National Information Technology Innovation Center

Business Industry Leadership Team (BILT)

Data Management KSAs March 2026

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This prioritized Knowledge, Skills, and Abilities (KSA) list was developed by the National IT Innovation Center (NITIC) in collaboration with IT industry subject matter experts (SMEs). This list is intended to help faculty and administrators align curriculum with industry needs so graduates are “workforce ready” when they graduate.

SMEs convened online to rank each KSA item one by one – a ranking of “4” meant that item was essential for entry-level IT workers, while a “1” meant that item could be removed from program curriculum. By default, items with an average vote of 2.6 or lower were turned pink to signal that this item may not be worth keeping.

After the vote, the SMEs discussed the results as a group. This discussion led to some revisions in the KSA descriptions and rankings. Some “pink” items the SMEs together deemed important despite the lower average and were kept, while some “green” items with a higher average the SMEs recommended be removed from the list. Those items can be found at the bottom of each KSA section under “Recommended Removal.”

The “To Be Included in the Next Vote” section at the bottom includes items the SMEs suggested that were not included in the original list vote.

This KSA prioritization process is a cornerstone of the successful Business and Industry Leadership Team (BILT) model which puts businesses in a co-leadership role.

Learn more about how the BILT works – and how you can implement it with your own program – by using these resources: https://www.nitic.org/industry/local-bilt/

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Data Mangement Knowledge and Skills - updated March 2026

	Knowledge Knowledge focuses on the understanding of concepts. It is theoretical and not practical. An individual may have an understanding of a topic or tool or some textbook knowledge of it but have no experience applying it. For example, someone might have read hundreds of articles on health and nutrition, many of them in scientific journals, but that doesn't make that person qualified to dispense advice on nutrition.	# votes (4 = most important)				
		4	3	2	1	Avg
K-1	Knowledge of computer networking concepts and protocols, and network security methodologies.	4	4	5	0	2.92
K-2	Knowledge of risk management processes (e.g., methods for assessing and mitigating risk).	5	6	2	0	3.23
K-3	Knowledge of laws, regulations, policies, and ethics as they relate to cybersecurity and privacy.	8	5	0	0	3.62
K-4	Knowledge of Data Governance topics and their relationship to Information Governance, IT Governance, IT Service Management, Business Management PMO, Business Operations, and Risk Management.	9	3	1	0	3.62
K-5	Knowledge of Overall Data Management Maturity Model.	7	5	0	1	3.38
K-6	Knowledge of ethics.	8	4	1	0	3.54
K-7	Knowledge of data architecture frameworks such as Zachman Framework for Enterprise Architecture.	2	8	2	1	2.85
K-8	Knowledge of data modeling techniques.	9	3	0	1	3.54
K-9	Knowledge of conceptual/logical modeling.	8	4	1	0	3.54
K-10	Knowledge of physical modeling.	5	5	2	1	3.08
K-11	Knowledge of how to document the model and its use as a data governance tool.	5	8	0	0	3.38
K-12	Knowledge of data storage and operations.	8	2	2	1	3.31
K-13	Knowledge of data integration and interoperability for both structured and unstructured data.	8	3	2	0	3.46
K-14	Knowledge of cybersecurity and privacy principles.	7	6	0	0	3.54
K-15	Knowledge of cyber threats and vulnerabilities.	4	7	1	1	3.08
K-16	Knowledge of specific operational impacts of cybersecurity lapses.	5	5	2	1	3.08
K-17	Knowledge of cyber defense and vulnerability assessment tools and their capabilities.	4	3	4	2	2.69
K-18	Knowledge of data administration and data standardization policies.	7	5	1	0	3.46
K-19	Knowledge of data backup and recovery.	8	2	2	1	3.31
K-20	Knowledge of data mining and data warehousing principles.	7	4	1	1	3.31
K-21	Knowledge of database management systems, query languages, table relationships, and views.	10	1	1	1	3.54
K-22	Knowledge of digital rights management.	3	5	3	2	2.69
K-23	Knowledge of recent streaming data frameworks and protocols AMQP, (e.g., Kafka, RabbitMQ).	4	6	1	2	2.92
K-24	Knowledge of network access, identity, and access management (e.g., public key infrastructure, Oauth, OpenID, SAML, SPML).	3	3	4	3	2.46
K-25	Knowledge of operating systems (Linux, UNIX, Windows).	4	2	6	1	2.69
K-26	Knowledge of policy-based and risk adaptive access controls.	2	7	3	1	2.77
K-27	Knowledge of query languages such as SQL (structured query language).	9	2	2	0	3.54
K-28	Knowledge of sources, characteristics, and uses of the organization’s data assets.	8	2	3	0	3.38
K-29	Knowledge of the capabilities and functionality associated with content creation technologies (e.g., wikis, social networking, content management systems, blogs).	1	6	5	1	2.54
K-30	Knowledge of the capabilities and functionality associated with various technologies for organizing and managing information (e.g., databases, bookmarking engines).	5	5	2	0	3.25
K-31	Knowledge of the capabilities and functionality of various collaborative technologies (e.g., groupware, SharePoint).	2	6	3	1	2.75
K-32	Knowledge of the characteristics of physical and virtual data storage media.	5	6	0	1	3.25

K-33	Knowledge of how IT systems and data architectures enable and optimize common organizational processes and business outcomes across industries (e.g. sales, operations, fiance, customer service) including how data and systems enable decision-making efficiency and value creation.	4	6	2	1	3.00
K-34	Knowledge of Cloud-based knowledge management technologies and concepts related to security, governance, procurement, and administration.	4	6	2	0	3.17
K-35	Knowledge of data classification standards and methodologies based on sensitivity and other risk factors.	7	5	1	0	3.46
K-36	Knowledge of database access application programming interfaces (e.g., Java Database Connectivity [JDBC]).	2	5	4	1	2.67
K-37	Knowledge of Personally Identifiable Information (PII) data security standards.	11	2	0	0	3.85
K-38	Knowledge of Payment Card Industry (PCI) data security standards.	5	4	3	0	3.17
K-39	Knowledge of Personal Health Information (PHI) data security standards.	7	2	3	0	3.33
K-40	Knowledge of current and emerging data encryption (e.g., Column and Tablespace Encryption, file and disk encryption) security features in databases (e.g. built-in cryptographic key management features).	7	2	2	1	3.25
K-41	Knowledge of current and emerging data remediation security features in databases.	2	7	2	1	2.83
K-42	Knowledge of use cases related to collaboration and content synchronization across platforms (e.g., Mobile, PC, Cloud).	3	3	6	0	2.75
K-43	Knowledge of information classification models, data sensitivity levels, and industry standard practices for preventing, detecting, and responding to data compromised incidents.	5	6	2	0	3.23
K-44	Knowledge of the principal methods, procedures, and techniques of gathering information and producing, reporting, and sharing information.	7	6	0	0	3.54
K-45	Knowledge of data mining techniques.	5	5	3	0	3.15
K-46	Knowledge of database theory.	6	5	1	1	3.23
K-47	Knowledge of maintaining databases (i.e., backup, restore, delete data, transaction log files, etc.).	7	2	4	0	3.23
K-48	Knowledge of understanding data ownership, data stewardship, and data stakeholders.	8	5	0	0	3.62
K-49	Awareness of replication services.	2	7	2	2	2.69
K-50	Knowledge of scripting languages.	5	3	2	2	2.92
K-51	Awareness of the broad range of tools available to retrieve data.	6	3	3	1	3.08
K-52	Awareness of business analytics tools (e.g., Power BI, Excel,Tableau, and others).	7	4	1	1	3.31
K-53	Awareness of data privacy, data protection legislation, and the general role and status of relevant state and federal laws.	8	4	1	0	3.54
K-54	Awareness of the Gen AI, its role in data management and engineering and related ethical and liability issues. More specifically, how to place boundaries around queries when using AI.	12	0	1	0	3.85
Skills The capabilities or proficiencies developed through training or hands-on experience. Skills are the practical application of theoretical knowledge. Someone can take a course on investing in financial futures, and therefore has knowledge of it. But getting experience in trading these instruments adds skills.						
S-1	Skill in allocating storage capacity in the design of data management systems.	4	5	3	1	2.92
S-2	Skill in conducting information searches.	10	1	1	0	3.75
S-3	Skill in conducting knowledge mapping (e.g., map of knowledge repositories).	6	4	3	0	3.23
S-4	Skill in conducting queries and developing algorithms to analyze data structures.	8	3	2	0	3.46
S-5	Skill in generating data queries and reports.	9	1	3	0	3.46

S-6	Skill in maintaining databases. (i.e., backup, restore, delete data, transaction log files, etc.).	6	3	3	1	3.08
S-7	Skill in optimizing database performance.	4	6	1	2	2.92
S-8	Skill in using knowledge management technologies.	2	7	3	0	2.92
S-9	Skill in problem solving from an entry-level viewpoint: Noticing a problem and figuring out the best way to solve it. Includes investigation and evaluation of new technology against core business processes and mission.	10	3	0	0	3.77
S-10	Skill in judgment and ethical decision making: Thinking about the pros and cons of different options and picking the best one.	10	1	2	0	3.62
S-11	Skill in systems evaluation: Measuring how well a system is working and how to improve it.	6	5	1	0	3.42
S-12	Skill in programming: Writing computer programs, including scripting.	5	4	3	1	3.00
S-13	Skill in consistency when modeling data (attention to data details).	9	2	2	0	3.54
S-14	Skill in using various operating systems (e.g., Linux, UNIX, Windows).	4	1	5	2	2.58
S-15	Skill in API design to retrieve data including languages such as REST, GraphQL, and capabilities such as Power BI and Tableau.	4	4	3	1	2.92
S-16	Skill in matching the appropriate knowledge repository technology for a given application or environment.	3	7	1	1	3.00
S-17	Skill in ordering and arranging information.	7	5	0	0	3.58
S-18	Skill in demonstrating self-driven inquisitive data discovery.	8	4	0	0	3.67
S-19	Skill in seeing systems holistically (data systems rarely exist in a silo).	10	2	1	0	3.69
To Be Included in Next Vote Items that emerged from BILT group discussion after the KSA vote						
	Knowledge of the capabilities and functionality associated with content management systems.					
	Knowledge of agentic AI concepts and agentic agents.					
	Knowledge of effective naming techniques.					
	Knowledge of AI governance.					
	Knowledge of MLOps and Observability.					
	Skill in Technical Storytelling - being able to explain what they are doing and why in terms that others can understand.					
	Knowledge of data normalization, retrieval optimization, and levels of encryption at rest or in transit.					
	Knowledge of Integrated Development Environments (IDEs) such as VS Code and PyCharm.					