In this study I explore the extent to which Library and Information Science (LIS) graduate curriculum aligns with knowledge, skills, abilities and attributes required by the Information Governance Professional (IGP) exam. To determine this, I evaluated 122 syllabi from two top-ten ranked iSchools and then crosswalked the syllabi to 24 IGP exam competency categories.

While I found that most IGP exam competencies are adequately addressed through this sample of LIS curricula, Information Science and Information Management specialties appear better aligned than coursework from the Library Science specialty. While certain courses teach individual knowledge, skills and abilities more heavily than others, a few courses address multiple competencies in depth. Ironically, the general information governance framework was not taught by either of these schools. This research can help inform students interested in information governance professions which classes to select and also help LIS schools determine what curriculum gaps may exist that would help meet student needs.
INFORMATION GOVERNANCE PROFESSIONAL EXAM COMPETENCY REQUIREMENTS AND GRADUATE iSCHOOL SYLLABI: A CROSSWALK

by
Betsy M. Ford

A Master’s paper submitted to the faculty of the School of Information and Library Science of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Science in Information Science.

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Approved by

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Denise Anthony
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INTRODUCTION

Managing business and institutional information was once a well-defined, somewhat linear process. Solutions for analog record storage included on-site record centers and archives, while retention schedules afforded some assurance that storing an increasing amount of material could be controlled. With the growth of networked computing, onsite information technology services assumed a role in managing the lifecycle of digital content. Information systems automated record lifecycle tasks in an effort to manage digital growth similar to the way analog content was managed. Enterprise content management systems later aimed to integrate structured and unstructured data repositories.

Today, a mobile and digitally-connected workforce demands integration along with quick access. At the same time, it is creating data in volumes we have never managed before and providing opportunities for enterprises to repurpose and monetize data. As an economically viable response, demand is increasing for cloud storage providers and hosted software applications offering seamless program updates.

These models increase security risks to organizations, make compliance with complex regulations difficult and complicate e-discovery processes, ultimately calling for change to the traditional information management framework. This new framework,
designed to address these complexities, is called information governance (IG). As a professional with a background in traditional records management and a student interested in staying current with the field’s trends, I am motivated to understand the competencies required of today’s IG professionals. This paper explores the relationship between skills and abilities required of certified information governance professionals (IGPs) and how graduate-level information science curricula might equip individuals develop them.
LITERATURE REVIEW

Information Governance

Disparate functions like risk management, legal, compliance, information technology, data management and records management all share an interest in mitigating risk with respect to managing enterprise information. A myriad of laws surrounds information management, and there are many well-documented standards, strategies and policies that address them (Saffady, 2017). However, even when these individual functions carry out their duties using sound guidance as established by their own industries’ standards, a disconnect between these information stakeholders persists. This is made evident when business processes collide, data is breached, laws are broken or simply when strategic objectives are not realized.

Information management literature has long cited challenges with information silos like these within organizations, followed by a consistent call for interdisciplinary collaboration (Cromity & de Stricker, 2011). Absent an organizational framework or performance structure supporting such an effort, information professionals have had little incentive or direction to overcome these silos. Information governance (IG) is a framework designed to facilitate this demand.

In addition, Patricia Franks, San Jose State University’s Master Degree in Archives and Records Management program coordinator, and Robert Smallwood, founder of the Institute for Information Governance, note other factors contributing to the increased
demand for IG. Franks explains that the growth of unstructured information, increasing e-
discovery demands and an absence of controls to manage electronically stored
information are leading causes that motivate organizations to strategically coordinate
threats as a contributing factor. He argues that these factors have led to a “recognition
that multiple overlapping disciplines [are] needed to address today’s information
management challenges” (2014, p. 5).

IG frameworks are designed to give these “overlapping disciplines” a structure to
optimize their efforts – one that clearly delineates roles and responsibilities for each party
involved. Widely-cited IG definitions specify a need for such accountability (Gartner,
2019; Wiler & Carlisle, 2017; ARMA, 2006). This accountability is managed in an IG
framework, often using a RACI matrix to assign each information stakeholder distinct
role(s) for every information management related task (Feltus, Petit & Dubois, 2009).

RACI stands for the four roles assigned to each task: responsible, accountable, consulted,
informed. Table 1 illustrates a RACI matrix using a sample task and assigned roles for
each discipline.

Table 1.
Responsibility Assignment Matrix

<table>
<thead>
<tr>
<th>Records Mgmt</th>
<th>Info Tech</th>
<th>Info Security</th>
<th>Risk Mgmt</th>
<th>Compliance</th>
<th>Legal Affairs</th>
<th>Data Science</th>
<th>Archival Admin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implement controls to prevent unauthorized access to digital information</td>
<td>I</td>
<td>A.R</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>I</td>
</tr>
</tbody>
</table>

Note. Sample reprinted from Information Governance – Concepts Requirements and Technologies, by
William Saffady, p. 137, Copyright 2017 by ARMA International.

The popularity of the structure that IG offers has grown in recent years as noted by
research from the Information Governance Initiative (IGI), a private think tank comprised
of diverse industry stakeholders. IGI first began assessing IG’s position in the marketplace in 2014 through research and subsequent annual surveys of government and various private-sector industries. Their annual reports have documented the IG market’s growth, with last year’s report announcing that IG could be characterized as a “clearly defined” field, compared to “emerging” just a year before (2018). This year’s ARMA and Cohasset’s 10th biennial Information Governance Benchmarking Report found that 41 percent of Records and Information Management (RIM)/IG survey respondents worked for organizations that prioritized IG advancement “as a business imperative” (2019, p. 3).

Information Governance Professional Certification

Trending along with IG’s increasing market growth are certification programs specific to IG professionals. Mardis, Spears & McClure contend that industry certificates are a means for professionals to demonstrate their readiness to contribute as qualified employees within a specialized job sector (2016). While several certificate options for IG subdisciplines are available, there are two certification programs specific to IG. ARMA endorses the Information Governance Professional (IGP) certification that was created by an independent body called the Information Governance Professional Board (2019). The Association for Information and Image Management (AIIM) promotes its Specialist in Information Governance certificate (2019).

The IGP certification was developed according to ISO/IEC 17024:2012, the standard used to develop certification programs and certify individuals (Franks, 2018). It became available in 2013 and has an established presence in the job market, with some postings listing IGP as a preferred or required qualification (Force, 2017). The mission of the certification program is to “provide an information governance credential within an
ethical and professional framework to support individuals to deliver organizational value and reduce risk” (IGCB, 2017, p. 7).

The 140-question exam measures IGP candidates’ competencies in six content areas denoted by letters A through F that are closely weighted: managing information risk and compliance (A), developing IG strategic plan (B), developing IG framework (C), establishing the IG program (D), establishing IG business integration and oversight (E), and aligning technology within the IG framework (F) (ARMA, 2017). The *Information Governance Defining a Curriculum* (DACUM) Chart is a matrix that breaks down these six content areas into 29 sub-areas that are each associated with several “duties, tasks and steps.” The sample matrix in Table 2 shows how this matrix connects knowledge, skills, abilities and attributes (KSAAs) to content areas, sub-content areas and duties, tasks and steps.

Table 2.
Defining a Curriculum (DACUM)

<table>
<thead>
<tr>
<th>Duties, Tasks and Steps</th>
<th>Knowledge</th>
<th>Skills, Abilities and Attributes</th>
<th>Tools, Equipment and Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C</strong></td>
<td>Developing IG Framework</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Conduct due diligence to identify standards to guide the IG framework</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Evaluate external standards, guidelines, technical reports, best practices</td>
<td>• Information management standards</td>
<td>• Analytical skills</td>
</tr>
<tr>
<td>b</td>
<td>Select standard, guidelines, technical reports, best practices to inform the framework</td>
<td>• Information technology standards</td>
<td>• Communication skills</td>
</tr>
<tr>
<td>c</td>
<td>Document the selection process</td>
<td>• Legal defensibility</td>
<td>• Discernment and judgement skills</td>
</tr>
<tr>
<td>d</td>
<td>Review and verify selection with stakeholders</td>
<td>• Policy development standards</td>
<td>• Project management skills</td>
</tr>
<tr>
<td>2</td>
<td>Establish enterprise IG policies and standards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Define discrete policies and standards</td>
<td>• Information preservation and archives</td>
<td>• Technical writing skills</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• …</td>
<td>• …</td>
</tr>
</tbody>
</table>

Note. Sample reprinted from *Information Governance DACUM Chart*, pp 3-4, Copyright 2017 by ARMA International.
Upon passing the exam, IGPs are required to document 60 hours of continuing education every three years to maintain certification. Before taking the exam, the IGP Governance Board also recommends that individuals with a bachelor’s degree have a minimum of three years’ experience managing or leading an information-related project or program (2017, pp. 10). There is no specific recommendation for candidates with graduate degrees.

*Industry Competency Requirements’ Relationship to Curriculum Development*

Despite the industry’s adoption of IG, there is very little literature from the LIS community regarding the topic. However, there is considerable literature published about LIS programs’ interest in aligning curricula to industry demands (Buttlar and Du Mont, 1996). In fact, The American Library Association (ALA), the accrediting body for LIS programs, supports this approach to curricula development by including an accreditation standard that states, “Design of general and specialized curricula takes into account the statements of knowledge and competencies developed by relevant professional organizations.” (2019, Standard II.4). However, the listed “relevant professional organizations” are limited to traditional library and archives organizations.

Although IG-related fields may not be formally recognized by the ALA, they appear to be integrated into LIS curricula to some degree. Common courses taught by iSchools include IG disciplines like project management, data management, information security, knowledge management, and records and information management. Associations from these subfields publish knowledge and competency statements similar to those listed by the ALA. These competencies are recognized in LIS literature and have influenced iSchool curricula through the addition of programs such as those related to digital
curation (Tibbo & Lee, 2011) and courses like project management (Cortez, Dutta & Kazlauskas, 2004).

Information research has applied several methods to assess curriculum against industry competency needs to identify gaps. Methods commonly used in LIS include job posting analysis (Force, 2017); surveys of practitioners (Blankson-Hemans and Hibbard, 2004); surveys of LIS alumni (Buttler & Du Mont, 1996); content analyses of syllabi, internships and professional standards (Mardis, Spears & McClure, 2016); literature review and certification education (Haqaf & Koyuncu, 2018); and curriculum gap analysis (Leonard, Jones & Lang, 2018).

In a Department of Education study, Klein, Cuccaro-Alamin, Hoachlander, and Giambattista recommended crosswalking knowledge, skills and abilities required by professional certifications’ blueprints to academic curricula to help align students’ competencies with the job market (1997). However, I found no literature where IG industry certification exam competencies are crosswalked to LIS syllabi. Outside of ARMA publications, very little academic research exists about the IGP exam.

In this study, I aim to explore the extent to which syllabi from two top-ten ranked iSchools align with the set of 102 unique terms and phrases used to describe the knowledge and skills listed in the IGP certification’s DACUM document.

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1 Examples include Certified Records Manager (CRM), Certified Records Analyst (CRA), Certified Information Privacy Professional (CIPP), and Project Management Professional (PMP)
METHODS

In this qualitative research, I used latent content analysis methodology. Content analysis is a means of identifying themes in text data by systematically classifying text through coding (Hsieh & Shannon, 2005). The latent approach makes sense of the data by reducing it into fewer categories using open coding, where the codes are derived from the text itself (Strauss and Corbin, 2008). The coding frame for this study was derived using methodology from Margrit Schreier’s chapter in The Sage Handbook of Qualitative Analysis, which outlines iterative procedures for developing mutually exclusive categories and assigning working definitions and coding indicators to each of them (2014). Its inter-rater reliability was evaluated using three raters, resulting in a Krippendorf’s alpha score of 0.8 (Krippendorff, 2013; Freelon, 2010). This score indicates an acceptable reliability.

Categorizing DACUM Competencies

This study crosswalked 102 unique DACUM competencies (KSAAs) to syllabi from two top-ten Library and Information Science (LIS) graduate schools. The final coding frame (Appendix A) ultimately reduced the 102 KSAAs into 24 categories using the following iterations:
1. Using Excel to deduplicate terms and phrases in the knowledge and skills columns reduced 281 original terms and phrases to 102 unique KSAs. (e.g., “continuous improvement” was listed as knowledge and a skill)

2. Grouping overlapping terms and phrases where I could not perceive a nuance in the definition. (e.g., “budgeting” and “budgeting skills”)

3. Grouping KSAs according to definitions found in *ARMA’s Glossary of Records and Information Management Terms*, as registered with American National Standards Institute (2016). (e.g., The *Glossary* defines risk management in a way that also incorporates KSAs “Risk analysis methods” and “Risk assessment methods”)

4. Grouping KSAs when the vocabulary overlapped conceptually but not verbatim (e.g., “communication skills” and “tact”)

5. Consulting the specific DACUM competency domain and subcategory for context when a KSAA could fit into more than one category (e.g., “Performance Management” can be used in both human resources and IT contexts. The DACUM context suggested it related to human resources and not IT system performance)

The resulting categories are not expected to be replicable, but they are useful to group like-concepts for my analysis. To ensure integrity during the crosswalk with LIS syllabi, exact DACUM terms and phrases that make up my artificial categories were used as much as possible

A sample of the coding framework is included in *Table 3*, and the full framework can be found in Appendix A. The framework includes my 24 categories and the unique DACUM KSAA terms and phrases. It also includes frequency counts representing how
many times the KSAA terms or phrases were used in *DACUM* and how many total times I crosswalked syllabi from both schools to each category.

**Table 3.**
Coding Framework Sample

<table>
<thead>
<tr>
<th>Category</th>
<th>DACUM’s KSAA Terms and Phrases</th>
<th>DACUM Frequency</th>
<th>Syllabi Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance and Accounting</td>
<td>total cost of ownership, financial analysis and planning, financial modeling, financial skills, budgeting, budgeting skills, cost benefit analysis</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>Records and Information Management</td>
<td>records and information management, information management standards, electronic information management principles and practices, electronically stored information</td>
<td>12</td>
<td>14</td>
</tr>
</tbody>
</table>

Working definitions for each category are in Appendix B. I developed them mostly from ARMA’s *Glossary of Records Management and Information Governance Terms*, relevant Body of Knowledge (BOK) books, and related industry standards (e.g., ISO and ANSI).

**Selecting Graduate School Syllabi**

I selected two top-ten graduate LIS programs (iSchools) rated in 2017 by *The U.S. News and World Report* for this study. The sample was selected, in order of the report’s ranking, based on whether or not syllabi were publicly accessible via iSchool or registrar websites. Two of the top ten schools met this criterion: University of North Carolina – Chapel Hill (UNC) and University of Maryland (UMD).

I evaluated only master’s-level courses for each university, with the exception of two undergraduate-level courses that are required for graduate students. To further narrow the scope of this research, I excluded courses unrelated to IG topics, including Health
Informatics, youth librarianship, computational linguistics, and human-computer interaction (product design and prototyping).

I input course codes for each relevant course by program into an Excel spreadsheet for analysis. I gathered syllabi and evaluated components such as course titles, descriptions, learning outcomes, assignment descriptions (if available), and daily/weekly topic descriptions. Memos containing insights during the review process were also noted in a Word document. Due to time constraints, I did evaluate readings from syllabi; however, further evaluation of readings may add value to this research.

I used additional inclusion criteria and syllabi analysis methods:

- Courses offered for four Masters degree programs (UMD’s Masters of Information Management, UMD’s Master of Library and Information Science; UNC’s Master of Library Science; and UNC’s Master of Information Science)
- Courses related to each program’s relevant sub-specialty areas (e.g. Records and Archival Science, Digital Curation)
- Core courses for each program (noted for analysis)
- Only syllabi published since 2017 were considered (DACUM published in 2017)
- The most current version of each syllabus, including summer school syllabi
- When the same course was taught in the same semester by multiple instructors, I only crosswalked one published syllabus (selection based on robustness)

I used the following exclusion criteria:

- Field experience, practicum, summer seminar, internship syllabi (due to variability)
- Course offerings from university programs outside the iSchools
• When full-credit courses (3 hours) were offered in abbreviated form for half-credit, I excluded the half-credit syllabus

Crosswalking Framework Categories to Syllabi

I conducted a pilot coding exercise using a selection of three disparate syllabi based on course title to test and refine the coding frame’s validity and its working definitions (Schreier, 2014). This involved coding each syllabus twice to ensure reliability and mutual exclusivity of the assigned IGP exam codes. Reliability was further assessed by recruiting two raters to crosswalk randomly selected terms and phrases from syllabi to the coding framework’s category list. With an acceptable Krippendorf’s alpha score and minor adjustments made to the coding frame, each syllabus was coded once.

During the crosswalking phase, I reviewed each syllabus three times. The first reading was conducted prior to analysis in order for me to understand the content and its context (Corbin & Strauss, 2008, chapter 8). During the second reading, I wrote memos for raw data encountered that aligned with the framework’s categories (Appendix A). Crosswalking involved using the categories’ working definitions (Appendix B) and the corresponding DACUM’s KSAAs. I conducted the third and final round of reading after coding all syllabi, and before analysis, to ensure I applied the codes consistently.

Limitations

There were limitations to this study. Due to the exploratory nature of this study, I used only a small sample of universities. Additionally, my choice to exclude certain degree curriculum from this study may have eliminated courses with learning outcomes that support DACUM knowledge and skills (e.g., research and instructional skills offered by youth library science courses; industry-specific informatics knowledge found in health
informatics courses; and technical skills offered by human-computer interaction courses).

Therefore, these competencies in LIS curricula may be more prevalent than this study discovered.

Some courses that may have been eligible for evaluation did not have syllabi available for review. These may have yielded IGP relevance, but I did not evaluate them, as course titles and descriptions alone are not always reliable (Force, 2017). Similarly, I did not evaluate assigned readings, and detailed assignment descriptions were not consistently included across syllabi. Further, syllabi do not account for education opportunities outside of coursework common in graduate programs such as workshops, seminars, product demonstrations and symposiums. These factors reduced possible mapping opportunities.

Finally, graduate students are constrained by the number of courses they can elect to take before graduating. It is common also for iSchools to offer specialization or certificate programs where courses are packaged by the university as requirements or recommendations. However, there are no IG specializations or certifications offered by any iSchool. Therefore, even if iSchools offer courses that align with the IGP competencies, it is likely that students would not take a combination of courses that would maximize their exposure to IG competencies.

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ii UNC’s INLS 161 is a prerequisite for graduate students (can be completed via a competency test) and INLS 465 is a required course for Archives and Records Management certificate students.

iii 48 credit hours are required by UNC and 36 credit hours are required from UMD.
ANALYSIS

In this section, I will analyze each of the 24 competency categories as they relate to the crosswalked syllabi. I evaluated a total of 122 syllabi (69 from UMD and 57 from UNC), resulting in 468 codes (268 from UMD and 200 from UNC). In summary, each of the framework’s 24 knowledge and skill categories corresponded to at least one course syllabi (the Coding Frame in Appendix A details the number of syllabi corresponding to each category). This analysis can help us better understand how iSchool curricula relates to IGP certification competencies.

Archival Preservation

Graduate-level archival studies have been a mainstay in LIS curricula since the 1960s, and more than twenty years prior to that the history field formally taught the topic (Ham, Boles, Hunter & O'Toole, 1993). Today, data from SAA’s education directory and the iSchool membership directory report that 78 percent of member iSchools offer Master’s programs in archival studies across the United States and Canada.

Consistent with this research, both UNC and UMD offer an archives specialty. The archival preservation category was crosswalked to 20 percent of the schools’ collective syllabi. Comparatively, archival preservation is only represented in one percent of the DACUM Chart KSAAs. The courses with archival preservation codes included at least one required course for both schools (both in library science core courses).
Notable across the syllabi terms and phrases in this category was the dominance of digital curation and digital preservation topics. This is not surprising, given UNC’s leadership in developing digital curation curriculum and its adoption by UMD (Tibbo & Lee, 2011). Even though the IGP certification competencies do not appear to prioritize archival studies or digital curation topics, digital curation is measured as one of the Information Governance Initiative’s IG subdisciplines, with 64 percent of the respondents to its latest survey agreeing that it has a role in the IG-space (2018).

This information suggests that the graduate curricula reviewed adequately meets or exceeds current KSAA requirements for the IGP exam. In addition, digital curation-specific competencies that are acquired by graduate students opting to take these classes may be underrepresented in the DACUM Chart. Further analysis of archival studies programs as they relate to IG may yield useful insights for both fields.

Audit & Risk Management

Geoff Yeagley explains that audit and risk are distinct topics but are often used interchangeably (2015). I combined the six related terms and phrases from the DACUM Chart to evaluate because they were often taught together in graduate courses and also combined in DACUM’s descriptions.

Six percent of IGP KSAs are focused in this area, while 16 percent of the graduate courses evaluated covered the topic to varying extents. The DACUM Chart’s aim is for professionals to be able to “conduct a risk assessment,” “prepare a risk profile,” “manage the risk mitigation process”, “conduct risk and compliance audits,” and “develop auditing and enforcement mechanisms…”
LIS syllabi show that audit and risk are taught through weekly class topics and assignments that require students to conduct an audit or risk assessment or even write an executive summary of an existing assessment. In a few cases, the KSAAs are referenced in high-level course descriptions, suggesting that the competencies are a primary course topic, opposed to one that is briefly touched on. It should be noted that while the schools offered courses that taught these KSAAs, none of them are core courses that the schools require students to take.

While both schools have multiple classes that teach these topics in a broad sense, three courses are dedicated to the topics. UNC teaches “Audit and Certification of Trustworthy Digital Repositories” as part of its digital curation certificate program. The school also teaches an information security and assurance course on IT-centered audits (e.g. network and Linux & Windows audits). UMD offers “Information Audits and Environmental Scans” as part of its Master of Information Management program.

**Business Process**

Four percent of the KSAAs focused on business processes analysis and business process management skills. They were mostly in the DACUM competency domain labeled, “Establishing IG Business Integration and Oversight,” noting the importance of being able to implement an IG program while accounting for existing business processes.

All four degree-programs evaluated for this study addressed KSAAs in this category at least once in their required courses. Business process analysis is the primary theme of the similarly-structured Systems Analysis (UNC) and Capstone Experience (UMD) courses. Both courses require students to assume a consultative role for an organization to assess an information system problem in a semester-long project. Students must evaluate
and understand current business processes and make process improvement recommendations for the client. UNC requires Systems Analysis for information science students, recommends it for its library science students, and requires it for students pursuing a Records Management and Archives certificate. UMD’s Capstone Experience is required for its Management of Information Science graduates.

By integrating a lecture component into its Systems Analysis course, UNC also introduces Six Sigma methodology. Both schools require students to complete workflow diagraming assignments in multiple classes, and UNC’s Information Assurance course (required for the digital curation certificate) prepares students to create “procedures documents for an organization” (INLS 767, Summer 2019).

Change Management and Training

In addition to “change management” knowledge, DACUM lists a skill for “training and learning methodologies,” a component common to change management efforts. Sixteen syllabi addressed this category; it is covered at least once in a required course for all four master programs I evaluated. I commonly found KSAAs related to “training and learning methods in library-specific courses focused around user instruction methodology.

Change management theories and concepts were notably taught in courses with IG-themes, including three courses required for UNC’s digital curation certificate and two courses in UMD’s Master of Information Management program. UNC’s Information Assurance class required students to write a “training methodologies letter” for an assignment (INLS 767, Summer 2019). A UMD course titled Management of Information Programs and Services had a course objective aiming to teach “adaptive
management techniques for issues such as change...,” addressed by an assignment and a weekly topic (INMF 612, Spring 2019).

Data Analysis

I crosswalked data analysis KSAAs to 32 percent of all syllabi but found dominance in the courses specific to information data analytics. DACUM skills and knowledge phrases in this category focus on trend/statistical analysis, metrics, and measurement methodologies. At the time of this writing, neither UNC or UMD programs offer distinct data science programs, but they both offer applicable, targeted courses.

UMD offers a course titled “Data Analytics for Information Professionals” that explores topics like statistical biases and requires programming competencies, and UNC offers “Information Analytics” that covers topics like regression, similarity and cluster analysis, and predictive modeling. UNC’s course description states that “the course introduces proven and emerging analytical techniques that can be used to deal with mountains of mostly unstructured data.”

Research courses taught by both schools present quantitative research methodologies. UNC’s required Research Methods course teaches analysis that gives students hands-on experience using a statistical software package. Other courses mapped to this category include terms like data cleaning, visual analytics, sentiment analysis, algorithm analysis, data interpretation, usability data analysis, data validation, data reduction, socio-statistical assessment, etc.
Data Systems and Data Classification

Knowledge competencies combined in this category refer to data systems, repositories, and their associated classification schemes for structured and unstructured data. DACUM situates these knowledge requirements in an IT context, as one component of skills and knowledge IGPs need in order to “define [the] current state of technology use in business process” and “align [an] IG strategic plan and framework with the IT strategy and operations.” DACUM only referenced these knowledge areas twice.

However, they are foundational topics at the schools evaluated, with all four degree programs requiring courses in information organization that “focus on fundamental concepts of organizing systems…” (UNC’s INLS 520, Spring 2019). Specialized metadata and database courses deliver this content in depth. Data systems and data classification was the third most frequently coded category in this research’s syllabi.

Finance

Finance-related knowledge and skills were listed ten times in DACUM, with some being broad terms (e.g. financial skills, budgeting skills) and others narrower (e.g. total cost of ownership, cost benefit analysis). Of the 14 syllabi crosswalked to this category, all but two focused on IGI subdisciplines, suggesting relevance to this category’s IGP competencies.

A course that incorporates competencies in this category within the IG theme is from UMD’s Masters of Information Management program titled, “Financial Management of Information Projects.” The introductory paragraph to the syllabus states, “Whether you are making the business case for a new initiative, evaluating a vendor’s financial viability, selecting information management project proposals for funding, or managing
an ongoing program, knowledge of concepts and techniques of financial management and management accounting are central to your ability to succeed as an information professional” (INMF 711, Spring 2017).

**Information Governance**

Even though the IGP certification is specific to “information governance”, this category only accounted for 5 percent of the *DACUM* knowledge and skills. Further, only one syllabus crosswalked to the category. The IGP certification exam requires knowledge of “IG principles and practices,” according to the *DACUM Chart*. Because IG is an umbrella concept, composed of many specialized subdisciplines, policies and standards, I was challenged to characterize “information governance” as competency. Instead, I assumed that this category of KSAAs call for candidates to understand the IG framework, related definitions and practices.

However, LIS curricula generally did not appear to teach IG, even as a broad concept. The closest course identified in this set of syllabi was from UMD’s Masters in Information Management program called “Introduction to Strategic Information Management.” Weekly topics from this course include IG-themed concepts like policy framework, enterprise strategy, information resource strategy implementation plan, and function management. An excerpt from the course description describes the course with similarities to the IG definition used for this research:

*Due to changes occurring in our global landscape the integrating of business and technology is compelling organizations to move beyond traditional reactive and silo-based information resources management approaches to a managed predictive approach that treats information resources as a strategic asset and uses it to create business value.* (INMF 620, Spring 2019)
The exact phrase “information governance” was only used in one syllabus (UMD), in the context of big data, and not as a generally taught concept. Regardless of whether or not information governance can be classified as a skill unto itself, it is surprising that two top-ten schools do not formally introduce information governance, given it is a trending topic in information and records management.

*Interpersonal & Soft-skills*

Research from the Society of Human Resources Management found that employers look more closely at soft-skills than they do so-called hard-skills (2016). Therefore, it stands to reason that interpersonal and soft-skills is the most frequently referenced knowledge and skill category for IGP candidates, making up a third of DACUM’s KSAAs. Congruously, these competencies were the most frequently referenced in syllabi, with nearly half of the syllabi being crosswalked to this category.

During the pilot syllabus evaluation, it quickly became clear that thoughtful attention was given to course design to help students develop these skills. I only crosswalked syllabi to this category if a word or phrase from the DACUM set of KSAAs was used verbatim or if the syllabus explicitly mentioned an intent for a particular skill to be developed. For instance, I did not consider courses requiring online forum discussions as developing “communication” skills unless intent to develop this skill was stated.

Interpersonal & soft-skills were mostly applied through semi-structured discussion forums, team projects, capstone work, assignments and grading rubrics. These were designed to teach DACUM KSAAs including critical analysis, presentation skills, stakeholder communications, collaboration, persuasion, analytical skills, tact, relationship building skills and ability to respond under pressure. A variety of presentation methods
were required in assignments, including webcasting, research posters, videos and Powerpoint-style delivery. Team assignments were common, intentionally designed to foster collaborative skills. Executive proposals were common assignments, designed to facilitate persuasion and stakeholder communication skill development.

**IT Concepts and Vocabulary**

This broad category includes IT operations, tools, vocabulary, concepts, standards, and roles and responsibilities. These KSAAs were mentioned 14 times in DACUM and were covered to varying extents in the syllabi. Terms and phrases crosswalked from syllabi ranged from computer-science topics like programming languages and network architecture to less technical topics like computer hardware. Because this category is so broad and its intent unclear as it relates to IGP needs, it is difficult to measure iSchools’ ability to meet these competency requirements. Better defined KSAAs from ARMA would be helpful.

Throughout the syllabi review, I noted multiple times that the DACUM Chart did not specify knowledge or skills required for data management. However, UNC and UMD syllabi crosswalked data management in syllabi five and six times, respectively. Most data management references were found in digital curation courses, which again, is a subfield of IG according to IGI (2018). Because data management is typically an IT role and responsibility (which is a DACUM KSAA in this category), it seems that the topic’s prevalence in iSchool curricula warrants inclusion in DACUM.

One of data management’s relevance to IG is in its lifecycle planning for long-term storage, reuse and sharing. Fields leveraging these skills seem to be science that collects large quantities of research data, government with long-term retention requirements for
public data, and researchers whose data may be needed for validation or reuse. On the other hand, enterprise interest in data management centers around monetizing data, managing its lifecycle to mitigate risk and optimizing storage requirements. It would be helpful to understand if data management skills are necessary for IGP-certification candidates.

*IT Governance*

Several common frameworks exist that help align business strategy with IT. COBIT and ITIL, both with certification programs of their own, are two such frameworks that help enterprise IT govern and manage the enterprise function. This category was referenced three times in the *DACUM Chart*, but like the information governance category, it is an umbrella topic comprised of a set of specialized skills and knowledge. Therefore, I did not crosswalk IGP-specific competencies that were unclear. Further, no key-word searches for this exact phrase or specific industry frameworks were identified.

The closest memo made to this topic was about the use of the phrase “data governance” in a UNC digital curation syllabus (INLS 751, Fall 2019). The topic was taught in-depth through weekly discussions, lectures, and an assignment. While data governance is a component of IT governance, skills and knowledge competencies in the area seem to be specific enough that they could arguably stand alone in *DACUM* or be included in the data management topic I described in the *IT Concepts and Vocabulary* section. Of course, this assumes that data governance is a competency useful for IGPs.
IT Storage Metrics

DACUM includes two KSAAs in this category, each only referenced once. They are labeled, “IT storage metrics and performance improvements” and “data migration processes.” Syllabi had eight applicable references (most from UNC) pertaining to storage performance.

In my opinion, DACUM and iSchool focuses on this category seem to be lacking, or not adequately targeted, given the prevalence of cloud storage. In 2019, cloud computing was in the “slope of enlightenment” of Gartner’s hype cycle model, estimated to be less than 2 years away from the fully mature end of the adoption cycle (Smith & Anderson, 2019). Despite the cloud’s relative stability in the marketplace, Flexera’s most recent RightScale report shows that a 24 percent growth in spending was expected among enterprise cloud-consumers in 2019 (2019). Smith & Anderson also refer to cloud computing as “one of the most hyped terms in the history of IT.”

One notable course that teaches cloud-storage content is UMD’s Big Data Infrastructure course, but a prerequisite exists that requires the instructor’s permission to enroll (INST 767, Spring 2019). Another potential barrier to this class for some IGP candidates is a heavy programming workload in multiple languages. The course covered the topic of “cloud economics” which addresses the DACUM storage metrics and data migration performance KSAAs. UNC offers a “special topics course” (i.e., not regularly offered) titled “Issues in Cloud Computing,” but a syllabus was not available and therefore not included in this research.

Note: While I did not review readings for this research, a keyword search of “cloud” across all the syllabi located a reference to a relevant required reading from Robert
Smallwood’s textbook for UMD’s Management of Electronic Records and Information course (INST 647, n.d.).

**Legal Defensibility and Frameworks**

Similar to the way DACUM described knowledge and skill requirements in this category, iSchool syllabi did not generally suggest that specific legal frameworks were taught. Instead, relevant excerpts from syllabi tended to be general in nature such as, “understanding suitable legal frameworks…” or “legal issues relating to…” (UMD’s LBSC 791 and UNC’s INST 615). This is not to say that lectures did not drill down on specific legal frameworks, but if they did, these syllabi did not offer that detail.

DACUM listed these KSAAs ten times, with 23 syllabi referencing the category, distributed relatively evenly between both schools. Compared to other specialized categories in this research, the range of course contexts that address legal defensibility and frameworks was notable. For instance, this topic was covered in courses spanning copyright, electronic records management, archives, library user services, data curation and competitive intelligence.

**Management Theory and Practice**

Both schools require a management-themed course for all four degree programs evaluated. These graduate-level courses are taught as a management primer to students from various backgrounds that may be similar to undergraduate management courses taught to business students, but with a focus on information-specific fields. UNC’s Management for Information Professionals course description frames the class this way:
“The focus of the course is on management in information agencies, but the principles taught are applicable in any management setting” (INLS 585, Spring 2019).

In addition to UMD’s general management class (for its Masters in Information Management program), the school offers a noteworthy course titled 21st Century Leadership (INST 660). It carefully selected historical and current leaders for the purpose of studying a range of leadership styles. The course culminates with student self-assessments and self-reflections about their own leadership styles. This course incorporates traditionally-accepted management practices from authors like Peter Drucker but goes well beyond by teaching nuanced characteristics from various leadership styles (e.g. situational, adaptive, resonant, servant, transformational, etc.).

The DACUM knowledge requirement for “management theory and practice” was listed four times. Given that this topic is not technical compared to IT or legal frameworks, surely a single graduate (or even undergraduate) course in management would fulfill basic knowledge requirements for IGP candidates. I recognize that management skills, along with skills in all of these categories, are certainly developed with experience.

Organization-specific

I did not anticipate these skills to appear on syllabi, because I thought topics like organizational structure, dynamics and culture would be learned through experience and not taught. However, I found these skills to be intentionally taught through targeted assignments, readings and weekly topics. This was the third most-frequently referenced KSAA category in DACUM, but it was not as commonly found in syllabi, with only 15 crosswalked.
Notably, both iSchools intentionally develop students’ abilities to evaluate and locate relevant, quality information. These skills help students and IGPs alike in DACUM’s industry-specific KSAA areas (e.g., industry regulations, technology industry, jurisdictional regulations and industry practices). As an example, a UNC digital curation course objective states, “Be familiar with the current state of knowledge in the field and its key research issues as well as past trends and emerging priorities” (INLS 756, Spring 2019).

With respect to organization dynamics, structure and culture, a UMD Masters of Information Management course covers “assessing the culture of the enterprise” with respect to professional conduct surrounding audits (INMF 612, Spring 2019). UMD’s INST 742 syllabus includes an assignment stating, “Your proposal should include a diagram of the major stakeholders and a characterization of the organizational culture” (Spring 2019).

Cultural awareness and cultural sensitivity were two competencies that I did not easily define at first. Because I frequently found societally-based cultural diversity topics in graduate syllabi, I thought these skills and knowledge belonged together in that context. However, the DACUM context appears to place these terms within an organization’s cultural framework, perhaps intending for IGPs to be able to sensitively identify organizational risks and manage change. Therefore, for the purpose of this research, I included these phrases in this category.

Performance Management

This category specifically pertains to the human resources concept of personnel management, opposed to IT performance or organizational performance. DACUM
includes this set of knowledge and skills six times in its matrix, specifically in relation to communications and training, assigning task accountabilities, and overseeing IG program implementation and management.

Four syllabi crosswalked to this category. As to be expected, each school’s general management course emphasized human resources and personnel management topics. UNC’s Understanding Information Technology for Managing Digital Collections course description covers IT personnel management by “[preparing] students to…evaluate the work of developers” (INLS 465).

**Policy Development Standards**

This category was mentioned twice in the *DACUM Chart*, and I found four policy development and analysis in UNC syllabi (e.g. social media policy, policy analysis, appraisal policy critique). I found two related phrases in UMD syllabi, including “information resources policy framework” (INMF 620) and “establishing ethical polices and guidelines for information management within the enterprise” (INMF 612). Two UNC phrases included “electronic records management policy requirements” (INLS 556) and “create appropriate policies…for an organization” (INLS 767).

IG-related policies are numerous and nuanced, especially when all subdisciplines are considered. Therefore, it is possible that not all relevant IG policies are covered in these iSchool curricula. However, understanding how polices are generally developed according to specific standards is a foundational skill that iSchools did appear to adequately address.
Privacy and Security

This category was a more frequent topic in syllabi than in the DACUM KSAAs and primarily related to information technology (IT security). While privacy and security were together as a phrase in DACUM, I noticed that the terms were distinguished from each other in the syllabi. Even though the two topics often overlap, Symantec, the popular anti-virus software maker, distinguishes the topics by explaining that privacy refers to individuals’ “rights to control [their] personal information and how it’s used,” while security refers to how such information might be protected (Symanovich, no date).

Even security as an isolated term can be approached in different ways. For instance, UNC teaches both an Information Security and an Information Assurance course. A UNC syllabus describes the former as a more technical, “computerized” course, while the latter...

...deals with aspects of data integrity, privacy, paper and human security issues, and security from several perspectives including legal issues, technical tools and methods, social and ethical concerns, and organization policies and procedures, and standards (INLS 767, Summer 2019).

Given this distinction, security alone can require technical and non-technical knowledge, skills, and abilities. Privacy, requires further distinctive skills. Knowledge of regulations like the European Union’s General Data Protection Regulation (GDPR) and California’s impending Consumer Protection Act (CCPA) are currently popular topics for IGPs. Despite the current prevalence of consumer privacy in society, only one syllabus addressed GDPR in depth, and it was from a UNC digital curation course (INLS 751, Fall 2019).

This research shows that security and privacy are frequently addressed, in-depth, as distinct topics in graduate curricula. DACUM refers to privacy and security as a singular topic in the context of records management, but it does not appear to target IT-related
security. It is possible that ARMA intends for the term security to overlap with IT, but the DACUM Chart could be clearer.

**Procurement**

This category was only crosswalked twice from syllabi in this research. UNC’s Understanding Information Technology for Managing Digital Collections (INLS 465) course syllabus says that it “prepares students to…write requests for proposal,” a fundamental procurement task. This is a required course for students pursuing a certificate in digital curation, but because it is an undergraduate-level course, it may not be widely taken by graduate students, even though it is available to them.

A UMD course (INST 706) also touched on procurement as part of a broader Project Management topic, but it did not go in depth about the topic. The term procurement, and certain related terms (contract, request for…) did not appear in keyword searches of both sets of syllabi.

The related knowledge and skills desired of IGP candidates include “business area procurement and development processes,” “ability to assess and analyze contract terms with regard to IG requirements,” and “IT procurement procedures.” While analyzing contract terms may leverage legal research skills and analytical skills found in other KSAAs, coursework distinctly addressing this category does not appear to adequately address it.

**Project Management**

Project Management was the second-most referenced KSAA in DACUM, comprising 11 percent of all KSAAs. Both schools offer courses titled Project Management (UNC’s
INLS 690-03 and UMD’s INST 706). UNC offers further options with its Project Management course by offering it as a half credit (1.5 hours) or as a full credit course (3 hours). Attention on this skill among iSchools aligns with previous research demonstrating that job postings for information professionals require project management skills (Kinkus, 2007).

In addition to offering the traditionally taught course, both schools require hands-on courses that “emulates real-world project consulting” for its Master of Information Science (UNC, INLS 582) and Master of Information Management (UMD, INMF 737) students. These courses require students to identify an information system problem for a client, analyze the problem, gather requirements, and develop an implementation plan with resource estimates. Students in both courses work closely with the course instructor who serves in an advising capacity.

Beyond these four targeted courses, 18 others taught project management knowledge and skills. A third of these were from UMD’s Master of Information Science program. The 18 courses wove in project management content through group projects, weekly lectures and course goals.

*Records and Information Management (RIM)*

It is no surprise that records management (RM) is a highly-valued skill for IGP candidates. ARMA, the IGP certification exam’s parent organization, has a long history in records management, originally founded in 1955 as the first professional association for information professionals (Wikipedia, no date). Information Governance Initiative survey-respondents from industry agree, with 94 percent stating that RM has a
“coordinating role” in IG (2018). This is the most heavily-agreed-upon IG subdiscipline in the survey.

In iSchools though, records management content tends to be paired with archival studies. For instance, UNC and UMD offer archives and records management certificates or specializations for its graduate students. They also both offer courses in electronic records management, while UNC offers a course titled “Introduction to Archives and Records Management.” In a previous study of iSchool records management and electronic records management syllabi, authors Force & Zhang questioned whether or not these courses should continue to be positioned within an archives context, as digital archives topics tended to converge into electronic records management courses (2016).

I coded a total of eight syllabi to this category. In addition to the three targeted courses just mentioned, digital curation courses added relevant RIM content, as data management standards use similar appraisal and lifecycle methodologies. And because library collections also utilize similar lifecycle management techniques, I also crosswalked library collection management courses to this category.

Research

DACUM referenced research skills 17 times, with the category composed of terms and phrases like “legal research,” “surveying,” “environmental scanning,” and “benchmarking.” Research received more than a third of all syllabi crosswalks, the second highest of all categories in the coding frame, suggesting that curricula strongly addresses these KSAAs.

Both schools offer research-focused courses, with UNC students required to take 7.5 credit hours in research, including courses in Research Methods (INLS 581), Proposal
Development (INLS 781) and culminating with a Master’s Paper (INLS 992). While UMD offered targeted courses, they were not required but instead suggested for students wanting to pursue careers in academia or other research. It appeared that research knowledge and skills were integrated into other course curricula for both schools.

UMD’s Master of Information Management courses seems to focus curriculum on the corporate sector, opposed to traditional archival institutions like galleries, libraries, archives, and museums (GLAMs). For that reason, this set of UMD’s syllabi favor IG-relevant research methods like benchmarking, environmental scanning, market research and competitive intelligence.

Even though environmental scanning is a method used in conducting audits, it is included with the research KSAA for this study. In one syllabus, the instructor explained that with environmental scanning “There is no single right or wrong way to conduct an environmental scan. It can be as simple as regularly surfing Web sites and reading magazines. Or it can be as sophisticated as conducting formal literature reviews, distributing surveys, and convening focus groups” (UMD INMF 732, Spring 2017).

Other terms commonly crosswalked from syllabi to this category include “contextual inquiry,” “interview,” “data gathering,” “literature review,” “quantitative and qualitative data,” and “usability study.”

Software Lifecycle Processes

Four syllabi crosswalked to the software lifecycle processes category. DACUM terms and phrases used once each include “IT development process” and “decommissioning processes.” UNC’s Systems Analysis syllabus came the closest to teaching all processes
by dedicating a week to “The Systems Development Life Cycle” (INLS 582). Other courses crosswalked to this KSAA focused heavily on the design end of the lifecycle.

**Technical Writing**

The technical writing competency was only noted once in DACUM while 11 percent of the syllabi addressed this knowledge and skill. Technical writing assignments in graduate school contributes to syllabi’s high crosswalking frequency. Examples include entity-relationship diagrams, process flowcharts, graphs, data modeling, and metadata modeling. Technical writing in narrative form include grant proposals, qualitative papers and technical reports. One UNC syllabus defined a course objective to “[develop]…your professional skills, such as technical writing” (INLS 582). The frequency of teaching, combined with experiential learning assignments, suggest that this IG skill is adequately acquired by graduate iSchool students.

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4 project management, digital curation, big data, information management, finance (IGI, 2018)
CONCLUSION

No matter how well-designed coursework is to teach certain knowledge and skills, academic studies are not intended to replace work experience or teach intricacies of policies and practices that can only be understood from working in individual workplaces and industries. However, I do conclude that most IGP exam competencies are taught by LIS graduate curricula. While it is likely that students will not take a combination of courses that fully maximize the DACUM Chart’s KSAAs, the IGP exam requirements can inform iSchools and its students of what types of courses can best prepare aspiring Information Governance Professionals.

Specifically, this research found that master’s degrees in Information Science (UNC) or Information Management (UMD) appear to more closely align with IGP KSAAs than Library Science master’s degrees from both schools. One notable factor that favors the Information Science and Information Management degrees is their requirements for students to take the similarly-structured Systems Analysis (UNC) and Capstone Project (UMD) courses that teach project management, business processes and software lifecycle competencies.

For UNC Information Science students, specialization in digital curation and records management coursework will help to further align their education to IGP KSAAs. Further research about the extent to which records- and archives-blended courses contribute to student IG skills could further the discussion that began with Force and Zhang (2016).
Additionally, further research about the extent to which digital curation coursework overlaps with IGP KSAAs could be useful for the field to understand how graduate coursework could be best packaged to formally train aspiring IGPs.

This research may also benefit the Information Governance Professional Board that is responsible for the DACUM Chart. I found that terminology clarification and more detailed explanations about specialized knowledge of particular KSAAs could help support IGP candidates’ study efforts. This research could also bring attention to potentially underrepresented DACUM topics like data governance and data management that are surely areas that contribute to information governance.
### APPENDIX A. CODING FRAME

<table>
<thead>
<tr>
<th>Category</th>
<th>DACUM Knowledge, Skills, Abilities &amp; Attributes</th>
<th>DACUM Frequency</th>
<th>Syllabi Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archival Preservation</td>
<td>information preservation and archives</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>Audit &amp; Risk Management</td>
<td>audit methodology, Auditing, risk analysis methods, risk assessment methods, risk management, insured vs. uninsured risk</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>Business Process</td>
<td>business process analysis, business process analysis and mapping, business process analysis skills, business process management, continuous improvement</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>Change Management &amp; Training</td>
<td>change management, training and learning methodologies</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>metrics and statistical analysis, statistical analysis, trend analysis skills, measurement methodologies</td>
<td>6</td>
<td>39</td>
</tr>
<tr>
<td>Data Systems &amp; Data Classification</td>
<td>data repositories and associated classification schemes (e.g. metadata, taxonomy, ontology), structured and unstructured systems</td>
<td>2</td>
<td>41</td>
</tr>
<tr>
<td>Finance</td>
<td>total cost of ownership, financial analysis and planning, financial modeling, financial skills, budgeting, budgeting skills, cost benefit analysis</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>Information Governance</td>
<td>information governance, information governance principles and practices</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Interpersonal &amp; Soft Skills</td>
<td>business relationship building skills, relationship building skills, communication skills, tact, stakeholder specific communication skills, strategic planning, strategic thinking skills, collaboration skills, critical thinking, ability to respond under pressure, decision making skills, skills, negotiation skills, networking skills, persuasion skills, presentation skills, trust building skills, discernment and judgement skills, analytical skills</td>
<td>94</td>
<td>56</td>
</tr>
<tr>
<td>IT Concepts &amp; Vocabulary</td>
<td>IT vocabulary and concepts, business and IT vocabulary and concepts, IT operations and tools, IT roles and responsibilities, IT standards</td>
<td>14</td>
<td>39</td>
</tr>
<tr>
<td>IT Governance</td>
<td>IT governance</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>IT Storage Metrics</td>
<td>IT storage metrics and performance improvements, data migration processes</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td>Count1</td>
<td>Count2</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>Legal Defensibility &amp; Frameworks</td>
<td>legal defensibility, legal frameworks, jurisdictional regulations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management Theory &amp; Practice</td>
<td>management theory and practice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organization-specific</td>
<td>business practices, industry practices, industry regulations, regional differences, organization dynamics, organization structure and culture, organizational structure, authority, roles and responsibilities, organizational goals and objectives, enterprise goals and objectives, business area goals and objectives, organizational knowledge, subject matter knowledge of business area, technology industry, cultural practices, cultural sensitivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance Management</td>
<td>personnel management, performance management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy Development</td>
<td>policy development standards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Privacy &amp; Security</td>
<td>information management (records privacy, security), privacy and security</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td>ability to assess and analyze contract terms with regard to IG requirements, business area procurement and development processes, IT procurement procedures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Management</td>
<td>project management, project management skills, project resource management, critical success factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Records and Information Management</td>
<td>records and information management, information management standards, electronic information management principles and practices, electronically stored information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research</td>
<td>research skills, legal research, surveying skills, benchmarking methods, environmental scanning, environmental scanning methodologies, interviewing skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software Lifecycle</td>
<td>IT development process, decommissioning processes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical Writing</td>
<td>technical writing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Appendix B. Working Definitions

<table>
<thead>
<tr>
<th>Code</th>
<th>Working Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archival Preservation</td>
<td>The process and operation involved in ensuring the technical and intellectual survival of authentic records through time because of their continuing or enduring value. (ARMA International, 2016, pp. 4, 40)</td>
</tr>
<tr>
<td>Audit &amp; Risk Management</td>
<td>A review of information-related activities to comprehend the nature and level of risk or to ensure that sufficient policies, procedures, and controls are in place and complied with to meet operational, legal, and regulatory obligations and to identify where and how improvements should be made. (ARMA International, 2016, p. 4; ISO 73:2009, Section 2.1)</td>
</tr>
<tr>
<td>Business Process</td>
<td>The business rules according to which information flows, process steps are drawn, tasks are assigned, and results are measured so efficiency and alignment with an organization’s strategic goals can be improved. (ARMA International, 2016, p. 7; ABPMP International, 2019)</td>
</tr>
<tr>
<td>Change Management &amp; Training</td>
<td>Processes and methods, used to introduce and implement a new system or set of procedures in an organization so that users can assimilate it into their daily work life (e.g. training). (Ward, 2008)</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>Methods used to establish metrics and analyze their results, including statistics and trends.</td>
</tr>
<tr>
<td>Data Systems &amp; Data Classification</td>
<td>Approaches to structured and unstructured data repositories and their associated classification schemes including metadata, taxonomies, and ontologies.</td>
</tr>
<tr>
<td>Finance</td>
<td>Methods employed to budget, estimate, analyze and document all aspects of a project or program.</td>
</tr>
<tr>
<td>Information Governance</td>
<td>A strategic, cross-disciplinary framework composed of standards, processes, roles and metrics that hold organizations accountable for the proper handling of information assets. The framework helps organizations achieve business objectives, facilitates compliance with external requirements, and minimizes risk posed by sub-standard information handling practices. (ARMA, 2016, p. 28)</td>
</tr>
<tr>
<td>Interpersonal &amp; Soft Skills</td>
<td>Used exact terms and phrases from <em>DACUM</em></td>
</tr>
<tr>
<td>IT Concepts and Vocabulary</td>
<td>General IT vocabulary and concepts, including IT operations and tools.</td>
</tr>
<tr>
<td>IT Governance</td>
<td>System by which the current and future use of IT is directed and controlled. (ISO 38500)</td>
</tr>
<tr>
<td>IT Storage Metrics &amp; Performance</td>
<td>Solutions and methods for electronic content storage and data migration, including methods for measuring and improving performance.</td>
</tr>
<tr>
<td>Legal Defensibility &amp; Frameworks</td>
<td>Legal structures including the regulatory frameworks, policies, and standards as they relate to defensible communications, training, roles, responsibilities, audits and enforcement mechanisms of the IG program</td>
</tr>
<tr>
<td>Management Theory &amp; Practice</td>
<td>Ideas and actions of managers/supervisors and how they relate to their organizations in the knowledge of its goals, the implementation of effective means to get the goals accomplished and how to motivate employees to perform to the highest standard. (Management theory, 2019)</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Organization-specific</td>
<td>Used exact terms and phrases from DACUM</td>
</tr>
<tr>
<td>Performance Management</td>
<td>An assessment of an employee to gauge progress toward predetermined goals. (performance management 2019)</td>
</tr>
<tr>
<td>Privacy &amp; Security</td>
<td>Privacy - Preservation of confidentiality, integrity and availability of information. The relationship between the collection and dissemination of data, technology, the public expectation of privacy, legal and political issues surrounding them. (Wikipedia “Information Privacy”) Security - Protected against unauthorized alteration, access, and destruction, whether intentional, unintentional, or natural. (ARMA International, 2016, p.48)</td>
</tr>
<tr>
<td>Procurement</td>
<td>Processes associated with acquiring goods or services from outside the immediate project organization, beginning with determining the need for the supplies or services and ending with the contract’s completion and closeout. (Ward, 2008, p. 328)</td>
</tr>
<tr>
<td>Project Management</td>
<td>Application of knowledge, skills, tools and techniques applied to project activities to meet or exceed stakeholder needs and expectations from a project. (PMBOK, 2008, p. 443)</td>
</tr>
<tr>
<td>Records &amp; Information Management</td>
<td>Policies, systems, and procedures that capture, create, access, distribute, use, store, secure, retrieve, and ensure disposition of an organization’s records and information, regardless of its format. (ARMA International, 2016, pp. 19, 43)</td>
</tr>
<tr>
<td>Research</td>
<td>Methods used to evaluate a given topic, including legal research, surveying, benchmarking and environmental scanning.</td>
</tr>
<tr>
<td>Software Lifecycle Processes</td>
<td>Processes associated with the software lifecycle, from development through decommissioning.</td>
</tr>
<tr>
<td>Technical Writing</td>
<td>Techniques for writing policy documents, documenting procedures.</td>
</tr>
</tbody>
</table>

5 Working definitions may be directly used or adapted from cited sources to incorporate DACUM context. Non-cited definitions generally included exact DACUM terms and phrases.
BIBLIOGRAPHY


Mardis, M. Spears, L. and McClure, C. A Method to Measure Information Technology Curricula and Workforce Readiness


