LAURA BUSH 21st CENTURY LIBRARIAN PROGRAM

Sample Application RE-259809-OLS-26
Project Category: Applied Research

University of Tennessee

Amount awarded by IMLS:	$199,893
Amount of cost share:	$0

Researchers from the University of Tennessee, Knoxville, the University of Indiana, and the University of Colorado will use findings from an analysis of workforce competencies among data management professionals to build a body of knowledge. They will also develop national standards for the assessment of research data management certificate programs and gather employer and employee perspectives on workforce credentialing for these emerging careers. In a data-driven economy, building human capacity for data management professionals is a necessity, and this applied research project addresses a need for standardization and quality control in research data management education. The lessons learned will provide a foundation for quality control of this growing profession and a model for the credentialing of other library, archives, and information careers.

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

The University of Tennessee, Knoxville, Indiana University Indianapolis, and the University of Denver request $199,893 from the Institute of Museum and Library Services (IMLS) for Credentialing Research Data Management (CRDM). This two-year Applied Research project supports LB21 Program Goal 2, Objective 2.1: developing and enhancing professional development and training programs for the library and archives workforce. In a data-driven economy where AI-readiness depends on high-quality, well-managed datasets, building a skilled research data management (RDM) workforce is essential to strengthening American research competitiveness, defending our research investments, and increasing public trust in library and information science scholarship. This project addresses the lack of standardization and quality control in RDM education—a need identified in both the literature and at the recent Research Data Management Education Summit (RDMES) (NSF-2432080). The project will answer four research questions: (1) What knowledge, skills, and abilities are needed for each RDM competency? (2) How may an RDM Body of Knowledge (BoK) be used by the profession? (3) What are the perspectives of stakeholders on the BoK and standards? (4) What are the demands for credentialing from stakeholders? To address these questions, the project will (1) build a BoK informed by a national survey of RDM core competencies; (2) develop national standards to assess RDM certificate programs; and (3) gather feedback on the BoK and standards and assess the market demand for credentialing. The findings will benefit the US research enterprise through increased standardization in research data education and provide a model for the credentialing of other library, archives, and information careers.

Project Justification

Advancement across research domains – the sciences, social sciences, and humanities – relies on access to large quantities of research data in the necessary types and formats. Vast amounts of federal resources – financial, human, technical, infrastructural – continually fund data collection across disciplines. Without effective RDM, however, the full value of these investments may not be realized. Research Data Management (RDM) ensures that datasets are findable, accessible, and interoperable, thereby making data reusable for all Americans. Properly managed data can be reused by both humans and AI to run additional studies, generate new scientific insights, and calibrate instruments. Governments, policymakers, and industry users employ research data to support decision-making, service provision, and generate economic value. Managing data beyond the end of projects can also support scientific integrity by enhancing the reproducibility and replicability of studies, thereby increasing trust in all research. The rise of AI has increased the demand for RDM services and resources. Researchers who build and use AI models need high-quality data, as poor-quality or poorly curated data can lead to biased or unreliable research outputs. Effective RDM can also promote the transparency and accountability of AI by generating documentation and facilitating accessibility of their underlying datasets. Credentialed RDM professionals, trained to consistent standards, are essential to ensuring that the datasets underpinning AI-driven research meet the quality, documentation, and ethical standards that responsible AI requires.

Open science movements in many disciplines heighten the need for research data to be discoverable and available beyond its creators. RDM support services and tools grow in importance as research data must be AI-ready (i.e., FAIR (Findable, Accessible, Interoperable, Reusable) Data Principles), used ethically (i.e., CARE (Collective benefit, Authority to Control, Responsibility, and Ethics) Principles for Indigenous Data Governance), follow existing protections of human subjects research (i.e., the Belmont Report), and abide by federal mandates on access and cybersecurity (Wilkinson et al., 2016; Carroll et al. 2020; NIH, 2020; Nelson, 2022).

National Laboratories, Research Institutes, College and University Libraries, and any other entity that relies on or supports federally funded research, rapidly mobilized to meet the expectations of these policies by hiring a workforce of data librarians, managers, stewards, and curators. These new RDM professionals deliver effective data discovery, access, reuse, and long-term preservation services to champion and defend these large US research expenditures. RDM professionals work with researchers across a variety of settings to provide consultation and technical expertise to facilitate the vast US research enterprise. Data professionals serve in key roles to facilitate more effective RDM, which increases the pace of scientific discovery, promotes the efficient

and effective use of government funding, comply with export controls to defend our research investments, and generates economic value beyond the research environment by publicly sharing data. Oversight of RDM education and credentialing is paramount to ensure the highest quality of care for this nation's research data.

This project addresses the need by using national survey findings of data librarians, managers, stewards, and curators, to develop a BoK, create national standards for certificate programs, and gather employer and employee perspectives through interviews and focus groups. Employer interviews will draw participants from academic research libraries, federal data agencies, and data repositories, while employee focus groups will include RDM practitioners across domains. Beyond benefiting the RDM workforce directly, the project's approach provides a replicable model for credentialing other careers in the information and data professions.

Federal policies and practices in the US necessitate that research institutions comply with mandates that increase research integrity and public access to data. The Nelson memo from the Office of Science and Technology Policy (OSTP) – *Ensuring Free, Immediate, and Equitable Access to Federally Funded Research* – called for publications and their supporting data from federally funded research to be publicly accessible without an embargo, free, and released publicly. In response, US research-funding agencies created new policies to support greater access and accountability for these research investments. In 2023, the National Institutes of Health (NIH) began requiring all proposals to have Data Management and Sharing Plans to maximize the sharing of scientific data. In December 2025, the Department of Energy (DOE) released its expectations of Data Management and Sharing Plans for all DOE-funded research. Any DOE-funded data must be more open than previously available to the public, with the additional expectation of persistent identifiers to ensure scientific and research integrity.

Other US funding agencies implemented data management plan mandates prior to the Nelson memo. Since 2011, the National Science Foundation (NSF) and National Endowment for the Humanities (NEH) have required a Data Management Plan (DMP) with all project proposals. NSF recently added a Public Access Policy Notice: Implementation of Policy Changes to their Proposal and Award Policies and Procedures Guide, which provides additional guidance and encourages the use of the DMPTool to write plans for proposals using machine-actionable templates. Additional guidance to researchers for the desirable characteristics of data repositories for federally funded research has also been issued (National Science and Technology Council, 2022). These policies necessitate an increase in the human capacity of skilled workers embarking on these new RDM careers.

While these project activities address a clear professional need, they also target specific gaps in the research literature. No existing study has systematically translated validated RDM competencies into a structured BoK, established standards for assessing RDM certificate programs, or empirically assessed the demand for formal credentialing from both employers and employees. The trajectory from occupational emergence to formal credentialing follows established patterns of professionalization (Abbott, 1988), and RDM is at a critical juncture where training programs exist but standardized quality assurance does not. This project builds upon existing competency frameworks (Murillo & Yoon, 2024a; Behrens & Blask, 2023) and differs from them by translating validated competencies into a structured BoK and actionable assessment standards—moving from descriptions of what practitioners do to specifications for what programs must teach. The project is organized around four research questions:

RQ1: What knowledge, skills, and abilities are needed for each RDM competency?

RQ2: How may an RDM BoK be used by the profession?

RQ3: What are the perspectives of stakeholders on the BoK and standards?

RQ4: What are the demands for credentialing from stakeholders?

Background on credentialing

Since this project lays the foundation for credentialing an emerging information profession, a brief history of library education standardization provides context. In 1919, the Carnegie Corporation funded studies to establish minimum qualification standards for librarians — parallel to its landmark studies for medicine (the Flexner Report), law, and other professions (Williamson, 1921). The resulting recommendations — restricting library education to post-baccalaureate students, affiliating library schools with universities, and creating an accreditation system (Williamson, 1923) — shaped the field. However, the accreditation system that materialized with the 1951 ALA standards focused on institutional goals rather than prescribed competencies, allowing programs to broadly experiment with curricular content (Swigger, 2010; Marco, 1994). Each ALA-accredited program may address the standards without prescribed competencies or consistent knowledge, skills, and abilities taught.

Over a century later, librarianship still lacks a comprehensive BoK or consistent credentialing for its specializations. By contrast, medicine requires standardized coursework, licensing exams, residencies, and specialization-specific credentialing with continuing education requirements (Hoxhaj et al., 2022). The Medical Library Association has established its own competencies and professional development pathway (MLA, n.d.). A comprehensive librarianship BoK would be ideal but is beyond the scope of any single study; given the importance and newness of RDM positions, the creation of an RDM BoK and credentialing standards for this specific area is both feasible and urgently needed.

Professional competencies establish baseline expectations for quality control, bridge theory and practice, provide clear career progression, and offer guidelines for hiring and job descriptions (Yang et al., 2023). In the rapidly evolving field of RDM — where data librarian roles have expanded significantly in recent decades (Suzuki et al., 2022), data types span from genomic sequencing to historical archives, and AI has increased demand for high-quality, well-documented datasets (Hahnel et al., 2026) — a well-defined BoK is especially critical. RDM has become increasingly complex, encompassing new methods of data creation, diverse metadata standards, complex research infrastructures, and evolving ethical requirements (Ashiq & Warraich, 2023).

Several existing frameworks can inform the development of a US RDM BoK. Data lifecycle models — including the DCC Lifecycle Model (DCC, n.d.), the USGS Science Data Lifecycle (USGS, n.d.), and the DataONE Data Lifecycle (DataONE, n.d.) — outline the activities required for effective RDM. The European Commission's Competence Framework for Research Managers (RM Comp), comprising seven competency areas, 50 competencies, and 800 learning outcomes across four proficiency levels, provides a model for structuring professional competencies at scale (European Commission, 2025). Other data professions maintain BoKs that serve as references, including the GIS&T BoK (DiBiase et al., 2006; Prager, 2012), the DAMA Data Management BoK (DAMA International, 2017), the EDISON Data Science BoK (Demchenko et al., 2017), and the ACM/IEEE-CS/AAAI Computer Science BoK (CS 2023, 2024). While these frameworks inform the proposed work, none address the specific professional context of US RDM practitioners—who operate within a distinct policy landscape (NIH, NSF, DOE mandates) and institutional ecosystem (academic libraries, federal agencies, research offices)—nor have they been empirically validated with the US RDM workforce through a systematic occupational analysis.

The rapid expansion of RDM responsibilities across libraries, research offices, and disciplinary research teams has created a fragmented professional landscape in which expectations, competencies, and job titles are inconsistently defined (Bishop, Orehek, & Collier, 2021). Prior research confirms that while RDM services are growing, staff preparation and expertise vary widely, and training opportunities are uneven in scope, depth, and assessment rigor (Tenopir et al., 2014; Yoon & Schultz, 2017; Wildgaard & Rantasaari, 2022). Employers in will benefit from improved role clarity and a mechanism to evaluate candidates' qualifications. The broader US research enterprise benefits through more consistent, higher-quality data stewardship that protects and maximizes federal investments in research data. LIS programs offering or developing RDM certificates will benefit from national standards that guide curriculum design and enable program assessment.

Although many benefit indirectly, the primary direct beneficiaries of this project will be RDM professionals — data librarians, data managers, repository curators, and data stewards — who will gain clearer career expectations and pathways through a validated BoK and credentialing standards. Students pursuing RDM careers will benefit from certificates with consistent, nationally validated learning outcomes.

The RDM educational landscape is actively expanding through both non-credit and graduate pathways. Non-credit options include the Research Data Management Librarian Academy (RDMLA), CODATA-RDA Schools of Research Data Science, the Medical Library Association's Data Services Specialization, and Data Carpentries. At the graduate level, at least three US RDM certificates exist–at the University of Tennessee-Knoxville (Bradley Wade Bishop), the University of Denver (Peter Organisciak), and the University of North Texas–and many other iSchools offer coursework in digital and data curation (UNC, n.d.). This growth demonstrates strong demand for practical, skill-based education, but these certificates currently exist without national standards. Although recent competency framework efforts (LG-256645-OLS-24, Murillo & Yoon; Behrens & Blask, 2023; Demchenko et al., 2021) articulate the skills required for RDM work, competency lists describing what individuals should know do not equate to standards for what programs should teach. A BoK goes beyond a competency list by specifying the knowledge, skills, and abilities underlying each competency and linking them to assessable learning outcomes—transforming "what practitioners do" into "what programs must teach." Certificates on the same topic should deliver consistent learning outcomes; at present, no mechanism ensures this.

All RDM credentialing–encompassing standardized certificates, program assessment, and governance for quality assurance–would harmonize roles and expectations, reduce ambiguity for employers and practitioners, and support the professionalization of data stewardship as a distinct field of practice. National standards will also benefit practitioners at institutions without established RDM programs by providing clear, publicly available benchmarks for self-directed professional development and portable credentials that facilitate career mobility across institutional contexts.

It is useful to distinguish the levels of credentialing relevant to this project: a *certificate* attests to completion of a structured educational program; a *certification* is a voluntary credential typically requiring examination and continuing education, awarded by a professional body; and *credentialing* is the umbrella term encompassing both. This project focuses on standardizing RDM certificate programs, but these findings may also inform future certification efforts. Several examples from adjacent fields illustrate the value of formal credentialing. The National Geospatial-Intelligence Agency offers the GEOINT Professional Certification for geospatial data management (Bishop, Cadle, & Grubesic, 2015). Within archival and records management, the Certified Archivist (CA) and Certified Records Manager (CRM) credentials give practitioners formal recognition of their expertise. DAMA International offers the Certified Data Management Professional (CDMP), the most established data management credential, though it addresses enterprise data management broadly rather than research data specifically. Healthcare and clinical data fields have numerous certifications (Hoxhaj et al., 2022). By contrast, RDM has no formal credential despite having graduate certificates and concentrations across multiple LIS programs (UNC, n.d.). A credentialing ecosystem—encompassing certificates for structured learning, standards for program assessment, and governance for quality assurance—would improve role clarity, strengthen trust in RDM expertise, and enable clearer career pathways across institutions.

Project Work Plan

Theoretical Framework and Prior Work

This project is grounded in the Developing A Curriculum (DACUM) approach as its theoretical and methodological framework (Norton, 2008). DACUM is an established occupational analysis methodology used across professions to develop competency-based training, curricula, and job descriptions (Campion et al., 2011). Its task-based focus is particularly suited to RDM, where professional responsibilities are operationally defined through specific activities such as data documentation, repository management, and compliance with federal mandates.

DACUM rests on three core principles: (1) job incumbents—those currently performing the work—are the most qualified to describe their tasks; (2) jobs are best defined by describing their specific tasks; and (3) all tasks require specific knowledge, skills, and abilities (KSAs) for successful performance.

While DACUM privileges incumbent expertise, the project addresses this limitation through triangulation: the BoK will be validated by forward-looking Subject Matter Experts (SME) review (Objective 1) and practitioner feedback on emerging competency needs (Objectives 2 and 4), ensuring the framework captures both current practice and evolving demands driven by AI, new federal mandates, and changing data types. PI Bradley Wade Bishop has applied the DACUM approach in multiple job analysis studies of librarianship and data management (Bishop, Cadle, & Grubesic, 2015; Bishop et al., 2022; Bishop & Larsen, 2024). A DACUM may be preferred over other job analyses because (1) the cost and time commitment are much lower than those for other methods (e.g., direct observation), and (2) the results are specifically intended for curriculum development. Using the DACUM approach ensures that what is taught to students matches the current demands of today's jobs — especially salient for the rapidly evolving roles of research data professionals who must adapt to new technologies and federal policies.

The first step in the DACUM approach is data collection from a panel of subject-matter experts (SMEs), asking them to describe the tasks they perform on the job. The SMEs should be representative of the industry for which the job analysis is being conducted. The SMEs' tasks described are compiled into a list of core competencies. The second step is a survey validation of the core competencies to ascertain the most important, frequent, and difficult competencies. In the past, the PI has used the DACUM approach three times to develop valid competencies for two different professions–Geographic Information Librarianship twice over a decade apart and once for Earth Science Data Managers (Bishop, Cadle, & Grubesic, 2015; Bishop et al., 2022; Bishop & Larsen, 2024). This DACUM experience and expertise is key for the research activities to build a BoK and subsequently standards for RDM.

The DACUM approach has been used by the co-PIs, Ayoung Yoon and Angela Murillo, in the preparatory work for this project. Their focus groups and literature review engage workers and educators in this space, and their competencies lay the foundation for building the RDM BoK (Murillo and Yoon, 2024a; Murillo and Yoon, 2024b; Murillo, Yoon, Duncan, & Thomas-Fennelly, 2024). Their competency list closely follows the first step of the DACUM. The 116 competencies derived from the focus groups and literature review include data curation competencies, technical competencies, and soft skills and emotional quotient competencies as they relate to data curation. Data curation competencies include acquiring/creating data; preserving/archiving data; metadata management; data assurance; access/identity management; data manipulation; and data dissemination. Technical competencies included: general technical skills; data analysis, programming, database design, and data repository infrastructure. Lastly, soft skills or emotional quotient competencies included communication, personal/interpersonal skills, teaching/instruction, advocacy/outreach, research skills, legal/policy/ethics, and people and project management skills.

Step two of the DACUM approach is underway in early 2026 as this proposal's research team is conducting a national survey validation of the 116 competencies with a representative sample of data librarians, managers, stewards, and curators. The survey results provide generalizable rankings of the most important, frequent, and difficult core competencies. The survey validation step results provide clearer decisions on which competencies to prioritize in any RDM certificate program. Although 116 competencies may be needed, the constraints of time in a certificate program may require some ranking to focus curriculum on the most vital KSAs to conduct a job. Some competencies will be more essential to learn first, and others may be gained through continuing education and on-the-job experience. The survey closed March 3 and has 97 complete responses and analysis will be underway throughout March 2026. A paper has been accepted to present at the European Geosciences Union meeting in May. These efforts demonstrate the research team's commitment to disseminating findings and the global relevance of the research activities outlined in this proposal.

This project fills professional gaps identified in existing RDM literature and the discussions from the national expert workshop organized by the PI–Research Data Management Education Summit (RDMES) (NSF-2432080).

The workshop brought together twenty-six educators, scholars, and practitioners across disciplines supporting and training the next generation of RDM professionals. This workshop exemplifies the team's established approach to engaging stakeholders and community leaders in RDM education reform. This emerging RDM profession would benefit from educational standardization and credentialing. Increased quality control over certificate programs would improve the stewardship and availability of the country's research data. The project directly supports LB21 Program Goal 2, Objective 2.1: developing and enhancing professional development and training programs to enable the library and archival workforce to meet the needs of their communities. Several RDM certificate programs exist, and standardization of these curricula will lead to credentialing and quality-control of these essential workers for the US research enterprise.

The project team combines complementary expertise across RDM education, job analysis, competency development, and qualitative research. PI Bradley Wade Bishop (University of Tennessee-Knoxville) brings extensive DACUM experience across three prior occupational analyses and will lead BoK development, standards creation, and employer interviews. Co-PI Ayoung Yoon (Indiana University Indianapolis) brings expertise in data curation education and competency framework development and will co-lead the employer interviews and employee focus groups. Co-PI Angela Murillo (Indiana University Indianapolis) contributes expertise in data curation competency analysis and will contribute to BoK development and employee focus groups. Co-PI Peter Organisciak (University of Denver) brings experience in research methods and directs one of the three existing US RDM certificate programs, and will contribute to standards development, data collection, and dissemination. A graduate research assistant at UTK will support the project across all phases. All co-PIs are faculty in LIS programs and have published peer-reviewed research in RDM and related areas.

Project Activities

The research project enhances professional development and training programs in RDM through the three objectives outlined above. Credentialing would allow employers and students to distinguish between programs that rigorously assess student learning outcomes and informal training that lacks such quality assurance. The perspectives of both employers and employees are essential to validate the proposed standards and to assess the true market demand for credentialing.

To answer the four research questions, the research team will meet the following objectives.

Objective 1. Review competency survey findings and build a BoK. (*RQ1, RQ2)*

Objective 2. Gather employer feedback on the draft BoK and opinions on credentialing. *(RQ3)*

Objective 3. Develop national standards for the assessment of RDM certificates. *(RQ2)*

Objective 4. Assess standards and interests for credentialing of RDM of employees. *(RQ4)*

RQ1 corresponds to the DACUM elaboration of KSAs for each validated competency; RQ2 addresses how the profession may use the resulting BoK and is operationalized through dedicated interview and focus group questions about BoK applications in hiring, professional development, and curriculum design; RQ3 and RQ4 extend the occupational analysis into standards validation and market assessment through qualitative methods.

In Year 1, Objectives 1 and 2 will be addressed in Phase 1. Phase 1 (Sep 2026-Aug 2027) involves recruiting and hiring a student worker, building a project website, and the research team reviewing the survey validation of RDM core competencies findings. The website for the project will serve as a central location for the dissemination of all materials. Digital objects and data will also be deposited in various places outlined in detail in our Digital Projects Plan.

Objective 1 will use the survey findings to inform the creation of an RDM Body of Knowledge (BoK). A BoK lists the required knowledge, skills, and abilities (KSAs) needed to demonstrate core competencies. The 116 core competencies identified through prior focus groups and literature review span multiple capability categories. Through survey validation, the most important, frequent, and difficult competencies will inform a prioritized

RDM core competency list. Preliminary analyses suggest that a subset of the competencies (approximately 25–35) will emerge as the highest priority enabling the research team to focus BoK development on the most vital KSAs first. Some competencies may not be performed frequently enough by respondents to warrant inclusion, while certain KSAs–such as interpersonal communication–will underpin multiple competencies. The actionable tasks that a professional is expected to perform on the job and learn in their education are the KSAs, which are more specific than each competency. For example, the competency *metadata management* comprises KSAs such as knowledge of metadata standards, the ability to interpret data, and the skills to apply metadata elements. A soft skill competency such as *teaching/instruction* may include knowledge of pedagogy, assessment of learning outcomes, and lesson planning. KSAs will be developed through a structured expert elaboration process: each PI will independently draft KSAs for competencies in their domain of expertise, followed by cross-review, reconciliation, and external validation by the RDMES advisory group. KSAs will be organized hierarchically within each competency and cross-referenced to identify foundational skills that underpin multiple competencies. Feedback on the draft BoK will be gathered from an advisory group of 6–8 subject matter (SME) experts drawn from the 26 participants in the NSF-funded RDMES workshop, representing academic libraries, federal data agencies, and data repositories. An advisory group of SME will convene virtually twice per year to review deliverables using a structured evaluation protocol assessing clarity, relevance, and completeness. Directors of the three existing US RDM certificate programs (UTK, DU, UNT) will additionally review standards ensuring they are practical and implementable. This approach embeds external validation throughout the project rather than relying solely on internal data collection.

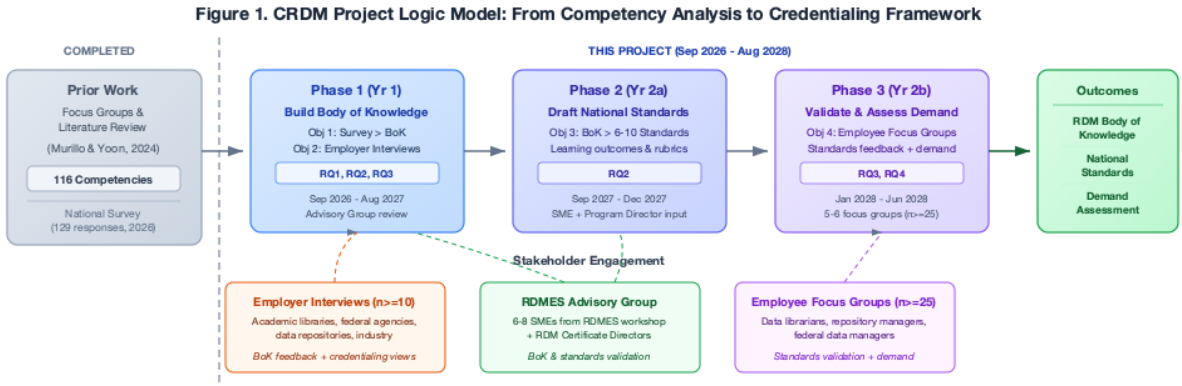
This project involves human subjects research through employer interviews (Objective 2) and employee focus groups (Objective 4) and requires Institutional Review Board (IRB) approval. The PI will submit the IRB protocol to the University of Tennessee-Knoxville IRB prior to the start of data collection in Year 1, with other institutions establishing inter-institutional reliance agreements with UTK as the IRB of record. All participants will provide informed consent prior to participation, including consent for audio recording and transcription. No minors or vulnerable populations will be included in this study. Participants will be informed of their right to withdraw at any time without penalty. All data will be de-identified during transcription, with personally identifiable information and institutional names removed prior to analysis and publication.

Employers will be recruited from data management-related units and institutions, including federal agencies, academic research libraries, and non-profit and industry sectors. Recruitment will occur through professional venues of data-related organizations such as the Research Data Alliance (RDA), Research Data Access and Preservation (RDAP), the Earth Science Information Partners (ESIP), and others. The budget justification includes incentives for participation for at least 10 employers. The amount for deans and directors at this career stage is double that of employees ($100 per employer). The interviews will focus on gathering employer feedback on the RDM BoK and its potential use in hiring and job descriptions, as well as employer opinions on the value of RDM credentialing. A target of 10 employer interviews is consistent with recommendations for achieving data saturation in qualitative research with a purposively selected expert population (Guest et al., 2006), with at least two team members independently coding each transcript to establish inter-coder reliability. Analysis will employ a hybrid deductive-inductive approach, using the BoK competency categories as initial codes while remaining open to emergent themes through iterative open coding (Braun & Clarke, 2006). The codebook will be iteratively refined as themes emerge, and analysis will be supported by NVivo qualitative data analysis software. Employer feedback will directly inform the refinement of the BoK and the development of national standards for assessing RDM certificate programs.

In Year 2 of the project, Phase 2 (Sep 2027-Dec 2027) addresses Objective 3. The research activity involves drafting standards to assess RDM certificate programs using the RDM BoK. Distilling the BoK's detailed KSAs into 6–10 actionable assessment standards will require careful synthesis by the research team. To engage with the community, feedback will be solicited from SME identified from the RDMES. The creation of these standards will also include writing example program learning outcomes and suggested assessment approaches for the standards.

Phase 3 (Jan 2028-Jun 2028) will address Objective 4 by conducting focus groups to gather employee perspectives on the standards and demand for credentialing. Focus group data collection will proceed under the IRB protocol approved in Year 1, with amendments as needed for the focus group instrument and recruitment materials. Because RDM spans diverse institutional contexts, the research team will use a stratified sampling frame to recruit across job types (e.g., data service librarian, repository manager, federal agency data manager). At least 25 employees will be recruited for 5 to 6 focus groups of 5-6 participants each, consistent with established guidelines for focus group research (Krueger & Casey, 2015). Recruitment will occur through data-related professional organizations including RDA, RDAP, ESIP, targeting practitioners from the humanities, social sciences, and STEM. Incentives of $50 per participant are budgeted to support recruitment. Employee perspectives will validate the proposed standards with current RDM practitioners and provide an evidence base for the demand for credentialing. Focus group transcripts will be analyzed using the same thematic analysis procedures described for the employer interviews, with iterative coding and inter-coder reliability checks. Focus group findings will be used to revise the BoK and standards in a final synthesis period in Summer 2028, with the revised documents posted on the project website by June 2028. All research team members have extensive experience in IRB-approved human subjects research, including multiple published qualitative studies in RDM and related areas.

Figure 1: CRDM Project Logic Model: From Competency Analysis to Credentialing Framework



Evaluation Plan

The project will include both formative and summative evaluations across four dimensions detailed in the Performance Measurement Plan: effectiveness, efficiency, quality, and timeliness. Formative evaluation will occur through monthly team meetings to assess progress against milestones, identify emerging issues, and make mid-course corrections. At the end of each Phase, the PI will conduct a summative review documenting objective completion, resource expenditure, and lessons learned. Quality of deliverables—the BoK, standards, and demand assessment—will be evaluated through structured feedback from SMEs identified through the RDMES network, assessing clarity, relevance, and completeness. The research team will also solicit feedback from RDM certificate program directors on the utility of the standards for program assessment. Progress reports and evaluation findings will be shared at quarterly team meetings and used to refine subsequent project phases. Timeliness will be tracked through milestone completion dates benchmarked against the schedule of completion, with adjustments documented when tasks deviate from planned timelines.

CRDM Personnel

PI: Wade Bishop is the coordinator of UTK's RDMC program, MSIS program Director of Graduate Studies, and was PI of IMLS LB21 Grant RE-13-19-0027-19, "CALL: Collaborative Analysis Liaison Librarians" and co-PI of IMLS LB21 Grant RE-05-12-0052-12, "Geographic Information Librarianship". Both prior projects used the DACUM approach to build curriculum related to RDM. He also is the current PI of NSF Research Data Management Education Summit (RDMES)--a workshop bringing together SMEs that provide oversight and input to the project.

Co-PI: Ayoung Yoon, Ph.D. is an Associate Professor at Indiana University Indianapolis, Luddy School of Informatics, Computing, and Engineering. She is the Information Science Ph.D. program director and oversees MLIS Digital Curation specialization. Her research areas include data sharing and reuse, open data, community data, and data curation. She is the recipient of several IMLS grants as PI and Co-PI on the topic of data curation and community capacity building, including "Data Reuse for Local Community" (#LG-96-17-0184-17), "Library Capacity Assessment and Development for Big Data Curation" (#LG-72-17-0139-17), and "Community Data Curation Competency" (RE-252380-OLS-22).

Co-PI: Angela Murillo, Ph.D. is an Associate Professor at Indiana University Indianapolis, Luddy School of Informatics, Computing, and Engineering. Additionally, she is the program director for the data science undergraduate program. Her research areas include scientific and research data management, data cyberinfrastructure, and data-related education. She is the recipient of several grants as PI and Co-PI, including "Open Science Roadmap for Research Infrastructures" (NSF #2531703), "CI Compass, an NSF Center of Excellence for Navigating the Major and Mid-Scale Data Lifecycle" (NSF #2127548), "CI CoE: Pilot Study for a Cyberinfrastructure Center of Excellence" (NSF #1842042), and "Community Data Curation Competency" (IMLS - RE-252380-OLS-22).

Co-PI: Peter Organisciak, PhD, is Department Chair and Associate Professor of Research Methods and Information Science at the University of Denver, where he teaches data curation and leads DU's Research Data Management concentration. His research spans computational text analysis, applied research methodology, and AI-assisted assessment, and has been funded by the National Science Foundation (2507129), Institute of Education Sciences (R305A200519), Institute of Museum and Library Services (RE-13-19-0027-19; LG-86-18-0061-18), and the National Endowment for the Humanities (HK-50176-14).

Project Results

Identified Need. These results directly address the lack of standardized credentialing for RDM professionals. The BoK will provide a shared foundation for what RDM professionals should know and be able to do; the national standards will give programs a framework against which to assess and improve their curricula; and the demand assessment will provide the evidence base needed to move from voluntary standards to formal credentialing mechanisms. Together, these products close the loop between workforce needs, educational standards, and quality assurance.

Intended Results and Deliverables. The project will produce three primary deliverables: (1) a comprehensive RDM BoK documenting the knowledge, skills, and abilities required for each core competency, validated by external subject matter experts; (2) national standards (6–10 standards with associated learning outcomes and example assessments) for evaluating RDM certificate programs; and (3) a credentialing demand assessment report synthesizing employer and employee perspectives on the proposed standards and the market for RDM credentialing. All deliverables will be published as open-access documents on the project website.

Dissemination Plan. The research team will disseminate findings through multiple channels to reach both scholarly and practitioner audiences. Conference presentations and engagement will include: RDAP Summit (Year 1 and Year 2, virtual engagement with the RDM practitioner community), ALISE Annual Conference (Year 2, presenting findings to LIS educators who develop and administer RDM certificate programs), and ALA Annual Conference (reaching practicing librarians who are primary beneficiaries of credentialing standards). The team will also pursue publication at iConference as appropriate. The team will prepare at least three peer-reviewed articles—on the BoK development, the national standards, and the credentialing demand assessment—targeting outlets such as the *Journal of Education for Library and Information Science*, *College & Research Libraries*, and *Journal of eScience Librarianship*. The PI will also publish accessible summaries through *The Conversation* to reach non-technical audiences. All presentations, publications, and datasets will be linked from the project website.

Adaptability and Generalizability. Other LIS specializations seeking to develop credentialing frameworks could follow the same DACUM-based pipeline: SME-driven competency identification, survey validation, BoK construction, and standards development. The project will document this process as a replicable methodology guide, enabling other fields to adapt the approach to their own professional contexts. The BoK itself will be structured modularly: full certificate programs can use it comprehensively, while individual courses or continuing education providers can reference specific competency areas. The standards will include a self-assessment rubric that programs can use independently to evaluate their alignment with national expectations. The standards framework will be designed to accommodate evolving technologies and policies, allowing periodic revision as the field changes.

Sustainability. The project website, hosted at UTK, will maintain all deliverables beyond the period of performance. The BoK and national standards are designed to be living documents that can be updated through future research as the profession evolves. The research team will explore potential governance pathways for the BoK and standards, informed by community feedback gathered at ALISE, RDAP, RDA, and ALA, to identify the most appropriate mechanisms for ongoing maintenance and adoption. The team recognizes that standards adoption requires institutional infrastructure beyond this project's scope; accordingly, the demand assessment data from Objective 4 will provide the evidence base needed to build organizational support for future adoption discussions.

De-identified interview and focus group data will be deposited in a disciplinary data repository (e.g., ICPSR or the Qualitative Data Repository) for reuse by other researchers. The credentialing demand assessment will provide the evidence base for future discussions about whether voluntary standards should evolve into formal certification requirements.

Digital products will follow the formats, metadata standards, and repository plans detailed in the Digital Products Plan. All datasets will use Dublin Core metadata and be formatted according to FAIR principles. Quantitative data (CSV) and de-identified qualitative transcripts (PDF/A) will be deposited in disciplinary repositories (Dryad/ICPSR for survey data; ICPSR or the Qualitative Data Repository for interview and focus group transcripts). Research publications and the BoK standards documents will be deposited in Zenodo. All products will be licensed under Creative Commons (CC BY-NC-SA 4.0). The proposed BoK will be designed for interoperability with international frameworks such as RM Comp and FAIRsFAIR, enabling cross-national comparison and potential harmonization of RDM professional standards. By establishing the first validated Body of Knowledge and national assessment standards for RDM education, CRDM will provide a foundation for professionalizing research data management—ensuring that the workforce responsible for stewarding America's research data is trained to consistent, rigorous standards.

CRDM Schedule of Completion

Year One

CRDM	**Activity**	**Year One: Sep 2026-Aug 2027**											
		Sept	*Oct.*	*Nov.*	*Dec.*	*Jan.*	*Feb.*	*Mar.*	*April*	*May*	*June*	*July*	*Aug*
PI	Recruitment and hire student worker and create website												
	Recruit employers												
	Subject Matter Expert BoK review												
Research Team	Review survey findings												
	Conduct and analyze employer interviews												
	Create a BoK												
Student worker	Assist with review of survey findings and writing of BoK												

Year Two

CRDM	**Activity**	**Year One: Sep 2027-Aug 2028**											
		Sept	*Oct.*	*Nov.*	*Dec.*	*Jan.*	*Feb.*	*Mar.*	*April*	*May*	*June*	*July*	*Aug*
PI	Conduct and analyze employee focus groups												
	Recruit employees												
	Subject Matter Expert BoK review												
Research Team	Drafting standards												
	Remaining analyses and dissemination of research												
Student worker	Assist with writing standards and analyses												