as a set of plans and arrangements regarding graduate learning outcomes, study materials, processes, and assessments that are used as guidelines for implementing study programs (According to the Regulation of the Ministry of Research, Technology, and Higher Education Number 44 the Year 2015). The development of a library science program will be adapted to the requirements of a librarian's field research, which should meet universal criteria established by the International Library Associations Federation (IFLA). IFLA has developed 11 core curricula for library and information science education programs, including 1) environmental knowledge, information system social effects, database, and ethics policy, library history, 2) information creation, communication, and use, 3) information needs evaluation, and sensitive service design, 4) information transmission process, 5) organizational management, 7) extension of database and communication technologies to all areas of library and information goods and services, 8) knowledge management, 9) management of government agencies, 10) qualitative and quantitative assessment of the effects of the usage of databases and libraries, and 11) understanding of the initial intelligence model for libraries and computer sciences[7].

Barden notes that prospective librarians require four competency levels, namely: 1) technical and network administration skills, 2) customer care, 3) media handling, and 4) storage and retrieval and market creation. [8]. In the era of disruption in 4.0, the librarian profession is interpreted as an era that must be quickly adaptive to all forms of changes that occur around it, and adapt to the demands of increasingly diverse and complex users [9]. Librarians in the industrial revolution era 4.0 must-have professional competence and personal competence. Professional competence consists of knowledge, skills, and works attitudes. Personal competence can be seen from the aspects of personality and social interactions. Competence is an ability that librarians must have in carrying out their duties or jobs [10]. In an attempt to increase the standard and quantity of creativity in the Industrial Revolution 4.0 period, it is important to reorient the curriculum with the function of research programs. The paper would address practical measures the research plan has taken to allow it to succeed in the Industrial Revolution 4.0 period. Activities are done through curriculum creation.

3. METHOD

This study uses a qualitative approach to explore and understand the meaning obtained from several individuals or groups of people. Qualitative research is an approach to exploring and understanding meanings that come from human or social problems [11]. Data collection was carried out using observation, interviews, Focus Group Discussion (FGD), and document analysis. Observations were made by researchers to match the data and information obtained from interviews and literature studies with the actual conditions in the field. Interviews and FGD were conducted with study program leaders, lecturers, stakeholders, and education staff related to materials that gave birth to the librarian competencies needed in the 4.0 era. Data analysis was performed by processing and preparing data for analysis from interview transcripts, reading the entire data, coding and interpreting categories, or interpreting the data.

4. RESULT AND DISCUSSION

The results of the identification carried out through the FGD activity, several things require an adjustment of the Library and Information Science Study Program curriculum by the development of the 4.0 industrial revolution as follows. First, increasing technological developments and the 4.0 industrial revolution is closely related to digitalization, so it is necessary to equip students with technology adoption and provide understanding in collecting, processing, and disseminating information. IFLA (The International Federation of Library Associations and Institutions) (2018) defines a digital library as follows: A digital library is an electronic set of digital items, of guaranteed consistency, produced or assembled, and maintained in compliance with generally agreed selection standards. Creation and usability consistently and sustainably manner, backed by the infrastructure required to allow users to receive and leverage the tools [12].

Second, librarian social and public knowledge where librarians must play a role in educating society through librarian activities. "To be a social librarian", librarians must begin to shift their roles, from information providers to knowledge creators in learning, education, and research [13]. Third, get used to digitalization in various subjects, because librarians are required to be able to provide digital collection services online by looking at the various information needs in each social element. This online service means the provision of library material information that is easily accessible by internet services without being limited by time and space [14].

Fourth, getting into the habit of documenting the results of knowledge sharing is an effective form of knowledge transfer for librarians, both from tacit (oral) knowledge transfer to explicit (written) and vice versa. Knowledge sharing, librarians can identify various problems and user information needs and can determine the right solution to overcome them [15]. Fifth, public knowledge, librarians should be able to position themselves as scientists (a scientist). Libraries facilitate literature while librarians are actively involved in the creation of knowledge in the internal environment of the institution and in sharing knowledge with external users [16]. Armed with this competency, the role of librarians will be even greater in institutional research activities, namely as a research collaborator, research consultant, or research data manager [17].

Sixth, the wider community needs for available information resources require the ability of human resources to master preservation activities and data utilization for access, dissemination, citation, and knowledge creation. Then, the knowledge that is disseminated can be reviewed, utilized, and reproduced by others. Libraries that initially focused on collections (collection centric) and users (user-centric) have shifted towards the importance of access [18].

Seventh, it is important to instill in students an understanding of the role of librarian 4.0 not only as a supplier of information but also as a guide and developer of knowledge, even if it is capable of mapping knowledge and policymakers based on data analysis results and the publishing of research results. Helping how one's research data is well organized and organized, well described, preserved, and shared [19]. Librarians must act as information agents, research partners, marketing, and public relations to help leaders make the right decisions [20].

Eighth, considering the expertise of librarians 4.0, it is important to realize the development of the 4.0 digital revolution, which stresses the facets of cyberspace and communication through the usage of data, records, awareness, and technology. Library 4.0 capabilities provide knowledge focused on intellect, vast details, enhanced truth, background understanding, the new display knowledge, and infinite creative space. Each library can take the opportunity in every existing situation by developing innovations that have been implemented or innovations to expand the reach of the library and enlarge the library's existence in the eyes of the community [21]. Broadly speaking, information technology engineering is involved in planning the creation of special library applications with features for member registration, member accounts, e-books, e-journals, e-learning, features that provide discussion forums, news columns, and general science columns [22].

From the results of the identification carried out by the Library and Information Science Study Program, it is necessary to develop a curriculum by looking at the development of the library 4.0. Libraries 4.0 are clever, state-of-the-art screens, connectivity, open access, digital data, cloud computing, augmented truth, and librarian 4.0. On the other hand, efforts must be made about professional disruption. Librarians must provide creative and innovative services to users without discrimination. Of course, this service must be supported by the professional competence of librarians, namely competences that are based on a strong foundation of knowledge and science. Actual creativity and innovation to produce unique services and new systems through the use of librarian's tools, skills, and talents. To reply to this, the curriculum was reoriented by the research plan and was then adapted as course material relating to the growth of Industrial Revolution 4.0, as can be seen in Table 1 below.

Table 1. Curriculum Reorientation of the Library and Information Science Study Program in the Era 4.0

No.	Efforts to Overcome Disruption of the Librarian Profession	Curriculum Reorientation	
		Courses	**Subject Competence**
1.	Improve the competence of digital literacy and scientific literacy of librarians	Information Literacy	Model, the guidance of information literacy, the influence of information technology on information literacy, search, and utilization of information.
		Information Ethics	Intellectual property rights, fair representation, and non-maleficence
		Information Bussines	Able to apply the concept of information business that can generate profits in the industrial era 4.0
		Visual Information Design	Discusses how to design documents visually using a variety of graphic design software
2	Able to utilize information sources for research in the era of open science	IT-Based Entrepreneurship	ICT-based entrepreneurship concepts and techniques for information distribution
		Information Retrieval	General techniques and information retrieval system evaluations
		Web Design	Design web-based information and communication media to facilitate communication between the library and the use of information.
		Collection Management	The principles, methods, and procedures for selecting and procuring library materials in the framework of developing collections.
3	Understand the system electronic resource management (ERM)	Database Management	Understand information technology and equipment, the use of equipment for gathering and disseminating information, the basics of making databases, and the practice of making databases for libraries.
		Library Automation	Automation techniques in processing bibliographic descriptions, collection processing, and retrieval systems in databases, and internet usage
		Graphic and Electronic Publishing Management	Development and types of publishing, editing and production of books, printing, and binding, and electronic publishing
4	Building knowledge-based community and connectivity	Knowledge Management	The information management process and pattern, knowledge collection and codification, knowledge exchange, knowledge deployment, knowledge management software, knowledge management development, and knowledge management techniques, and library knowledge management assessment.
		Minangkabau Information Documentation	The concepts and application of information and documentation related to the preservation of Minangkabau local wisdom knowledge.
		Information in the Socio-Cultural Context	Characteristics of information culture, understanding, and behavior of information seekers as well as information processing to be utilized as a center of activity within the community.
5	Building research collaborations with researchers	Organizational Communication	Innovation, conflict and decision making, climate, and organizational culture.
		Library Public Relations	Communication management between an institution and its public, institutions image, public relations characteristics, and the development of public relations programs for libraries.
		Writing Scientific Papers	The development of effective sentences, paragraphs, essay writing, references, citations, and making reading lists.
		Multimedia Communication	The ability to adapt quickly to the latest technologies.
		Visual Information Design	Design documents visually using a variety of graphic design software.
		Cooperation and Information Network	The information networks and library collaboration.

It can be shown from Table 1 above that the reorientation of the program adapts to the growth of the 4.0 industrial revolution. The current curriculum uses a learning framework of the 21st century, which emphasizes skills in

critical thinking and problem-solving, communication and collaboration, and skills in creativity and innovation. Then the study program curriculum must be oriented towards the development of a digital society that is adaptive to the industrial revolution. This is intended so that the study program can always respond to the demands of change accordingly and be able to contribute optimally in efforts to build a knowledge-based society.

The curriculum compiled by the study program must be able to prepare the demands for librarian competence and open opportunities for the development of science and technology in a multidisciplinary and interdisciplinary manner, while at the same time producing experts and skilled staff that are more suited to work in information management in the industrial revolution era 4.0. Throughout the light of the 4.0 digital revolution, the viability of the program adapted to the learning phase in the Library and Information Science Study Program is directly related to improvements in the knowledge flows and the rapidly rapid advancement of communication technologies. Creativity and innovation have an important role in the effort to increase productivity sustainably manner, to improve librarian competence.

5. CONCLUSION

The task of librarians in the age of industrial revolution 4.0 is to provide both technological and functional skills in the worldwide, multimedia, and innovative usage of different media resources. The transformation of digital library practices is inseparable from the contribution of industry 4.0 through technology penetration, resulting in changes in various ways in various digital library activities. The Library and Information Science study program as a librarian-producing organization it must be necessary to keep pace with these developments by designing a curriculum for the research program and reorienting the curriculum to satisfy the demands of librarian expertise in the 4.0 industrial revolution. Reorientation of the curriculum by guiding the development of the 4.0 library, namely smart, maker space, technology, open-source, big data, cloud services, augmented reality, state of the art displays, and librarian 4.0.

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