



# LAURA BUSH 21<sup>st</sup> CENTURY LIBRARIAN PROGRAM

Sample Application RE-259668-OLS-26  
Project Category: Planning

## University of North Texas College of Information

Amount awarded by IMLS:      \$187,506  
Amount of cost share:              \$0

University of North Texas (UNT) Department of Information Science, UNT Libraries, and Texas Woman's University School of Library and Information Studies will explore Information Organization and Knowledge Organization (IO&KO) skills for librarians and archivists. The planning project will focus on curriculum design and materials that lead to a training certificate. The project team will analyze available learning resources and pedagogical approaches, and design and implement a nationwide needs assessment survey. These analyses will inform specific curricular elements and a plan for the training certificate with an experiential component for existing IO&KO professionals in need of continuing education. The plan will cover cataloging, classification and other metadata work in libraries and archives, as well as applications of linked data and Artificial Intelligence (AI) in facilitating information discovery.

Attached are the following components excerpted from the original application.

- Narrative
- Schedule of Completion

When preparing an application for the next deadline, be sure to follow the instructions in the most recent Notice of Funding Opportunity for the grant program to which you are applying.

## Introduction

University of North Texas (UNT) Department of Information Science, UNT Libraries, and Texas Woman's University (TWU) School of Library and Information Studies propose a 2-year collaborative project "Planning for USA Information Organization and Knowledge Organization (IO&KO) Workforce Training" that will enable development of up-to-date **continuing education** of librarians and archivists who organize information and knowledge to support United States population's information needs. The project's goal is to ensure these professionals' successful adaptation to the **challenges of constantly evolving IO&KO**. The project result will be the **evidence-based plan for systematic curriculum design** and development of accessible professional training materials in the form of Certificate. We will conduct an in-depth content analysis of available relevant IO&KO learning materials, pedagogical approaches, and research publications across the United States, design and implement a **nationwide needs assessment** survey of librarians and archivists to identify employer expectations and gaps in IO&KO preparation. These analyses will inform our development of specific curricular elements and enable us to create a detailed long-term strategic plan for the training Certificate with a strong experiential component for existing IO&KO professionals in need of continuing education. The plan will cover cataloging, classification and other metadata work in libraries and archives, and applications of Linked Data and Artificial Intelligence in facilitating information discovery and reuse. It will **leverage** existing and emerging tools, technologies, and approaches in descriptive metadata, subject representation, name and title authority control. **Project outputs** will be iteratively developed with feedback from advisory board and other experts (IO&KO practitioners, researchers, and educators), **widely disseminated**, and made available as **open access resources** for use in training initiatives across the United States of America.

## Project Justification

The proposed planning project aligns with the IMLS LB21 program Goal 2 "Train and retain current library and archives professionals, faculty and staff" and Objective 2.1 "Develop or enhance professional development and training programs to enable the library and archival workforce to meet the needs of their communities". It will address the current significant need (as described below) by completing preparatory research and systematic planning of an open-access curriculum to offer continuing education to the existing United States library and archival workforce in IO&KO – the core area of the profession. This continuing education Certificate curriculum plan will be available to all (accredited or not) professional degree programs for librarians and archivists at the United States universities interested in offering such certificates.

### Fluid nature of IO&KO and technology developments

The knowledge and technical skills of the United States workforce that organizes our nation's collective information resources and cultural heritage for discovery and access is the focus of the proposed project. This workforce is its main direct beneficiary, with indirect beneficiary being the entire population of the United States of America that would greatly benefit from improved training of information professionals by receiving significantly improved access to valuable historical information (especially important now as the nation is celebrating 250th anniversary of American independence) and contemporary information and knowledge. Professionals working in this important area (cataloging and metadata specialists, technical services specialists, archival records managers, digital asset metadata specialists, digital librarians, serials/electronic/continuing resources catalogers, description and access specialists, taxonomists, etc.) have always adapted their knowledge and skills, with varying degrees of success, to account for the increasingly rapid changes in information and communication technology, evolution of information needs and expectations of the USA people they serve. Library and Information Science and Archival Studies educators in the United States need to ensure their curriculum systematically evolves to reflect these changes in the core area of information profession.

Information organization (IO) through descriptive metadata and subject representation and knowledge organization (KO) through classification systems, thesauri and ontologies are vital to people's ability to discover information. These two disciplines (IO&KO) are closely interrelated by their function and purpose. IO&KO is traditionally recognized as one of the nine core competencies for the USA librarians, and one of the eight core competencies for the USA archivists (referred to as "archival arrangement and description"). Being a core competency, introduction to IO&KO is a required area to address in the USA library and archival curricula. The IO&KO encompasses best practices of creating descriptive bibliographic metadata in library catalogs, archival finding aids, and digital repositories. It also encompasses development and application of knowledge organization systems used in the USA libraries and archives: classification schemes, thesauri, controlled vocabularies, ontologies, and taxonomies. For example, IO&KO applications in biomedical domain include the United States National Library of Medicine (NLM) classification system, Medical Subject Headings (MESH) controlled vocabulary, Medical Text Indexer-NeXt Generation algorithm (based on neural network machine learning), and MEDLINE bibliographic databases.

Since the late 1990s, IO&KO professionals and educators have faced a near-constant wave of changes and new

developments in IO&KO practices, tools, processes, and technologies. The United States has been at the forefront of these developments. These changes – unfolding with increasing speed – include the introduction of new conceptual models that guide IO&KO work: Functional Requirements for Bibliographic Records (FRBR), Subject Authority Data (FRSAD covering subject authority records), and Authority Data (FRAD covering name and title authority records) and their subsequent replacement by the Library Reference Model (LRM). They also include development and implementation of two versions of major cataloging guide Resource Description and Access (Original RDA and Official RDA) replacing the 2<sup>nd</sup> edition of Anglo-American Cataloging Rules (AACR2). At the same time, Describing Archives: A Content Standard (DACS) and Cataloging Cultural Objects (CCO) national guides for archives and museums were developed. These rapid changes also include continuing regular revisions to ensure that the main metadata element set, and data encoding standard traditionally used for describing resources in library collections, Machine-Readable Cataloging (MARC) maintained by the United States Library of Congress, meets emerging requirements. Equally important rapid developments ongoing in the IO&KO professional area are the growth of Semantic Web, and resulting evolution of data value standards (classification systems, thesauri and other controlled vocabularies for names and terms), development and redesign of major digital repository metadata element sets – Dublin Core, Metadata Object Description Schema (MODS), Encoded Archival Description (EAD), etc. – to support the Linked Data functionality, emergence of the new Bibliographic Framework (BIBFRAME) data structure standard and element set intended as a Linked Data alternative to the MARC family of description standards. Professional tools are also entirely redesigned (e.g., OCLC Connexion Browser to WorldShare).

Importantly, these dramatic changes in the landscape of the United States IO&KO work include the recent rapid growth in Artificial Intelligence (AI) – including generative AI (GenAI) and Large Language Models (LLM) developments. The undeniably massive scale of AI's popularity and rapid evolution and adoption highlights the need to prepare information professionals to creatively and effectively use new technologies and incorporate AI in IO&KO workflows. The integration of AI within IO&KO practices, tools, and processes is currently under active investigation by researchers and practitioners in the United States and abroad. Studies evaluate results of experimentation with AI to generate classification numbers, subject headings, summaries, and more to augment existing human-created metadata records, to develop interdisciplinary controlled vocabularies, and to draft entire metadata records following general-applicability metadata standards used in libraries and archives such as MARC, Dublin Core, MODS, BIBFRAME and specialized or locally-developed ones (e.g., Chow, Kao, & Li, 2024; Dobreski & Hastings, 2025; Greenberg et al., 2021; Karnani et al., 2022; Pepper et al., 2021; Song et al., 2026; Taniguchi, 2024; Zavalin & Zavalina, 2025; Zavalin, 2025, etc.). The realization of the need for AI-assisted IO&KO work is global, with recent reports from all over the world published in special issues of major journals in this subject area – *Cataloging & Classification Quarterly*, *Journal of Library Metadata*, and *Technical Services Quarterly* – in 2024 and 2025. AI adoption in IO&KO work will undoubtedly mean incorporation of new computing knowledge and programming skills that have not traditionally been included in IO&KO curricula. The strategic directions for AI integration in library cataloging and classification, archival arrangement and description, and digital repository metadata processes are reviewed by multiple publications (e.g., Chen & Li, 2024; Hernandez, Poewster, & Penniman, 2024; Moulaison-Sandy & Coble, 2024; Sussmeier & Henry, 2025). In these publications, interviews with IO&KO experts (e.g., Alemu & Tamarro, 2025), and panel discussions at major professional conferences (e.g., Hoffman et al., 2024), an important theme is the need for IO&KO training for the United States librarians and archivists to keep up with all these rapid developments.

In response to the changes summarized above, the IO&KO [Core Competencies for Cataloging and Metadata Professional Librarians](#) in the United States have been revised multiple times, each time expanding the list of competencies that IO&KO professionals are expected to have. In the latest version (2023), three major kinds of competencies – knowledge, skill and ability, and behavioral competencies – are divided into 50 sub-competencies, with 28 third-level competencies. The document lists 25 data standards (content, structure, encoding schemes, and exchange) as “*illustrative examples of some of the common types of standards in use in libraries and cultural heritage institutions.*” This list is expected to continue growing to reflect the IO&KO developments. Findings of the recent study of IO&KO professionals self-assessed skills based on this list of competencies highlighted that IO&KO work's increased complexity and “*proliferation of standards and technologies makes the idea of being—much less feeling—competent a seemingly Sisyphean task*” which led to conclusion that United States universities need to intentionally and systematically incorporate these competencies (continually updated) in IO&KO workforce training (Sanders & Snow, 2025).

Individual USA IO&KO educators make curriculum revisions that reflect competencies evolution incrementally, usually without following a systematic and coherent plan and not in conjunction with training developments by other institutions or professional associations. Without competence-based systematically planned revisions, USA degree programs and continuing education would fail to adequately prepare IO&KO workforce for successful career. Even more importantly, the possibility of large numbers of long-term career IO&KO professionals leaving the profession under pressure of these

massive changes – as has happened with the implementation of then-new AACR2 standard in the early 1980s and shortly after RDA replaced AACR2 in early 2010s – creates a critical need to proactively retool and refresh the IO&KO workforce in the United States of America, and provide alternative pathways into the library services field.

USA libraries and archives share a critical and profound responsibility to organize historical and modern information resources and enable their discovery, access, and use. IO&KO supports nation's education, research, and technological developments. The proposed project will help libraries and archives effectively use new technologies, including artificial intelligence, in IO&KO to improve both academic practices and visitor experiences at our nation's libraries and archives.

### **The known curricular needs and gaps in the USA IO&KO education**

IO&KO job descriptions and workflows were examined to gauge changes in employment qualifications and duties. For example, Hoffman's (2012) analyzed how technology affected the cataloging profession and concluded that it led to a more shared and efficient cataloging process yet created several new challenges. These developments were coupled with the rise of paraprofessional hirings, outsourcing IO&KO work to library vendors without necessary skills that resulted in lower-quality metadata and reduced discoverability of information resources. Electronic publishing and digitization have created new areas of IO&KO work to the point that *"...catalogers [responsible for library catalogs] and metadata librarians [responsible for bibliographic databases of digital repositories] seem to be competing for this work."* In a longitudinal analysis of IO&KO jobs descriptions over 16 years, Dieckman (2018) observed a continued demand for both traditional and emerging qualifications, with employers increasingly seeking *"coding languages and knowledge of non-traditional [i.e., non-MARC] metadata"*, and documented 146 qualification types. Turner (2020) found that *"cataloging positions still outnumber metadata jobs 2 to 1."* Ho's (2020) examination of academic libraries' workflows found an increase in catalogers working with non-MARC metadata and that *'metadata librarian'* and *'cataloging librarian'* positions are increasingly being incorporated into the same department, which has *"implications for expected competencies and skills."* Ho (2020) study's results also indicate a shortage of qualified individuals to perform IO&KO work.

Gap analysis is utilized for assessing curricula and planning curriculum development efforts in different disciplines, such as marketing (Davis et al., 2002), nursing (Fater, 2013), and information systems (Leo, Jones, & Lang, 2019). It includes monitoring of the curriculum's relevance to the current work environment. This systematic evaluation method was used for identifying gaps in Library and Information Science (LIS) education overall (De Long & Sivak, 2010) and biomedical informatics training specifically (Ritko & Odum, 2013) but has not been used in LIS curricula assessment recently or applied to IO&KO education. However, gaps in IO&KO education are being identified by studies that use other, less systematic research methods. Examinations of IO&KO curricula offered in the United States have a long history and evidence the USA information professions' understanding of the complex and constantly changing nature of IO&KO work. These studies so far analyzed accredited master's degrees and did not include continuing education Certificate programs. The recent survey by Poole and Todd-Diaz (2025) of archivists' satisfaction with curriculum revealed the need to place greater emphasis on archival arrangement and description (IO&KO) skills, and to expand experiential learning. Hudon's (2021) analysis of IO&KO training at 65 programs found that *"cataloging, classification, and metadata-oriented course content is very present in the vast majority of programs"* but many courses are not required, not offered consistently every year, and are taught by instructors without research expertise in IO&KO. The longitudinal study on the state of IO&KO education in 58 programs (Joudrey & McGinnis, 2014) found that offering one or more required courses *"in traditional library cataloging is no longer the answer."* Authors found that although the number of IO&KO courses offered steadily rose since 1987, this growth is tempered by the low number of courses taught (e.g., low-enrollment courses are typically canceled). Another important barrier they identified is the fact that many of the existing IO&KO courses are general electives, thus students are not required to complete them. As a result of this lack of robust IO&KO training (beyond the core course that all students in accredited programs complete), many information professionals who graduated in 2010s and 2020s and find themselves in the IO&KO roles feel the lack of necessary knowledge and skills. Joudrey and McGinnis (2014) also pointed out the notable decline – which continued during almost 12 years since their study – in courses focusing on subject access and classification, which are central for facilitating discovery of information resources.

These trends are coupled with the relatively small number of qualified IO&KO-oriented faculty who teach and research in these programs in the United States of America. It has been equally challenging to attract doctoral students to rejuvenize and increase the ranks of the USA IO&KO faculty in academic programs for librarians and archivists. Hudon's (2021) study emphasizes the continued need to develop in students thorough understanding of IO&KO theory and practice as the field is undergoing rapid developments because *"such an understanding proves invaluable when objects, procedures, and systems are in constant transformation."*

### **Planning specialized USA IO&KO certificate training as a vehicle for keeping up with rapid developments**

While general programs of studies in accredited graduate degree programs for librarians and archivists do not require students to complete in-depth IO&KO coursework, the basic training at the level of a single introductory core course is clearly not sufficient to succeed in IO&KO profession, especially with the reduced volume of training that was traditionally offered by IO&KO continuing education field leader – the United States Library of Congress. In this environment, existing IO&KO workforce needs to rely on training offered by professional associations or Library Juice Academy which however provides very basic introduction – with [4-weeks-long courses \(each only 15 hours of learning total\)](#) – to the complex and emerging IO&KO topics. For providing much more robust training that ensures successful adaptation to new developments in IO&KO, Certificates offered by academic programs and leveraging existing expertise of their faculty are needed as an alternative pathway into library services. Graduate Academic Certificates (GACs) in different subfields of LIS and Archival Studies are commonly offered by the same graduate programs that offer accredited degree programs for the USA librarians and archivists. These Certificates usually consist of 4-6 organized graduate courses that can be completed entirely online. For example, TWU School of Library and Information Studies currently offers 3 post-graduate certificates – in [Community Information](#), in [Evidence-Based Health Science Librarianship](#), and in [School Librarianship](#) – and UNT Department of Information Science (DIS) currently offers [ten GACs](#) with clear admissions process through the [Apply Texas system](#) for certification seekers who pursue the GAC separately from their Master of Science (MS) degree.

Graduate Certificates are important vehicles of competency-based education, and are known to help increase “*graduate skills engagement, a culture of progression and scholarship, and ultimately competitiveness in today’s workplace*” (Thorsell, 2015). They also take significantly less time and financial resources to catch up with the recent developments in the field than MS degrees. Certificate programs in digital curation, archival studies, or knowledge management include an IO&KO course but IO&KO-focused Certificates are lacking in the USA academic programs. For nationwide impact, such programs need to be coordinated among USA IO&KO education experts, with openly available degree plans, syllabi, and assignment descriptions. The UNT MS program with majors in Information Science and Library Science, while not yet having an IO&KO Certificate program, is known for its strong IO&KO component (a total of 6 regularly offered specialized graduate courses in cataloging, classification, digital repository metadata, and archival arrangement and description beyond the core course). Building on these strengths, our team will begin the necessary work to address the critical need for coordinated IO&KO Certificate curriculum development by undertaking a systematic review of learning materials, pedagogical approaches, and long-term strategic planning, including professional competencies and employer expectations.

The output of the proposed planning project will be made available as open access resources. Project results will then inform the future development of the Certificate training programs. Piloted at UNT and TWU, the future Certificate would be replicable by any interested academic program (or on-the-job training program) in the United States. It will equip existing USA IO&KO workforce in need of retooling with the necessary knowledge, skills and practical experience (including with emerging technologies), enable them to successfully retain their current IO&KO jobs, compete for new IO&KO roles, and advance to IO&KO management and leadership positions. It will provide established USA IO&KO professionals with an avenue to enhance their existing competencies via rich continuing education opportunities. Current graduate students will also be able to benefit from this training by completing Certificate coursework at the same time with their MS degree.

## Project Work Plan

### Project Goals and Outcomes

The proposed *Planning for USA Information Organization & Knowledge Organization (IO&KO) Workforce Training* project will address the need for developing a systematic evidence-based plan for refining and extending existing competency-based training for better preparing IO&KO professionals in libraries and archives to support United States information user needs and meet challenges of a constantly evolving IO&KO landscape and technologies. This training must effectively leverage existing and emerging IO&KO tools, technologies, and approaches in descriptive metadata, subject representation, name and title authority control through (1) library cataloging and classification, and archival arrangement and description, (2) digital repository metadata, and (3) application of Linked Data and Artificial Intelligence.

This planning project is aimed at identifying the needs and gaps, and its outcomes will later be used for developing continuous education programs to address these needs and fill these gaps. As part of the proposed project, we will collect and analyze existing relevant publications, as well as the data from the United States graduate courses, Certificate programs and informal education offerings focusing on IO&KO principles, methods, tools, and techniques in various information settings (archives, libraries, digital repositories).

In this 3-phase project, we will complete the needs assessment, gap analysis, and systematic planning for the future evidence-based nationwide implementation initiative that will develop the details of the learning content (practical

assignments, activities, readings, etc.) of the IO&KO continuing education Certificate program. The development plan will be informed by IO&KO competencies and recent research results of United-States-focused job analyses, practitioners' knowledge and skills studies, curricula analysis, and information end-user needs analysis studies.

### Expertise Needed: Project Team and Advisory Board

The proposed project team will include PI Dr. Oksana Zavalina, Co-PIs Dr. Mary Burke, Dr. Vyacheslav Zavalin, and Dr. Mark Phillips, and senior personnel Dr. Shawne Miksa. The team successfully collaborated on research and publications on IO&KO in libraries and archives, and IO&KO-focused student advising. It possesses robust expertise in the development of graduate, undergraduate and continuing education IO&KO courses, academic program management, practical experience in cataloging, classification, digital repository metadata, and IO&KO applications of Linked Data and Artificial Intelligence, as well as strong IO&KO professional community connections. Each project team member's expertise is summarized (along with expected responsibilities) below and detailed in the **Resumes** attachment. The roles of proposed team members are specified below.

Dr. [Oksana L. Zavalina](#) (Professor, UNT Department of Information Science (DIS)) is the proposed **project PI**. She is an expert in research on facilitating resource discovery in libraries and digital archives. Since 2007, she has developed and taught multiple graduate and undergraduate online and face-to-face courses in IO&KO area (for example, UNT's INFO [5200](#), [5220](#), [5223](#), and [5224](#)), and the *Metadata and Linked Data* 6-week professional development course offered 9 times during 2015-2021. She has long-term experience in administration and planning of US-based graduate degree programs and Certificates, and multi-year experience as a practicing IO&KO specialist in libraries. Her grant project management experience includes serving as a PI on IMLS-funded [LG-87-18-0197-18](#) and [RE-254860-ols-23](#). Her responsibilities will include overall project supervision and budget oversight; official communication with IMLS; participation in data collection and analyses, in development of competency-to-learning-objective mappings; coordinating development of systematic plan for IO&KO Certificate curriculum development; coordinating evaluation and dissemination of project outcomes.

Dr. [Mary Burke](#) (Assistant Professor, UNT DIS) is the proposed **project Co-PI 1**. She is an expert in facilitation of resource discovery in archives that document local history, has taught and developed courses in IO&KO area and possesses a recent multi-year expertise as the United States digital archive practitioner: a curator and metadata manager. Her responsibilities will include data collection and analyses; development of competency-to-learning-objective mappings and of systematic plan for IO&KO Certificate curriculum creation; evaluation and dissemination of project outcomes.

Dr. [Vyacheslav Zavalin](#) (Assistant Professor, TWU, with the past experience developing and teaching IO&KO courses at UNT) is the **project Co-PI 2**, an expert in I&KO research and education, including AI integration in metadata work. Responsibilities will include participation in data analyses, competency-to-learning-objective mappings development and dissemination of project outcomes, assessing suitability of the curriculum plan for adoption by other USA universities with library professional degree programs beyond UNT (using TWU as the case study target).

Dr. [Mark E. Phillips](#) (UNT Digital Libraries Associate Dean, adjunct instructor at UNT DIS) is the **project Co-PI 3**. He is an expert in IO&KO practice and research, and developer of IO&KO automation tools. He will participate in all Year 1 project activities and will evaluate the project-produced Certificate's curriculum development plan, mappings, and draft learning materials by assessing their suitability for on-the-job trainings of librarians and archivists in the USA in Year 2.

Dr. [Shawne D. Miksa](#) (Professor, UNT DIS) is the proposed project's **senior personnel**. She is an expert in IO&KO research and resource discovery facilitation in libraries, who has developed and taught IO&KO graduate courses (including UNT INFO [5200](#), [5210](#), and [5212](#)), led IO&KO-focused research projects funded by IMLS ([LG-02-04-0024-04](#)) and OCLC/ALISE as Co-PI and PI. She contributed to the major IO&KO professional standard work as a chair of RDA Implementation Task Force and a member of North American RDA Committee ([NARDAC](#)). Her responsibilities will include data collection and analyses in Year 1-2; participation in development of competency-to-learning-objective mappings and of systematic plan for IO&KO Certificate curriculum creation in Year 2; participation in evaluation and dissemination of project outcomes.

The team will include a **Research Assistant (RA)** – a UNT PhD student with an interest in IO&KO – who will assist in all project-related tasks, with the focus on research. Specifically, RA will participate in developing and implementing the evaluation plan, in collecting and analyzing data, and in project results dissemination through publications and presentations. The RA will also participate in organizing and maintaining project records and maintaining the project's online presence. The RA job description is included in the **Resumes** attachment. Project team will use a mix of face-to-face and online meetings and collaboration to enable broader feedback and to support flexibility.

The proposed planning project will engage the external **advisory board** consisting of 5-7 members, all of whom have extensive experience in one or more aspects of the project. The board will assist in guiding the project to successful completion. It will include representatives of educators and practitioners in cataloging, classification, digital repository metadata, Linked Data and Semantic Web, Artificial Intelligence, etc. We are inviting the following experts from different organization in the United States to join the advisory board:

- Dr. Jane Greenberg (Professor and Director of Metadata Research Center, Drexel University College of Computing and Informatics), an expert on digital repository metadata, Linked Data, automatic (including AI) generation of metadata and thesaurus construction
- Dr. Daniel Joudrey (Professor, and Director of Libraries and Librarianship Concentration at the Simmons University School of Library and Information Science), an expert in cataloging, subject analysis, controlled vocabularies and barriers in their application, and in trends in IO&KO graduate education
- Dr. Karen Snow (Professor and the PhD Program Director, Dominican University), a leading expert in IO&KO professional competencies
- Dr. June Abbas (Professor and Director of the University of Oklahoma School of Library and Information Studies), an expert in KO within various contexts
- Dr. Athena Salaba (Professor, Kent State University), an expert in KO systems, subject access to information, conceptual modeling of bibliographic data, faculty advisor for Kent State University's IO&KO program
- Dr. Robert Maxwell (Senior Librarian at the Harold B. Lee Library, Brigham Young University, member of the RDA Steering Committee), an expert in cataloging and classification, professional development training for catalogers, implementation of IO&KO standards (RDA & BIBFRAME), creator of high-impact learning materials
- Samantha Dodd Summerbell (Lead Archivist, Annenberg School for Communication at the University of Pennsylvania), an expert in archival arrangement & description, experienced IO&KO educator (including at UNT).

Letters of support from Ms. Summerbell, Drs. Greenberg, Snow, and Maxwell are included in **Supporting Document 2**.

### Activities

Figure 1 illustrates the progression of the proposed 3-phase project. Details are discussed below. The specific timing for completing each of the stages is presented in the **Schedule of Completion** attachment.

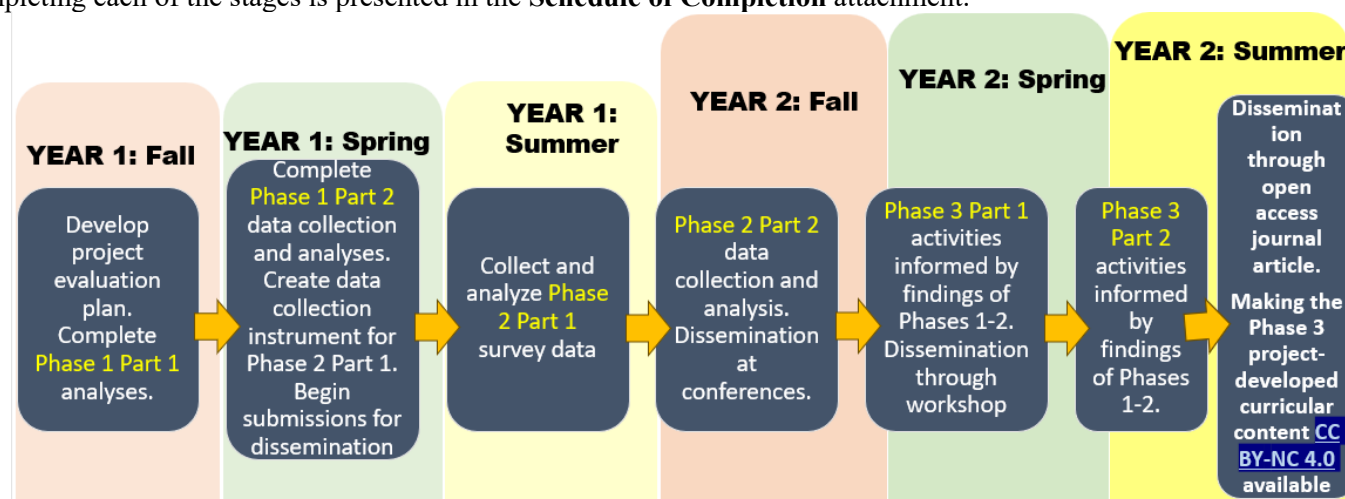


Figure 1. Stages of the proposed planning project

**In Year 1, the project team will complete Parts 1 and 2 of the proposed project's Phase 1 and will begin the Phase 2 work:**

1. As part of the project **Phase 1 (Part 1)**, identify and analyze (using Dedoose or NVivo qualitative analysis software) the **published findings of relevant research** with the goal of developing the list of coding categories to be used in the next steps:
  - IO&KO practitioners' knowledge and skills studies (e.g., Engelson, 2019; Hernandez, Pewster, & Penniman, 2024; Poole & Todd-Diaz, 2025; Sanders & Snow, 2025; Tosaka & Park, 2018),
  - IO&KO job analyses (e.g., Brannon, Sassen, & Janowski, 2022; Dieckman, 2018; Ho, 2020; Turner, 2020),

- end-users' needs analysis of information end-users in relation to IO&KO (e.g., [LG-87-18-0197-18](#) project),
- United States IO&KO curricula analyses (e.g., Bailey, 2021; Dobreski et al., 2022; Hertenstein, 2023; Hudon, 2021; Joudrey & McGinnis, 2014; Salaba, 2020).

These analyses will be led by PI and Co-PI1, with active participation from RA and senior personnel. They will inform the proposed planning project activities (e.g., development of coding manual for Phase 1 Part 2, data collection instrument for Phase 2 Part 1).

2. As part of the planning project's **Phase 1 (Part 2)**, we will conduct an **in-depth content analysis of the learning content currently offered by the IO&KO experts in the United States**. Our team will collect for analysis syllabi and assignment documents from organized graduate IO&KO courses as well as other training programs (e.g., [LEADING](#) and [LEADS-4-NDP](#) IMLS-funded programs that were developed and offered to integrate Data Science practical learning in professional development of library and archive faculty). Beyond openly accessible materials, this dataset will include materials requested by the project team from their creators, with whom the project team has professional connections. These educators with national and international reputation as IO&KO experts include Drs. Jane Greenberg and Jung-ran Park (Drexel Univ.), Dr. Karen Snow (Dominican Univ.), Dr. Daniel Joudrey (Simmons Univ.), Drs. Marcia Zeng and Athena Salaba (Kent State), Dr. Gretchen Hoffmann (Texas Woman's Univ.), Dr. Jian Qin (Syracuse Univ.), etc. Dissemination of project's preliminary results will begin at this stage. Phase 1 Part 2 activities will largely be conducted by RA, under the leadership of PI and Co-PIs, with participation of senior personnel. Findings will be used to inform the activities of Phase 2 and Phase 3 of the proposed project.
3. As part of the planning project's **Phase 2 (Part 1)**, conduct nationwide **survey of IO&KO practitioners across a broad range of settings: in libraries (academic, public, special, national), and archives**. This scale is necessary to get an accurate picture of the work that IO&KO practitioners are doing daily, including:
  - what IO&KO tools and resources they use, and don't use, in their work
  - how the information systems in which they work influence their decision making and productivity
  - what information and skills they may be lacking
  - demographic data, levels of education and coursework completed, and length of work experience.

The survey will allow us to correlate IO&KO qualifications necessary or desired in the job, those obtained in degree programs for librarians and archivists, and those captured by [Core Competencies for IO&KO Professionals](#). Survey development will be informed by previous competencies-focused surveys and questionnaires (e.g., Miksa, 2008; Sanders & Snow, 2025), and findings of other recent studies analyzed in Phase 1 Part 1. The data collection instruments will be developed jointly by the project team, in consultations with advisory board. Dissemination of preliminary findings of the project will continue at that stage. Phase 2 Part 1 data collection will largely be conducted by RA, under the leadership of PI. Data analysis will also involve three Co-PIs and senior personnel. Findings will inform the gap analysis in Phase 2 Part 2 to be completed in Year 2.

**Proposed project activities in Year 2 will include a pilot study.** University of North Texas Department of Information Science (UNT DIS) is selected as a target of this pilot due to its long-standing strong position in IO&KO education, with a total of 6 IO&KO-focused graduate courses regularly taught at UNT DIS Library and Information Science and Archival Studies programs. In the 1990s, UNT DIS was one of the first in the United States of America to offer online learning for librarians, with most of its courses offered online. UNT DIS has always offered an introductory specialized cataloging and classification course, with the advanced course taught for over 20 years. UNT DIS was the USA pioneer of digital repository metadata education: its graduate introductory course *Metadata I*, initially developed by Dr. William Moen, has been continuously offered since 2000. UNT DIS advanced graduate metadata course has been continuously offered since 2014. UNT DIS archival arrangement and description graduate course is approved by the [SAA Academy of Certified Archivists](#). Specialized IO&KO-focused courses are also offered as part of undergraduate program in Information Science, School Librarian Certification program, and Health Informatics graduate programs.

The activities conducted in **Year 2** as part of the proposed project will include:

1. As part of **Phase 2 (Part 2)**, conduct an **in-depth content analysis of the IO&KO learning content currently offered at UNT DIS**. Because the audience of the continuing education Certificate is practitioners holding graduate professional degrees for information professionals, the focus will be on graduate courses. Syllabi, lists

of learning objectives, assignments, instructor presentations etc. used in 6 UNT IO&KO advanced graduate courses (INFO [5210](#), [5212](#), [5220](#), [5223](#), [5224](#), [5240](#)) will be examined and compared, with the focus on:

- degree of overlap with professional core competencies in their coverage
- identification of gaps in professional preparation of IO&KO professionals (catalogers, archivists engaged in archival description, digital repository metadata specialists, records managers etc.), and
- identification of potential content sources to supplement existing relevant UNT learning resources.

Performance metrics and student feedback (collected through UNT [Student Perceptions of Teaching \(SPOT\)](#)) on the content covered in the current versions of these courses and the effectiveness in reaching the course learning objectives will also be collected and analyzed to support the gap analysis. Phase 2 Part 2 activities will be led jointly by PI and Co-PI1, with active participation from RA and senior personnel. Findings will be used in Phase 3 activities.

2. As part of the planning project's **Phase 3 (Part 1)**, based on the analyses completed in Phases 1-2, the project team will create **mappings** between (1) currently expected competencies of the IO&KO professionals and (2) course-level and module-level objectives, tasks included in the assignments, discussions and other course activities. In 2019, the proposed project PI Dr. Oksana Zavalina created a basic preliminary mapping between IO&KO competencies listed in the earlier (2017) and now outdated version of *Core Competencies for Cataloging and Metadata Professional Librarians* by the USA Association for Library Collections and Technical Services (ALCTS) and 5 UNT IO&KO graduate courses. This crude mapping (as shown in Figure 2) mapped each competency (or its specific part) to a course. The proposed project will develop much more fine-grained mappings that would map each competency (or its specific part) identified in previous phases of the project to each of UNT 6 IO&KO courses' specific module and learning objective, and assignment (or a section of assignment) or other activity. Phase 3 Part 1 activities will be led jointly by PI and Co-PI1, with active participation from RA and feedback from senior personnel. Findings will be used in Phase 3 Part 2 project activities.

| <b>Coverage of ALCTS (2017) Core Competencies for Cataloging and Metadata Professional Librarians in UNT INFO 5210, 5212, 5220, 5223, and 5224 courses</b>            |                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Last updated October 5, 2019                                                                                                                                                                                                                              |                                                                                                      |
| Knowledge Competencies:                                                                                                                                                                                                                                   | Courses:                                                                                             |
| <b>1. Knowledge of foundational cataloging and metadata principles:</b>                                                                                                                                                                                   |                                                                                                      |
| <ul style="list-style-type: none"> <li>Understands historical context for current metadata principles (e.g., Ranganathan's Five Laws of Library Science, Cutter's Objects and Means)</li> </ul>                                                           | INFO 5210                                                                                            |
| <ul style="list-style-type: none"> <li>Understands principles of identity management and authority control</li> </ul>                                                                                                                                     | INFO 5210<br>INFO 5220                                                                               |
| <ul style="list-style-type: none"> <li>Understands principles behind controlled vocabularies, including syndetic structure and the benefits and drawbacks of pre- and post-coordinated terms, and can identify the vocabularies in current use</li> </ul> | INFO 5210<br>INFO 5220                                                                               |
| <ul style="list-style-type: none"> <li>Understands various classification structures and can identify the classification schemes in current use</li> </ul>                                                                                                | INFO 5210<br>INFO 5220                                                                               |
| <ul style="list-style-type: none"> <li>Understands data standardization: Content standards (e.g., RDA guidelines, AACR2, DCRM, DACS, CCO)</li> </ul>                                                                                                      | INFO 5210 (RDA guidelines)<br>INFO 5220 (RDA guidelines, AACR2)<br>INFO 5223 (DACS, CCO)             |
| <ul style="list-style-type: none"> <li>Understands data standardization: Data encoding, format, and exchange standards (e.g., MARC, XML, Turtle, RDF/XML)</li> </ul>                                                                                      | INFO 5210 (MARC)<br>INFO 5220 (MARC, XML)<br>INFO 5223 (XML, MARC)<br>INFO 5224 (XML, RDF/XML, JSON) |
| <ul style="list-style-type: none"> <li>Understands data standardization: Structure standards (e.g., Dublin Core, MODS, MARC, RDA Element Sets, BIBFRAME, EAD, VRA Core)</li> </ul>                                                                        | INFO 5210 (MARC, RDA Element Sets)                                                                   |

Figure 2. Previous crude mapping of IO&KO competencies to 5 UNT IO&KO graduate courses

3. As part of the planning project's **Phase 3 (Part 2)**, we will create a **master plan for the future continuing education Certificate** (to be piloted at UNT as a Graduate Academic Certificate (GAC) as part of the future implementation project informed by findings of and plans developed in the proposed planning project). In the United States, GACs typically consist of 4 to 6 courses and are available for completion on their own (for practicing professionals) or as part of the graduate MLIS degree. The advanced professional development training option appeals to practicing United States IO&KO workers with existing professional degrees. The plan developed in the proposed planning project will detail how specifically the future continuous education Certificate will address the curricular needs (including those identified through the proposed planning project Phase 1 and Phase 2) and cover fundamental and advanced topics related to key components of the IO&KO work in providing effective access to information resources. These key components include **descriptive metadata** that represents various attributes and relationships of information resources, **name and title authority control** (for representing

personal, corporate, and event names, titles of series, etc.), and **subject analysis and representation**, including **integration of AI** and other emerging technologies in IO&KO workflows.

The project will develop **curriculum master plan** with the goal to be usable by educators in any professional degree program that prepares librarians or archivists in the United States. It will detail the steps for development of the Certificate program that would systematically address the curricular needs in preparation of the United States IO&KO professionals and ensure development of robust skills in a variety of important topics. The exact list of these topics will be identified in proposed planning project's Year 1 analyses. This is expected to include (but not limited to) creating descriptive metadata for various kinds of information resources with multiple data content standards ([RDA](#), [CCO](#), [DACS](#)); application of major metadata element sets for describing analog and digital information resources ([MARC](#), [BIBFRAME](#), [Dublin Core](#), [MODS](#), [VRA Core](#), [EAD](#), etc.); encoding metadata in major encoding standards [MARC](#), [XML](#), [JSON](#), [RDF](#); KO systems including but not limited to classification schemes ([LCC](#), [DDC](#), [NLM classification](#), etc.) and ontologies (e.g., [OWL](#), [FOAF](#), [BIBO](#), [SKOS](#), etc.); ontology development; knowledge graphs and Artificial Intelligence (AI) for IO&KO; the practical use of IO&KO professional tools (e.g., [BIBFRAME Tools](#), [Classification Web](#), [LC Linked Data Service](#), [Marc Edit](#), [OCLC Connexion Client](#), [OCLC WorldShare](#), [RDA Toolkit](#), etc.); project management for IO&KO projects.

Also, at a more specific level, as a case study, the plan developed by the proposed project team as part of the pilot study in **Phase 3 in Year 2** will detail the steps for redesigning 6 existing UNT non-core IO&KO courses ([INFO 5210](#), [5212](#), [5220](#), [5223](#), [5224](#), [5240](#)) and non-core TWU IO&KO course [LS 5103 Cataloging and Classification](#) with the continuous education needs in mind. The aim will be to introduce and reinforce experiential learning via practical assignments and real-life IO&KO projects to equip students with applied knowledge and analytical skills, familiarity with and strategies for efficient use of the tools and technologies of growing importance, such as Linked Data applications, and Artificial Intelligence adaptation for high-quality organization of information and knowledge. In Phase 3 Part 2, suitability of the project-developed plan for implementation at other universities and in on-the-job training will be assessed. Phase 3 Part 2 activities will be led jointly by PI, three Co-PIs, and senior personnel, with active RA participation, and with feedback from project advisory board.

## Project Results

The proposed project will focus on education in the IO&KO areas that are key to facilitating information access through enabling discoverability of information resources: organization of information (e.g., through cataloging, records management, digital repository metadata, archival arrangement and description) and organization of knowledge (through classification schemes, ontologies, taxonomies, etc.). The intended results of the project include development of the:

1. Evidence-based competency mappings to content and instructional methods of existing relevant training materials.
2. Master plan for the systematic redesign of relevant curricula and development of open access professional training materials that address continuing education needs of the United States IO&KO workforce.

The project deliverables will enable development of the future nationally coordinated IO&KO continuing education Certificate, as well as redesign and implementation of training content to plan programs that will help IO&KO professionals to navigate and successfully adapt to the challenge of constantly evolving IO&KO landscapes and technologies.

The success of the project will be evaluated through formative assessments of the project-developed content and outcomes-based evaluation of the entire initiative for effectiveness, efficiency, quality, and timeliness (please see **Performance Measurement Plan** attachment for more details). In the spirit of continuous improvement, we will assess and refine the project-developed materials. Assessment methods for the data collection and analysis of the proposed project, and for its outputs will include formal and informal feedback from:

1. the project advisory board (obtained at multiple points during the proposed project, to evaluate success of each individual stage of the project).
2. other IO&KO experts and practitioners (obtained at project-led workshops, as part of peer review of the project-based publications, and audience questions and comments on project-based presentations).

Based on the results of these assessments obtained in this planning project, we will refine the continuing education Certificate curriculum plan to prepare for its full development and implementation in the near future.

We will ensure that results from the proposed planning project are disseminated widely to interested communities of researchers, educators, and practitioners, with the major focus on the United States audiences. The dissemination will include paper/poster presentations at relevant conferences such as [iSchools](#) Conference, annual meetings of [Association for Information Science and Technology](#) and [International Society for Knowledge Organization](#), [Dublin Core Metadata Initiative](#) annual conference, etc.

To reach the audience of USA instructors and program administrators engaged in curriculum development and planning for the IO&KO competency-based education, one or more articles will be published in the [Journal of Education for Library and Information Science](#). Also, sessions organized by two [Association for Library and Information Science Education \(ALISE\)](#) special interest groups (SIGs) – [Metadata, Cataloging, & Collections](#), and [Archival / Preservation Education](#) – are target venues for project-based panel presentations. The resources developed by the proposed project will also be publicized through the major specialized discussion lists for IO&KO educators ([EDUCAT](#)) and library and archives educators ([JESSE](#)), and the mailing list for Archival Education and Research Institute ([AERI](#)).

To ensure far-reaching impact beyond the USA academic community of researchers and educators, dissemination will include discussion list for IO&KO practitioners ([AUTOCAT](#)) and publication in the peer-reviewed [Library Resources and Technical Services](#) journal, published since 1957, well-known among IO&KO practitioners, and issued in fully **Open Access** mode since 2023. In addition, our dissemination efforts will target information practitioners interested in enhancing their and/or their employees' IO&KO preparation with a workshop – offered through a professional meeting organized by [Digital Library Federation \(DLF\)](#) or [Society of American Archivists \(SAA\)](#) – that will publicize the mappings and curriculum plans and solicit IO&KO practitioners' feedback for improvements. The workshop(s) will include collaborative work with the project-developed documents made available to participants as editable files on Google Drive and/or other similar platforms used by conferences (e.g., [Open Science Framework repository](#)). Specifically, we will contact an IO&KO-focused SIG (e.g., [DLF Metadata Support Group](#)) for offering the workshop as part of its meeting. The **Budget Justification** attachment includes more information on the conferences planned as dissemination venues at different stages of the project.

To ensure reproducibility of the project results, project-developed mappings of competencies and IO&KO continuous education Certificate curriculum plan, paper preprints and presentation slides will be shared for long-term access via [UNT Scholarly Works](#) repository to facilitate discovery of these resources and extend the project's benefits beyond its period of performance. Project-developed open-access resources will be made available for reuse by IO&KO educators with Creative Commons attribution noncommercial [CC BY-NC 4.0](#) license. The project-developed mappings and curriculum plan will be made available in open or near-universal file formats (e.g., .xls/.csv, .docx/.odt/.rtf) to ensure they are readily adaptable by other USA institutions for their IO&KO curriculum development needs. The evidence-based project deliverables (with data collected for analysis from multiple existing relevant programs and courses across the nation and through a survey of IO&KO information professionals employed in a variety of different settings in the USA public, academic, and special libraries, and archives) will be statistically generalizable to the entire USA IO&KO workforce.

We will support the PhD Research Assistant (RA) by covering tuition for the duration of the project, providing a competitive salary and a laptop for conducting project work. Through engagement with all tasks of the project, the proposed project RA – a student recruited into the UNT PhD program in Information Science – will receive preparation as a future IO&KO faculty member. With requested tuition support, the RA will be able to enroll in summer courses which will allow RA to graduate and enter the job market sooner. This, along with the curriculum development training of early career Assistant Professor (Dr. Burke) as a project Co-PI1, will help address the shortage of IO&KO faculty in the United States.

While the immediate target audience for the proposed planning project is the educators of United States professional degree programs for librarians and archivists who are interested in developing IO&KO continuing education Certificate, this collaborative project will have a broad and lasting national impact on library and archival education and profession. It will do so by making a strong contribution to ensuring the quality of continuing education in this cornerstone area of the information profession offered to graduates of professional programs. Receiving such training will have a major positive impact on employment benefits of professional librarians and archivists, as well as on retraining and retention of existing USA IO&KO workforce. Also, in the long run, through implementation of the project-developed systematic continuing education curriculum development plan in future initiatives, the proposed planning project is expected to make a solid contribution to improving information access for a wide range of the United States user communities in various information environments. The USA population's information needs will be significantly better met through more robust and functional metadata creation and management by IO&KO professionals in our nation's libraries and archives, whose competencies will be enhanced through evidence-based technology-focused up-to-date practical training that is systematically planned with the output of the proposed planning project.

**Schedule of Completion: Year 1 (September 1, 2026 – August 31, 2027)**

|                                                                                                                                                                                                                                  | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Identification of relevant published studies for analysis in Phase 1; recruitment and training of RA; development of evaluation plan. Submission of a panel proposal to iConference 2027.                                        |     |     |     |     |     |     |     |     |     |     |     |     |
| Phase 1 Part 1: content analysis of identified publications for I&KO competencies.                                                                                                                                               |     |     |     |     |     |     |     |     |     |     |     |     |
| Phase 1 Part 2: collection and content analysis of curriculum materials in US I&KO courses and programs. Preparation of submission based on preliminary findings to SAA 2027                                                     |     |     |     |     |     |     |     |     |     |     |     |     |
| Creation of data collection instrument for Phase 2 nationwide survey of I&KO practitioners; obtaining IRB approval. Preparation of submissions to ALISE 2027 annual meeting, to DCMI 2027 or ASIS&T 2027 or JCDL 2027 conference |     |     |     |     |     |     |     |     |     |     |     |     |
| Phase 2 Part 1: I&KO professionals survey data collection. Preparing and submitting workshop proposal for DLF 2027 forum                                                                                                         |     |     |     |     |     |     |     |     |     |     |     |     |
| Phase 2 Part 1: Survey data analysis. Presenting at SAA 2027                                                                                                                                                                     |     |     |     |     |     |     |     |     |     |     |     |     |
| Advisory board meeting to report Year 1 progress and Year 2 plans and collect feedback on project activities. Preparation of interim (Year 1) project reports to IMLS.                                                           |     |     |     |     |     |     |     |     |     |     |     |     |

**Schedule of Completion: Year 2 (September 1, 2027 – August 31, 2028)**

[illegible]