Learning Objectives

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Chief Information Officers Council
Federal IT Workforce Committee

General Services Administration
Office of Governmentwide Policy

A LETTER FROM THE
CIO COUNCIL

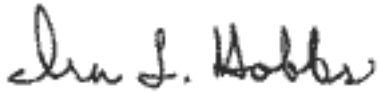
The Chief Information Officers (CIO) Council's Federal IT Workforce Committee is pleased to issue these Learning Objectives. They were derived from the Clinger-Cohen Core Competencies which were adopted by the CIO Council. They are meaningful statements of knowledge, skills and abilities that are crucial to the effective management of technology resources. And, most importantly, they were developed by *practitioners* at the executive level.

The Learning Objectives form the foundation for establishing and piloting the Federal CIO University to meet the professional development needs of CIOs and other Senior Executive Service (SES) personnel involved in information technology. They are a fundamental component of the CIO University because they "drill down" the Core Competencies to a level of definition which can be taught. Ultimately, the Learning Objectives represent the core requirements for executives who deal with information technology.

We encourage public and private organizations to distribute and use these objectives in executive development programs. Over time, we expect these Learning Objectives and their associated Core Competencies to have a significant and lasting impact on the performance of senior officials.

We are deeply grateful to the Focus Group Representatives from academia, industry and government for participating in the sessions which helped produce these Learning Objectives. In particular, we would like to thank the General Services Administration's Office of Governmentwide Policy for facilitating the entire process.

Gloria Parker
Co-Chair, Federal IT
Workforce Committee,
CIO Council; and
Chief Information Officer,
Department of Housing
And Urban Development



Ira Hobbs
Co-Chair, Federal IT
Workforce Committee,
CIO Council; and
Deputy Chief Information Officer,
Department of Agriculture

A LETTER FROM THE GENERAL
SERVICES ADMINISTRATION

The General Services Administration is pleased to partner with the CIO Council's Federal IT Workforce Committee in developing and issuing these Learning Objectives for Federal executives.

The Learning Objectives are a critical component of the CIO University. They define the Clinger-Cohen Core Competencies to a level of performance which can be evaluated and taught. In doing so, they represent the government's core educational requirements for Senior Executive Service personnel involved in information technology.

We encourage the distribution and use of these objectives in professional development programs throughout the Federal government and beyond. A highly educated and skilled Federal executive workforce is essential to the effective and efficient delivery of services to the American public.

Dr. Joan Steyaert
Deputy Associate Administrator for Information Technology
Office of Governmentwide Policy
General Services Administration

BACKGROUND AND PURPOSE

Since its inception, the Chief Information Officers (CIO) Council has responded to a number of issues which affect the Federal information technology (IT) community. Some of these issues arise from IT legislation, such as the Clinger-Cohen Act of 1996. Others reflect broader areas of concern - such as the Year 2000 problem, information systems architectures, security, capital planning, performance measurement, and IT education. The CIO Council's focus on the latter issue, IT education, has led to a specific initiative to address the needs of Federal executives - The CIO University.

The CIO University is a collaborative effort between the Federal government and educational institutions to develop executives for the top IT jobs in government. The University consists of programs and offerings which address the core competencies needed by an organization to manage its IT portfolio successfully. These "Clinger-Cohen Core Competencies" were originally developed and adopted by the CIO Council in 1997.

Although an excellent product, the Competencies, as produced initially, were broad and general and did not provide enough specificity for curriculum development. To produce a set of learning objectives which could provide a clear-cut basis for executive development, the General Services Administration (GSA) and the Federal IT Workforce Committee of the CIO Council conducted a series of focus groups for each of the major competency areas. In total, over 100 subject matter experts from academia, industry, and government participated in the sessions which were facilitated by experts in group process and learning theory. The vigorous exchanges which ensued during the sessions resulted in a mutually agreed upon set of learning objectives for each competency area.

The learning objectives and key critical commentary were then summarized and sent to the participants. The participants were asked to review their respective focus group areas (and any other areas in which they possessed competence), seek feedback from their colleagues, and respond with comments to GSA. Their comments were then scrutinized by a panel of people with varied backgrounds in technology, graduate education and Federal management. Revisions were made to the learning objectives as appropriate.

This resulting document, *The Learning Objectives of the CIO University*, is an important product of the CIO Council for two reasons. First, it clearly delineates the Core Competencies and Learning Objectives which form the basis for evaluating and selecting responses from universities seeking to be part of the CIO University. Second, and more importantly, it defines the Federal government's requirements for IT executive development.

Educational organizations and developers should feel free to use these Learning Objectives to develop curricula in other program areas. Because many of the issues addressed by the Core Competencies are common to anyone managing large technology enterprises, the application of these objectives has wide appeal to private, state, and local organizations.

FOCUS GROUP REPRESENTATIVES

Government

Department of the Air Force
Department of the Army
Department of Justice
Department of Transportation
Department of the Treasury
General Accounting Office
General Services Administration
Internal Revenue Service
Office of Federal Procurement Policy
Office of Personnel Management
Social Security Administration

Industry

Hosky, Inc.
Knowledge Transfer Options, Inc.
National Computer Systems
Leads Corporation
Xerox Corporation
Data Warehousing Institute
Abacus Technology Corporation
Xerox Corporation
Kearney & Company
Lucent Technology
Computer Science Corporation
OAO Corporation
Robbins & Gioia, Inc.
Computer Sciences corporation
Federal Data Corporation
Unitech Universal Systems & Technology
GEIA
AAC Associates, Inc.
Unisys Corporation

Academia

University of Maryland
George Washington University
Capitol College
Syracuse University
George Mason University
University of Virginia
Carnegie Mellon University

LEARNING OBJECTIVES

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CIO University Learning Objectives

(Derived from Clinger-Cohen Core Competencies)

CLINGER-COHEN CORE COMPETENCIES	LEARNING OBJECTIVES
1.0 POLICY AND ORGANIZATIONAL	*General Discussion: The CIO has one of the most serious positions in the government and must be able to talk to an extremely wide range of people. They work in a fast-changing environment (technology, legislation, policy, and politics) and there is a "felt pain" about the size and scope of the job.*
Competency 1.1— Department/Agency missions, organization, function, policies, procedures	1.1 LO 1: List and describe the elements of the CIO's role which are common to all CIOs regardless of size of the organization.
	1.1 LO 2: Differentiate between the role of the CIO as the CEO of the information group, and the role of the CIO as a critical staff member of the top management team.
	1.1 LO 3: Describe the various models/patterns of organizational structure in Federal agencies and compare/contrast the organizational structure of the CIO's own agency to the general models available. (Note: Same as 1.4 LO 3)
	1.1 LO 4: Identify and discuss the attributes that characterize an effective CIO organization. (Focus on the best practices of an effective CIO structure.)
	1.1 LO 5: Identify and describe how the enterprise (or program) mission/purpose should influence the IT mission statement. (See also 5.1 LO 3)
	1.1 LO 6: Identify and describe the ways in which an organization's mission/mission statement impacts its decision-making. (See also 5.1 LO 3)
	1.1 LO 7: Discuss how the IT mission and structure supports the organizational mission. (See also 5.1 LO 3)
Competency 1.2— Governing laws and regulations (e.g., Clinger-Cohen, GPRA, PRA)	1.2 LO 1: Legislation such as the Clinger-Cohen Act, the CFO Act and acquisition reform legislation is driving a new management paradigm in the Federal government. List the major provisions of such legislation and discuss the implications of such legislation on the CIO and on his/her organization.
	1.2 LO 2: Identify legislation and/or regulation (Examples: Clinger-Cohen, GPRA, FOIA, PRA, A-11, 43B, A-130, Computer Security Act of 1997, National Reform Act) evant

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	to the CIO's responsibilities. List the provisions of the legislation/regulation and discuss the implications for his/her organization. Include performance mandates in the discussion. (See also 5.1 LO 7)
	1.2 LO 3: Discuss the role (impact, interaction) of agencies/organizations such as OMB, GSA, OPM, and NIST on the CIO and his/her responsibilities.
	1.2 LO 4: Discuss the importance of developing a comprehensive system to track and communicate emerging legislation, regulations, and intergovernmental legislation, including changes in acquisition regulations/guidelines. List the steps necessary to develop, implement and maintain such a monitoring system.
	1.2 LO 5: Compare and contrast approaches that can be developed to assess the organization's performance, particularly its compliance with relevant legislation, and the intent of that legislation. Consider both IT legislation and other relevant legislation.
	1.2 LO 6: Describe the areas of flexibility in the operational reality of IT in the government.
	1.2 LO 7: Assess the impact of technology on the implementation of "electronic government." Consider benefits and unexpected negative impacts such as seen in the DoD removal of a web site due to security concerns, or the use of Social Security numbers as identifiers. (See also 1.6 LO 12)
Competency 1.3—Federal government decision making, policy making process, and budget formulation and execution process	1.3 LO 1: Discuss the strategic planning process for IT. Demonstrate the importance of the process, assess the internal and external organizational environment, address organizational strengths, weaknesses, and culture and anticipate and forecast the impact of future trends.
	1.3 LO 2: Design a strategic planning process that links IT strategic plans to enterprise/program strategic plans, and enterprise/program strategic plans to government-wide strategy, strategic goals and performance objectives.
	1.3 LO 3: Discuss the advantages and limitations of different decision-making approaches, and identify a method or methods of effective decision making that supports the agency mission.
	1.3 LO 4: Describe the steps needed to develop a culture/climate of innovation and creativity that will support the Clinger-Cohen mandate to create and develop IT

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	initiatives. (Note: Same as 1.4 LO 8)
Competency 1.4—Linkages and interrelationships among agency heads, COO, CIO, and CFO functions	1.4 LO 1: Identify the attributes of organizational culture and discuss how the organization's culture, especially its decision-making process, demonstrates particular cultural attributes.
	1.4 LO 2: Describe traditional Agency head, COO, CIO and CFO roles and compare those roles to the relationships and outcomes that are mandated by Clinger-Cohen, NRA, and other relevant legislation.
	1.4 LO 3: Describe the various models/patterns of organizational structure in Federal agencies and compare/contrast the organizational structure of the CIO's own agency to the general models available. (Note: Same as 1.1 LO 3)
	1.4 LO 4: Discuss organizational structure, line and staff responsibilities, the flow of communications, independent and interdependent decision making and the contribution of IT and the CIO to the organizational structure. Example: Programs must be developed in collaboration with the Operations group, so that they are integrated with Operations, as well as Finance.
	1.4 LO 5: Describe and map both the structure and the processes of an organization.
	1.4 LO 6: Assess technology's role in streamlining delivery of services to state and local governments.
	1.4 LO 7: Discuss Clinger-Cohen and other recent legislation and identify the mandates to create and develop IT initiatives.
	1.4 LO 8: Describe the steps needed to develop a culture/climate of innovation and creativity that will support the Clinger-Cohen mandate to create and develop IT initiatives. (Note: Same as 1.3 LO 4)
	1.4 LO 9: Discuss differentiation and integration (Lawrence and Lorsch) in a dynamic environment. Defend the importance of coordination within the organization as Strengths, Weaknesses, Opportunities and Threats (SWOT) are translated into a shared vision.
Competency 1.5—Intergovernmental programs, policies,	1.5 LO 1: Identify and classify the types of agency and interagency resources that may be used for tracking legislation, technology, regulation, and other external drivers. (Note: Also see 1.2 LO 4.)

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and processes	
	1.5 LO 2: Discuss the legislative, regulatory and coordination dimensions of intergovernmental programs, policies and processes.
	1.5 LO 3: Discuss the impact of Government policy-making and/or advisory groups including the CIO Council, GITSB, CIAO, the President's Task Force on Federal Training Technology, etc.
	1.5 LO 4: Entities external to the CIO's organization may affect the CIO in fulfilling his/her responsibilities. Discuss organizations/entities such as the Inspector General, the GAO, law enforcement organizations, etc.—and the role of the CIO in interacting with these individuals and their programs and policies.
Competency 1.6— Privacy and security	1.6 LO 1: List and discuss the laws and regulations regarding privacy. Include the impact of these laws and regulations in differing contexts.
	1.6 LO 2: Evaluate privacy laws and regulations relative to the openness that is sought in FOIA (Freedom of Information Act).
	1.6 LO 3: In a specific agency, be able to analyze current practices regarding privacy, and design systems needed to achieve organizational excellence.
	1.6 LO 4: Discuss global privacy issues, including those emerging from changes occurring in the European Union.
	1.6 LO 5: Assess internal and external factors affecting an organization's privacy policies and practices.
	1.6 LO 6: Distinguish between privacy issues and regulations and security concerns and regulations.
	1.6 LO 7: Track and analyze emerging technology trends and their impact on security and privacy issues. (See also 1.2 LO 4)
	1.6 LO 8: Be able to identify and discuss national security concerns emanating from global trade practices.
	1.6 LO 9: Discuss and give examples of the importance of planning, developing, and implementing systems addressing privacy and security concerns.
	1.6 LO 10: Use a systems approach to describe the potential impact of organizational policies on other elements/units of the organization. (Example: Secretary of

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	Defense gets 10,000 e-mails a day, all of which must be screened for viruses.)
	1.6 LO 11: Be able to identify and discuss privacy and security issues that may occur relative to other IT responsibilities such as records management, archival records, freedom of information requests, declassification, firewalls, security involving partners (extended enterprises), etc.
	1.6 LO 12: Assess the legal and social effects of emerging technology on individuals (internal and external customers). Consider Social Security putting profiles "on line." (Note: See also 1.2 LO 7)
	1.6 LO 13: Assess the legal and social impacts of emerging technology on the implementation of "electronic government." (Note: See also 1.2 LO 7)
	1.6 LO 14: Discuss the "trade-offs" involved when considering E-Commerce vs. IT Security.
	1.6 LO 15: Discuss concerns regarding the protection of America's critical infrastructures, both governmental and commercial, including power, transportation, banking and telecommunications systems. Include in the discussion, PDD 63, and the Critical Infrastructure Assurance Office (CIAO) and other efforts to protect and maintain America's physical and cyber infrastructure.
	1.6 LO 16: Define and discuss concepts involved in IT security technologies, including cyberterrorism and its countermeasures, and various auditing, and monitoring tools and techniques.
Competency 1.7—Information Management	1.7 LO 1: Define, discuss, and evaluate technology and technological advancement. Include current concepts such as "What is the range of technology available," and "How net-centric environments are changing the landscape."
	1.7 LO 2: Identify and classify the types of agency and interagency resources that may be used for tracking legislation, technology, regulation, and other external drivers. (Same as 1.5 LO 1, also see 1.2 LO 4 and 1.2 LO7.)
	1.7 LO 3: Compare and contrast alternative means or sources of information that will assure awareness and understanding of new and emerging technology and its business implications. Include internal (in-house capability) or external (using industry/academic sources) and the advantages and disadvantages of each.

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	1.7 LO 4: Since rapidly emerging technology can overwhelm the regulatory responsibilities of a government entity, identify and evaluate approaches and methods to anticipate and forecast future trends (Electronic banking, market transactions, etc. represent recent illustrations for the need to anticipate such trends.)
	1.7 LO 5: Discuss bleeding edge, leading edge and trailing edge IT, and the importance of maintaining a properly balanced portfolio of technologies in one's organization.
	1.7 LO 6: Good IT management plans in an integrated manner for managing information throughout its life cycle. Discuss the IT planning, budgeting, implementation, and control lifecycle with reference to this concept (Reference: OMB Circular A-130). (See also Competency 7.0)
2.0 LEADERSHIP/ MANAGERIAL	*General Discussion: Management concepts are important <u>but</u> CIOs must move beyond management to leadership. They must be able to understand the dimensions of Clinger-Cohen, and how they play out operationally in their organization. Interpersonal skills are essential for success because of the frequency of change, and the need to communicate vision.*
Competency 2.1— Defining roles, skill sets, and responsibilities of Senior IRM Officials, CIO, IRM staff, and stakeholders	2.1 LO 1: List and describe Mintzberg's informational, interpersonal and decisional roles. Discuss how these roles are demonstrated in the workplace.
	2.1 LO 2: Define Katz's conceptual, interpersonal and technical skills. Discuss the application of these skills at each level of the organization.
	2.1 LO 3: Compare the concepts of Mintzberg and Katz with the OPM listing of Executive Competencies—which all CIOs are expected to demonstrate.
	2.1 LO 4: List and discuss the importance of interpersonal skills and identify the interpersonal skills demonstrated by leaders.
	2.1 LO 5: Discuss the importance of CIOs identifying their own interpersonal skill sets, as well as those of their staff.
	2.1 LO 6: Define leadership and distinguish among the different types of leaders.

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	2.1 LO 7: Discuss visionary leadership and why it is so important today.
	2.1 LO 8 Discuss the relationship between program visionary leadership and technical visionary leadership and the need for both.
	2.1 LO 9: After defining the communication process, and the variety of communication media, demonstrate effective communication skills.
	2.1 LO 10: Identify and demonstrate behaviors related to effective listening and feedback.
	2.1 LO 11: Discuss the communications barriers present in various media and situations, and practice/model approaches to overcome and/or manage these communication barriers.
	2.1 LO 12: Discuss the advantages and disadvantages of the different small group and network communication patterns.
	2.1 LO 13: Describe the range—and impact—of interpersonal communications (including media) in individual, small group, and organizational communication.
	2.1 LO 14: Discuss and demonstrate the application of the principles of individual behavior and group behavior in organizations.
	2.1 LO 15: Define the concept of motivation and discuss its importance in the organization.
	2.1 LO 16: Evaluate both need-based theories of motivation and process-based theories, in order to demonstrate the application of motivation skills.
	2.1 LO 17: Identify and analyze the needs of both internal and external stakeholders.
	2.1 LO 18: Discuss the advantages and limitations of different decision-making approaches, and identify a method or methods of effective decision making that supports the agency mission.
	2.1 LO 19: Describe the steps needed to develop a culture/climate of innovation and creativity that will support the Clinger-Cohen mandate to create and develop IT initiatives. (Note: Same as 1.3 LO 4)
	2.1 LO 20: Design approaches to champion initiatives.

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Competency 2.2—Methods for building Federal IT management and technical staff expertise	2.2 LO 1: Identify the steps needed, and develop a plan to create, an environment that encourages continuous learning. (Note: See also 10.0 LO 1)
	2.2 LO 2: Since individual differences extend to learning style(s), differentiate among the different learning styles, and discuss/demonstrate how communication and learning opportunities can address each learning style.
	2.2 LO 3: List, describe, and evaluate several different developmental tools. Include in the listing: team building practices, feedback/reinforcement systems, delegation, junior boards, etc. as well as traditional education and developmental opportunities. (Note: See also 10.0 LO 1)
	2.2 LO 4: Analyze organizational structures to identify, evaluate, and plan career development paths.
	2.2 LO 5: Discuss methods that can be used to provide opportunities for staff to apply learning.
	2.2 LO 6: Explain the importance of knowledge capital.
	2.2 LO 7: Compare and contrast possible staff recruitment, development and retention plans.
Competency 2.3—Competency testing—standards, certification, and performance assessment	2.3 LO 1: Describe, classify, evaluate, and compare existing IT certifications (Microsoft, Novell, etc.), tests, and academic degrees presented by IT personnel.
	2.3 LO 2: Discuss the concepts of organizational design as they apply to the development of job descriptions appropriate to the organization, and the development of selection criteria based upon both the job description and job specifications.
	2.3 LO 3: Some Federal positions (such as that for CO) have legislated and/or regulated requirements. Identify and discuss positions, particularly those impacting IT, for which there are legislated or regulated requirements.
	2.3 LO 4: Although testing is often used as part of the selection procedure for positions, tests should only be used as part of a comprehensive approach to selection. Discuss

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	advantages, and limitations, of testing in the selection process.
	2.3 LO 5: Although well-designed position descriptions and job specifications are integral to the selection process, they are also fundamental to the development of a comprehensive performance appraisal process. Compare, contrast, and evaluate the various approaches to performance appraisal.
Competency 2.4— Partnership/team-building techniques	2.4 LO 1: Discuss Organizational development and organizational development techniques— and their role in team building and partnering.
	2.4 LO 2: Although the dynamics of specific groups may vary, theories of group dynamics explain the process, and assist the manager in anticipating behavior. Discuss the principles of group dynamics. Give particular attention to the role organizational culture plays in the adoption and support of teams.
	2.4 LO 3: List and define typical team roles.
	2.4 LO 4: Identify the attributes of organizational culture and discuss how the organization's culture, especially its decision-making process, demonstrates particular cultural attributes. (Note: Same as 1.4 LO 1)
	2.4 LO 5: Describe the steps, including the need for trust and importance of empowerment, in the team building process.
	2.4 LO 6: Discuss, and plan for, the application of the principles of team leadership in a variety of settings including a matrix environment, an interorganizational environment, and in a systems environment.
	2.4 LO 7: Report on the practices involved in good meeting discipline, including when to schedule (and not schedule) meetings, when to make decisions, and when to involve others in the decision-making process. (Reference Doyle and Strauss.)
	2.4 LO 8: Evaluate the contributions that self-awareness tools (Myers-Briggs, etc.) bring to team building.
	2.4 LO 9: Discuss significance of diversity and individual differences when involved in team building activities.
	2.4 LO 10: Since individual differences extend to learning style(s), differentiate among the different learning styles, and discuss/demonstrate how communication and learning

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	opportunities can address each learning style. (Note: Same as 2.2 LO 2)
Competency 2.5—Personnel performance management techniques	2.5 LO 1: Support the concept that an organization can be more effective if performance profiles of incumbent personnel are developed, and staffing specifications are developed that address the unit's weaknesses.
	2.5 LO 2: Evaluate advantages and disadvantages of different performance management (a.k.a. performance appraisal, job evaluation) approaches. Include checklists, ranking systems, distribution systems, critical incident methods, BARS, MBO, 360° feedback, etc. among the methods evaluated.
	2.5 LO 3: Discuss the potential performance advantages of communicating job/role expectations.
	2.5 LO 4: Identify possible advantages and disadvantages of utilizing a process in which staff participate in identifying their performance objectives.
	2.5 LO 5: Discuss the value of timely performance feedback, and identify opportunities to practice such timely feedback.
Competency 2.6—Practices which attract and retain qualified IT personnel	2.6 LO 1: Discuss the role of encouragement and recognition in the motivation, learning and retention processes.
	2.6 LO 2: Describe the ways in which a culture of trust functions as a motivator, encourages innovation, and retains personnel. Design approaches to develop and implement a culture of trust.
	2.6 LO 3: Discuss the opportunities and challenges present in a diverse workplace. Include generational differences in the discussion as well as gender, race, etc.
	2.6 LO 4: Support the concept that a clearly defined and jointly held vision improves performance and personnel recruiting and retention.
	2.6 LO 5: Justify why a CIO and top management should model a culture of shared vision and shared leadership.
	2.6 LO 6: Identify the steps needed, and develop a plan to create, an environment that encourages continuous learning and provides opportunities for staff to apply learning. (Note: See 2.2 LO 1 and 2.2 LO 5)

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	2.6 LO 7: Analyze organizational structures to identify, evaluate, and plan career development paths. (Note: Same as 2.2 LO 4)
	2.6 LO 8: List and describe survival strategies in a Civil Service environment.
	2.7 LO 9: Compare and contrast the impact of the presence (or absence) of infrastructure on the achievement of organizational mission.
	2.7 LO 10: Discuss the motivational and performance impact that empowerment brings to the workplace.
3.0 PROCESS/CHANGE MANAGEMENT	General Discussion: CIOs need to distinguish between the behavioral and affective dimensions of change management that are more related to leadership and the cognitive dimensions of process management which provide "measuring points" and are a tool for change management.
	3.0 LO 1: CIOs frequently must lead change (technology adoption, skill transfer, etc.) in an organization. Discuss the concept of change, and the dimensions of behavioral change.
	3.0 LO 2: Discuss the role of leadership in successful change initiatives.
	3.0 LO 3: Discuss the role of the CIO as a change agent in his/her organization.
	3.0 LO 4: Discuss process management as it relates to change management. Include the roles of strategic planning, and the transfer of strategic vision into tactical goals.
	3.0 LO 5: When considering the process of change management, discuss the role of goals, budgets and activities to achieve those goals.
	3.0 LO 6: Federal CIOs work within a large system that includes the OMB, different administrations, and multiple initiatives requiring change over years. Discuss the dimensions of the government environment as a factor in successful change management.
Competency 3.1— Modeling and simulation tools and methods	3.1 LO 1: Identify and describe modeling and simulation approaches. Include among the approaches systems dynamics modeling, cost benefit analysis, capital budget and investment, forecasting, sourcing models (build or buy), and transferability (how transferable it is to the mission).

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	3.1 LO 2: Compare and contrast among modeling and simulation tools to demonstrate that the tools chosen offer productivity, reliability, availability, accessibility, etc. to advance the business, information, and technical missions of the organization.
	3.1 LO 3: Demonstrate how to build from business goals to technology solutions.
	3.1 LO 4: Identify and describe tools for IT product design and development. Include among the tools OO, data warehousing, COM, etc.
	3.1 LO 5: Demonstrate analysis of organizational requirements, and design a program(s) to train staff in simulation and modeling tools.
Competency 3.2— Quality improvement models and methods	3.2 LO 1: Explain the different uses/meanings of the term "quality."
	3.2 LO 2: Identify and assess quality factors in business, information and technical areas. Include among the general indicators of quality all the "ilities" such as productivity, reliability, availability, accessibility, etc.
	3.2 LO 3: Discuss the importance of "quality" when addressing customer (employees, customers, and stakeholders) expectations.
	3.2 LO 4: Identify and discuss the ways in which quality can be integrated into the culture of the organization.
	3.2 LO 5: Defend the integration of quality dimensions into the articulation of performance standards.
	3.2 LO 6: Discuss the need for linkages between initiatives and organizational mission. Include the need to address customer needs and expectations (including quality perceptions) driving strategic planning and linked to performance goals/objectives, resulting in initiatives.
	3.2 LO 7: Illustrate the ways in which quality initiatives (tactical goals) can be developed so that they advance strategic goals.
	3.2 LO 8: Describe the CIO's responsibility regarding quality improvement.
	3.2 LO 9: Differentiate and prioritize among quality factors. Include, but do not limit the discussion to issues such as, "If a 98% quality assurance program costs $100,000 and a

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	99% quality assurance program costs $1,000,000, the CIO needs to be able to assess the cost/benefit between them."
	3.2 LO 10: Clinger Cohen mandates that the CIO promote improvements to work processes in organizations. Identify and discuss the ways that CIOs, working collaboratively with the program leadership, may indeed promote such improvements to work processes. Include in the discussion the potential role of interorganizational relationships and partnerships with the business domain.
	3.2 LO 11: Discuss and plan ways in which a CIO may analyze organizational requirements and design a program(s) to train staff in quality models and methods. Include in the discussion/planning programs that will address ISO 9000, the Baldridge award, QFD, CMM, and Customer vs. Owner.
	3.2 LO 12: Define Activity Based Costing (ABC) and discuss the potential role of ABC as a process assessment tool. (Note: See also 4.3 LO 3 and 4.5 LO 2)
	3.2 LO 13: Since most process improvements and/or changes have systemic implications, identify and assess the impact of the business process improvement program on all aspects of the organization. (Note: See also 3.3 LO 11)
Competency 3.3— Techniques/models of organizational development and change	3.3 LO 1: Identify and discuss approaches that an executive may utilize to assess the need for change.
	3.3 LO 2: Demonstrate the ability to perform SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis).
	3.3 LO 3: Identify approaches to the evaluation of performance, quality, productivity, customer satisfaction, usability, cycle time, cost, functionality, risk, etc., etc., using basic metrics.
	3.3 LO 4: Recognize and evaluate change possibilities, including those arising from "best practices" literature. Develop approaches to defend such change initiatives.
	3.3 LO 5: Identify and discuss the classical elements of change management.
	3.3 LO 6: Discuss the importance of the organization and its stakeholders being ready for change. Identify approaches to assess workplace culture and environment regarding their readiness for change. Design approaches (including the

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	identification of individuals) to prepare the workplace for change.
	3.3 LO 7: Resistance to change is an organizational reality. Comprehensively discuss the critical importance of addressing resistance to change. Include identification of the barriers to change, identification and assessment of strategies for overcoming resistance to change—including leverage points and other opportunities to effectively implement change.
	3.3 LO 8: List and describe change techniques and tools including training.
	3.3 LO 9: Describe approaches that will facilitate the product adoption process.
	3.3 LO 10: Differentiate between voluntary and mandated change strategies and the approaches to their implementation.
	3.3 LO 11: Assess planned change from a holistic systems perspective. Include the identification of multiple points at which risk assessment and abatement techniques should be applied. (Note: See also 3.2 LO 13)
	3.3 LO 12: Design and support a change implementation plan.
Competency 3.4— Techniques and models of process management and control	3.4 LO 1: List, describe and evaluate tools/techniques for process control management.
	3.4 LO 2: Compare and contrast the major tools of process management.
	3.4 LO 3: Identify, describe and evaluate process simulation tools used to support process change management.
	3.4 LO 4: Describe gap analysis activity (gaps between present and desired state) and discuss the application of its results. One example: Can I add 90,000 transactions to the network and preserve sub-second response time?
	3.4 LO 5: Illustrate and support the concept that process supports quality (CMM model), i.e., that one must manage the completion of results rather than the activities that get those results.
3.5 Competency—	3.5 LO 1: Define Business Process Redesign/ Business

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Business process redesign/ reengineering models and methods	Process Reengineering (BPR).
	3.5 LO 2: Champy defines reengineering as "the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance, such as cost, quality, service, and speed." Discuss this statement and its implications for an organization.
	3.5 LO 3: Identify and discuss the characteristics of successful BPR.
	3.5 LO 4: List and discuss the models and methods that may be utilized in a BPR effort.
	3.5 LO 5: Discuss the potential problems that may beset a BPR effort.
	3.5 LO 6: Discuss BPR and the CIO's role of a change agent.
4.0 Information Resources Strategy and Planning	*General Discussion: IT must be a value-adding dimension of the business plan. IRM strategic planning must begin with the business strategic planning process and integrate with the organization's business functions and plans since business planning and IRM planning are parallel and coupled processes. Thus the CIO must be able to ask the right questions and understand the answers. Understanding IT architecture is essential.* *The planning process itself must be holistic, flexible (not platform or vendor specific), at a high level and must be in balance with the overall business strategy. The IT strategic plan must be a lesson in integrating since IT should be woven into the very fabric of the way the organization does its work.*
Competency 4.1— IT baseline assessment analysis	4.1 LO 1: In IT planning, differentiate between "baseline" analysis (inventory) and "assessment", which places that baseline into the business and IT strategic plan.
	4.1 LO 2: List the reasons to identify current technology architecture. Describe the process in which current technology architecture, including platforms, networks, etc., are identified.
	4.1 LO 3: Explain classical benchmarking, particularly as applied to IT. (Reference: "Benchmarking" by Camp)
	4.1 LO 4: Evaluate current baseline analysis against established benchmarks.
	4.1 LO 5: Describe the ways in which benchmarks may be

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	used to forecast performance of both your organization and your competition.
	4.1 LO 6: Describe the IT performance analysis and assessment process.
	4.1 LO 7: Discuss the importance of IT performance assessment/ analysis and support how the assessment can be used in developing appropriate and timely IRM strategies and plans that support business goals.
	4.1 LO 8: Design performance analysis and assessment approaches that address each element of IT. Include technology components (inventory of physical components, technical viability of components, capacity plan to manage extension of inventory, and performance measuring plans to assess ability to remain current with technological evolution), personnel (capabilities and skills), organizational structure and culture, and business plan linkage.
	4.1 LO 9: Characterize the baseline architecture.
	4.1 LO 10: Describe and define IT architectural principles. Discuss the role of architectural principles in IT strategic planning.
	4.1 LO 11: Assess the baseline architecture in terms of its effectiveness in meeting enterprise/program strategic goals and performance goals and identify gaps that should be addressed.
	4.1 LO 12: Define and describe performance goals and distinguish performance goals from performance standards.
	4.1 LO 13: Discuss and describe the role of IT performance goals and standards with respect to the enterprise/program strategic plan, general goals, and performance goals.
	4.1 LO 14: Describe the relationship between IT strategic planning and IT functional analysis.
	4.1 LO 15: Describe how IT visionary strategic planning is linked to enterprise/program visionary strategic planning.
Competency 4.2— Interdepartmental, interagency IT functional analysis	4.2 LO 1: Define functional analysis in an IRM setting.
	4.2 LO 2: Define the context (purpose and goals) for functional analysis. Discuss when cross-functional work is desirable and when it is not desirable. (Note: Successful

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	CIOs use cross-function systems or data where it adds value to the bottom line.)
	4.2 LO 3: Assume there is a mission and a baseline analysis. Analyze the functional requirements for the IT group, including functions that will be needed "cross functionally."
	4.2 LO 4: Describe the widening scope of IT interactions.
	4.2 LO 5: Design a system for interdepartmental functional analysis.
	4.2 LO 6: Since there may be cultural differences between departments or agencies, discuss when OD interventions may be needed for functional analysis to succeed.
	4.2 LO 7: List and describe functional analysis tools and issues. Include BPR and security, privacy, and open access issues in this discussion.
	4.2 LO 8: IT needs can be addressed in a number of ways including, "use what we've got," "build new," "acquire from the private sector," "acquire from the public sector," etc. Compare and contrast these potential solutions.
	4.2 LO 9: Justify the statement that "cross-functional IT aspects must be embedded in the system." Include interagency communication channels in the discussion.
	4.2 LO 10: Identify the criteria that would be examined to determine whether to "stop" or "kill" a project.
Competency 4.3— IT planning methodologies	4.3 LO 1: List and describe the elements involved in a comprehensive IT planning process.
	4.3 LO 2: Compare and contrast the range of IT planning methodologies. Include at least the following in the discussion of these IT planning methods: Martin's Information Engineering approach, gap analysis, weighted priorities (especially in terms of backbone questions), modeling techniques, and BPR.
	4.3 LO 3: Discuss the value of applying Activity Based Costing (ABC) to IT planning. (Note: See also 4.5 LO 2)
	4.3 LO 4: Define the activities and tasks of the plan. Assess interoperability of resources available.
Competency 4.4— Contingency planning	4.4 LO 1: Identify the need for contingency planning, and for garnering the needed resources to protect against costly IT "events." The discussion should include but not be limited

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	to issues such as the following: data integrity, disaster recovery, emergency preparedness, system crash and backup planning, cyber terrorism, and program contingencies such as Y2K.
	4.4 LO 2: Develop and support contingency plans to protect against costly IT "events." Plans should identify risks to the IT plan, inventory opportunities for failure, and identify resources to protect against such events.
	4.4 LO 3: Describe the benefits involved in a periodic review of IT plans and contingency plans for IT.
	4.5 LO 4: Discuss the value of interoperability of resources in support of contingency needs.
Competency 4.5—Monitoring and evaluation methods and techniques	4.5 LO 1: Identify and describe approaches that will assess value, benefit, and cost of IT and its impact on the business, or the organization's components.
	4.5 LO 2: Discuss the value of Activity Based Costing (ABC) in demonstrating the value, and benefits, of IT. (Note: See also 4.3 LO 3)
	4.5 LO 3: Demonstrate the value of establishing periodic and timely reviews and reporting milestones in which IT performance is compared/contrasted to the IT strategic plan. (Note: See also 5.7 LO 3)
	4.5 LO 4: Describe the importance of establishing and evaluating program success factors. (Note: See also 5.7 LO 3)
	4.5 LO 5: Understand project management planning and control tools. (Note: See also 6.0)
	4.5 LO 6: Identify ways in which IT milestones may be linked to the organizational reporting structure. (Note: See also 5.7 LO 3)
5.0 IT PERFORMANCE ASSESSMENT: MODELS AND METHODS	*General Discussion: The basic question: "Is IT meeting both the business plan goals and the needs of constituents?" There must be a "balanced scorecard"—revenue/program accomplishment with both customer and employee satisfaction.* *The CIO must be aware of the range of perspectives on performance and of the types of performance measures available and must embrace a systems perspective for IT and its assessment process(es). The CIO must understand the importance of baseline assessment measures—qualitative measures and quantitative measures (Example: ROI) in the performance assessment cycle.*
Competency 5.1—	5.1 LO 1: List and describe non-monetary contributions to

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GPRA and IT: measuring the business value of IT	business value including usability, efficiency, productivity, perceived value, etc.
	5.1 LO 2: Defend the value of data in supporting assessment conclusions and decisions.
	5.1 LO 3: Since the GPRA requires government agencies to develop a strategic plan that is linked to specific performance goals, describe how IT systems relate to the business mission, vision, strategy, goals and objectives of an organization. (Note: See 1.1 LO 5, 1.1 LO 6 and 1.1 LO 7)
	5.1 LO 4: Identify the ways that IT is tied to an organization's critical success factors. (Note: See also 5.7 LO 3)
	5.1 LO 5: Discuss how IT relates to both internal (process) and external (Congress, the customers, etc.) business drivers.
	5.1 LO 6: List and describe how IT aligns with the core process of the business—in terms of both efficiency and effectiveness.
	5.1 LO 7: List current Federal performance legislation (e.g., GPRA, ITMRA, Clinger-Cohen, PRA of 1995, and other relevant performance legislation) and describe/discuss the performance mandates that a CIO must address. (Note: See also 1.4 LO 7)
Competency 5.2—Monitoring and measuring new system development: when and how to "pull the plug" on systems	*General Discussion: It is essential for CIOs to understand that "pulling the plug" is an issue for both new systems and existing systems.*
	5.2 LO 1: Schematize the entire PPBS lifecycle, including both funding and retirement, and show how integral performance measures can support each phase of the cycle. (Note: Also see 5.7 LO 3 and Competency 7.0)
	5.2 LO 2: Evaluate the different approaches to life cycles to determine if the most appropriate life cycle has been chosen.
	5.2 LO 3: Identify criteria and integrate "go/no go" checkpoints into the development life cycle.

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	5.2 LO 4: List and describe the tools, including S-curve (time over money, performance over cost etc.) evaluation systems, that are typically used to make go/no go decisions. Include tools that address cost and schedule data as well as rules of thumb such as "when a system gets behind 20%, it is time to 'kill' it."
	5.2 LO 5: Identify the types of criteria to be used within the development life cycle to determine when a system has reached maturity. Discuss the importance of this process. Include concepts such as 80/20 and tools such as Pareto Analysis.
	5.2 LO 6: Identify criteria to be used when analyzing whether to replace an existing system.
	5.2 LO 7: Compare and contrast the characteristics and the challenges involved in "new" systems, both those that are replacing existing systems, and those that are completely new.
	5.2 LO 8: Describe the process involved in choosing the most appropriate control measures. (Note: See also 6.3 LO 2)
Competency 5.3—Measuring IT success: practical and impractical approaches.	5.3 LO 1: List and explain the various criteria (time, budget, etc.) that may be used to determine IT "success." Discuss the importance of aligning these criteria with stakeholder needs.
	5.3 LO 2: Identify and evaluate (based on the organization's need for information) a variety of approaches/tools that may be used for measuring IT success. Include among the tools, the GQMM (Goals, Questions, Metrics, Measures) approach, the Balanced Scorecard (financial, customer, internal business process, innovation/learning), Benchmarking, Best Practices, etc. (Note: See 5.5 LO 3 and 6.3 LO 2)
	5.3 LO 3: Describe the concept and be able to identify applicable leading and lagging indicators.
	5.3 LO 4: Discuss the limits of analysis. Include discussion on the concept of measurement for measurement's sake.
	5.3 LO 5: Distinguish between outcome (what the system needs to achieve) and output (what the system does).
	5.3 LO 6: Discuss the importance of identifying a few critical measures of IT success, and keeping those measures "on

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	display."
	5.3 LO 7: Explain the role of survey instruments in identifying elements of IT success.
Competency 5.4—Processes and tools for creating, administering and analyzing survey questionnaires	5.4 LO 1: Discuss the importance of questionnaires and other survey instruments in addressing the "soft side" of IT and helping to identify "gaps."
	5.4 LO 2: List and describe a variety of survey collection techniques. Include interviews, elite interviews, focus groups, surveys, questionnaires, etc. The discussion should include advantages, disadvantages and tradeoffs associated with each technique or tool.
	5.4 LO 3: List and describe frameworks such as maturity measures CMM, ISO 9000, questionnaires, etc. and the applicability of their role.
	5.4 LO 4: List and discuss the characteristics of good survey design. Discuss validity and reliability. (Reference: GSA link to GAO documents.)
	5.4 LO 5: Discuss possible "interactions" among various survey instruments, and the importance of addressing such possible interactions before they occur.
Competency 5.5—Techniques for defining and selecting effective performance measures	5.5 LO 1: Support the statement that the "key criteria in establishing measures of effective performance is alignment—alignment with stakeholder needs, mission, vision and critical success factors, etc."
	5.5 LO 2: Discuss the advantages and disadvantages of building user feedback into the design and development of performance measures.
	5.5 LO 3: List, describe, and evaluate techniques that are appropriate for measuring effective performance. Identify where these techniques/practices may be found. Include best practices, benchmarking, etc. (Note: See also 5.3 LO 2 and 6.3 LO 2)
	5.5 LO 4: Discuss the importance of identifying and establishing specific measurements of effective performance. Anticipate the use of the data obtained and identify the "behavior" that may need to be modified.

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Competency 5.6—Examples of and criteria for performance evaluation	5.6 LO 1: Identify and report on sources of performance evaluation information. Include the Price Waterhouse web site on performance measures (www.govexec.com/edge) and Performance Pathways (www.itpolicy.gsa.gov) among the sources explored.
	5.6 LO 2: Identify and prioritize criteria that address strategic and tactical dimensions of IT. Demonstrate the ways in which typical criteria can be focused (business, information quality, technical application) and evaluate whether the technology is fulfilling strategic business needs as well as the tactical dimensions of service, information and system quality.
	5.6 LO 3: Discuss the approaches to, and the value of, identifying/prioritizing customers and stakeholders.
Competency 5.7—Managing IT reviews and oversight processes	5.7 LO 1: Discuss the significance/importance and impact of IT reviews.
	5.7 LO 2: Define the roles and responsibilities of managers (program managers, project managers, program leads, etc.) in the IT review process.
	5.7 LO 3: Identify key performance parameters, beginning with the requirements definition phase. (Note: See also 5.2 LO 1)
	5.7 LO 4: Describe the dual role of the CIO—as CEO in IT and in the Clinger-Cohen mandated role in agency leadership. (Note: See also 1.1 LO 2, 1.2 LO 1, and 1.4 LO 2)
	5.7 LO 5: Describe the importance of the CIO "having a seat at the table." Consider that in the CIO's line responsibility, he/she is responsible for the reviews and the oversight process. He/she must have visibility in the process—and also has the responsibility to advise the organization's leadership team.
	5.7 LO 6: Show IT's strength as a solution provider that can demonstrate business value.
	5.7 LO 7: Design a process to ensure that measurement data that has been collected in the assessment and review processes is used in decision making.
6.0 PROJECT/PROGRAM	*General Discussion: Both program management and project management require the same set of skills, including communication, effective decision-making, and team building.*

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MANAGEMENT	*However, there is a difference in scalability and granularity between the management of projects and programs, and therefore a need to distinguish between the two.* ***Project Management**: A project may be an element of a program, is relatively short term and has a defined beginning and end. They are often detail oriented.* ***Program Management**: A program is considered to be a set of related activities with a common focus and could include multiple projects. Although a program has a target, it is not bounded in time, and can accommodate change.* ***Decision-making** is essential to both project and program* management.
Competency 6.1—Project scope/requirements management	6.1 LO 1: List and define the elements involved in the scope (money, time, people, impact, etc.) of the program/project being considered. Discuss how these elements address the needs of the organization, including its vision, values, history and culture.
	6.1 LO 2: Discuss the way in which vision impacts scope and requirements, i.e., most of the discretionary dollars (up to 90%) are committed once the planning stage is completed.
	6.1 LO 3: Schematize how program/project fits into the global picture of the organization, other programs, Congress, and the organization's constituencies.
	6.1 LO 4: Anticipate and understand the global and forward-looking direction of the organization so as to be prepared to move forward when the plan is announced.
	6.1 LO 5: Illustrate the essential and central role of information in the management of projects/programs.
	6.1 LO 6: Assess and anticipate the impact of change that arises from mission change, organizational change, changes in resources, and global (not just geographic, but also a broad conceptual view) change, etc. (Note: See also Competencies 3.1 and 3.3)
	6.1 LO 7: Scope or requirements "creep" is natural. Considering A. V. Graicunas's representation of the span of control, discuss how to identify, manage and control project requirements creep.
	6.1 LO 8: Discuss and design systems to track both technology changes and user needs changes so as to reduce risk.
	6.1 LO 9: List and discuss the types of organizational and project change that may occur due to partnering with vendors and other external partners.

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	6.1 LO 10: Justify the need to observe and to abstract the "big picture" from the detail that is presented so as to be able to make appropriate decisions.
	6.1 LO 11: List and describe potential issues that may emerge to threaten the success of a program.
	6.1 LO 12: List and describe the range of decision-making methods and tools available to the project/program manager.
Competency 6.2— Project integration management	6.2 LO 1: Define and illustrate "project integration."
	6.2 LO 2: Discuss and give examples of the importance of innovation and creative thinking in creating new program strategies.
	6.2 LO 3: Describe integration across programs including the moving of resources and allocating and integrating resources across programs.
	6.2 LO 4: Compare and contrast among available "knowledge management" tools.
	6.2 LO 5: Discuss the value of electronic communication tools as an integration driver. Include speed, wider sharing of program/project management information, "pull vs. push" information flow and the limits of the systems including "spam," etc.
	6.2 LO 6: Identify the types of external integration opportunities that exist with vendors, extranets, distance learning, etc.
	6.2 LO 7: Develop plans to integrate project management and business management.
Competency 6.3— Project time/cost/ performance management	6.3 LO 1: Describe and evaluate project management tools so as to be able to select the right tool for the task.
	6.3 LO 2: List, describe and evaluate performance metrics. (Note: See also 5.2 LO 4, 5.2 LO 7, 5.3 LO 2, 5.5 LO 3)
	6.3 LO 3: Analyze and deduce performance, resources, cost, schedule, business objectives.
	6.3 LO 4: Identify and develop criteria to be used for selection of the analysis.

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	6.3 LO 5: Demonstrate decision making based on resource management information.
	6.3 LO 6: Discuss the importance of program control processes and experts.
	6.3 LO 7: Describe the importance of financial management techniques and tools such as the budget process, ROI, PPBES etc., in both government and corporate project management situations.
	6.3 LO 8: Recalling that it is essential to find solutions that work, install them and make them operational in a timely fashion. Identify, evaluate, and integrate cost, time and performance drivers so that the tradeoffs that are made are reached in a realistic way, especially at the program level. Include EIS systems, DSS systems, Earned Value Management, Army Systems Synchronization, etc.
Competency 6.4—Project quality management	6.4 LO 1: Differentiate between quality assurance and quality.
	6.4 LO 2: Identify quality requirements and evaluate/establish metrics to achieve those requirements.
	6.4 LO 3: Identify and discuss ways to build quality into systems.
	6.4 LO 4: Design systems to obtain feedback from users.
	6.4 LO 5: Design systems, including the use of metrics that cover the full range of quality requirements, that assure honesty in testing, and that assure that quality programs are taken seriously.
	6.4 LO 6: Discuss the advantages of independent verification and validation (IV&V) and design approaches to tie IV&V to the quality assurance program.
Competency 6.5—Project risk management	6.5 LO 1: Define risk.
	6.5 LO 2: Differentiate among the different types of risk. Include at least the following types of risk: technical, obsolescence, technology capability, stovepipes, time, cost, resources, external partners, competing projects, security and threat, and lack of synergy.
	6.5 LO 3: Identify, discuss, develop and disseminate risk

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	taxonomy. (Reference: SEI from Carnegie Mellon University.)
	6.5 LO 4: Identify approaches to quantify risk assessment and to prioritize among risks. (Reference: DSMC Risk Management manual.)
	6.5 LO 5: Describe the risk mitigation process, and how it is tailored to particular situations.
	6.5 LO 6: Evaluate monitoring and control systems. Discuss their implementation.
	6.5 LO 7: Discuss the need for risk management in completed systems. Include discussion of the "larger environment" in which the system will be functioning.
Competency 6.6—Project procurement management	6.6 LO 1: Describe the project management lifecycle. Show how the procurement phase is integrated into the entire lifecycle.
	6.6 LO 2: Discuss the CIO's "cradle to grave" responsibility for project and program management.
	6.6 LO 3: Describe the CIO's involvement in the early phases (concept exploration and acquisition) of procurement management.
7.0 CAPITAL PLANNING AND INVESTMENT ASSESSMENT	*General Discussion: It is essential that CIOs understand the importance of Capital Planning and Investment Analysis. Clinger-Cohen mandated such planning and assessment and changed the "rules of the game." Successful industry does the same things. Clinger-Cohen decentralized IT and made each agency autonomous in the way it plans, invests in, and implements IT. Capital planning is needed to provide a framework for running government with the same disciplines as private business.* *In addition to Clinger-Cohen other legislation involved in these significant changes include:* ***PRA**—Paperwork Reduction Act of 1995,* ***GPRA**—Government Performance and Results Act (Results Act) (PL 103-62),* *Title V Extract-Federal Acquisition Streamlining Act of 1994 (PL 103-355) which sets standards for planning, organizing and monitoring projects,* *Chief Financial Officers Act (PL 101 576)* *BEA—Budget Enforcement Act* *BBA—Balanced Budget Agreement* *The OMB and the White House have also issued guidance related to the acquisition and management of information resources, including:* *OMB Circular A-11* *OMB Circular A-94* *OMB Circular A-109* *OMB Circular A-123* *OMB Circular A-127*

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	OMB Circular A-130 *Executive Order 13011 Sec. 2(b)(3)* *OMB Memorandum M-97-02* *In the new paradigm IT decisions need to be supported by using business case analysis. Business cases will be presented to the Investment Review Board that includes the CIO. Finance and acquisition will need to be linked to capital planning.* *IT is only one of six CIO responsibilities emanating from the PRA and the Clinger Cohen Act. These responsibilities are:* *1. Information collection and burden reduction* *2. Statistical activities* *3. Records management* *4. Privacy (Privacy Act)* *5. Information Technology* *6. Security*
Competency 7.1—Best practices	*General Discussion: Although there are current "best practices" in cost benefits, risk management, etc., the CIO needs to be aware of both current best practices and emerging best practices. Thus, a desirable approach to "Best Practices" is one that emphasizes continuous learning.*
	7.1 LO 1: Identify the steps needed, and develop a plan to create an environment that encourages continuous learning. (Note: Same as 2.2 LO 1)
Competency 7.2—Cost benefit, economic, and risk analysis	See Competency 7.3 for more detail on risk analysis learning objectives.
	7.2 LO 1: Analyze ROI data, assess its quality, and communicate its meaning to others. (Note: See 7.6 LO 5)
	7.2 LO 2: Describe and interpret a variety of methodologies used in cost benefit, economic and risk analysis. (Note: See 7.6 LO 5)
	7.2 LO 3: Compare and contrast among the methodologies used in cost benefit, economic and risk analysis in order to be able to implement a single set of methodologies with common standards throughout a large organization. (Note: See 7.6 LO 5)
	7.2 LO 4: Compare and contrast the implications of commonly used metrics such as ROI, NPV, IRR, MIRR etc. This comparison should address not only the outcomes of the metrics, but also the assumptions upon which the metrics are based. Note: Some methods (NPV) result in positive or negative numbers, while IRR results in a percentage, but is less robust. Often percentages are more appealing, and more compelling. (Note: See 7.6 LO 5)
	7.2 LO 5: Analyze the quantitative data behind qualitative

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	decisions adequately to be able to ask appropriate questions. (Note: See 7.6 LO 5)
Competency 7.3—Risk management—models and methods	7.3 LO 1: Discuss the reasons why risk analysis and risk management are vital. Include discussion of the role risk management plays and how the specifics relate to the organization and its mission.
	7.3 LO 2: Discuss and illustrate each of the three major areas of risk—cost, technical (including obsolescence) and management capability.
	7.3 LO 3: Compare and contrast the commonly accepted standards, tools, and methods used in risk management.
	7.3 LO 4: List and describe commonly used best practice risk management models including opportunity cost, sunk cost, etc. (References: www.cio.gov, documents from the GAO Investment Guide; OMB A94, A11 Part 3, Capital Programming Guide; and GAO Report assessing Risks and Returns)
Competency 7.4—Weighing benefits of alternative IT investments	7.4 LO 1: Compare and contrast the commonly accepted standards, tools, and methods available for weighing benefits of alternative IT investments.
	7.4 LO 2: Discuss the benefits of uniform standards (such as OMB A 94, A11 which is a standard, but not mandated) vs. the value of flexibility in assessing alternative IT investments. Include the importance of familiarity with "best practices."
	7.4 LO 3: Discuss the appropriation process and the way that politics (both local agendas and national issues) may impact the capital planning and investment process.
	7.4 LO 4: Since all capital planning and investment assessment decisions should be evaluated across a broad spectrum of criteria, discuss the value of developing a uniform (within an agency) approach to evaluate alternative investment decisions. (Note: This need for evaluation assumes that there are limited resources (fiscal, human, etc.) available for capital planning and investment.) (Note: See also 7.7 LO 4)
	7.4 LO 5: Identify and analyze the hard criteria (e.g., ROI and shelf life) and the soft criteria (Veteran's Administration addresses "principles" such as internal customer satisfaction, quality of life, etc.) that would be included in the capital planning and assessment decision—and design a sample evaluation instrument that reflects these criteria as

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	well as other forms of performance metrics. (Note: See 7.6 LO 5 and 7.7 LO 4)
	7.4 LO 6: Discuss the role of forecasting in cost-benefit analysis. Include situations in which IT systems are making an investment in information that does not show up immediately in the ROI, but needs to be inserted into the ROI forecast. (Note: See 7.6 LO 5 and 7.7 LO 4)
Competency 7.5—Capital investment analysis—models and methods	7.5 LO 1: Compare and contrast the various capital investment models and methods, e.g., Capital Assets Pricing Model (CAPM), Internal Rate of Return (IRR), Net Present Value (NPV), Modified Internal Rate of Return (MIRR), etc. (Note: See 7.6 LO 5)
Competency 7.6—Business case analysis	7.6 LO 1: List and define the elements (customers, management, and technical cost) of a Business Case Analysis in government.
	7.6 LO 2: Discuss each of the six elements of a comprehensive Business Case Analysis. The six elements to be discussed include: 1. Best practices 2. Cost benefit, economic, and risk analysis 3. Risk management 4. Weighing the benefits of alternative IT investments 5. Capital investment analysis 6. Integration of performance with mission and budget process (Note: See also 7.7 LO 4)
	7.6 LO 3: Utilizing case studies, examine how Business Case Analysis provides the means to evaluate the quantitative and qualitative aspects of competing investment opportunities. (Example: The FBI has three investment initiatives before it: 1) add 1500 agents to the field; 2) obtain laptops for field agents; and 3) build a new building.)
	7.6 LO 4: Discuss the use of “Raines Rules” in developing a Business Case Analysis. (Reference: **Raines Rules Document** [from OMB Memorandum of October, 1996] Business Case Analysis—demonstrate a projected return on the investment that is clearly equal to or better than alternative uses of available public resources. Return may include improved mission performance in accordance with GPRA measures; reduced cost; increased quality, speed, or flexibility; and increased customer and employee satisfaction. Return should be adjusted for such risk factors as the project's technical complexity, the agency's management capacity, the likelihood of cost overruns, and the consequences of under- or non-performance.)

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	7.6 LO 5: Verify the validity of measurements used in developing/calculating investment metrics. Note: The CIO need not be a financial analyst, but must be able to understand different methodologies that have been used to calculate return, etc. (Note: See also 7.2 LO 1; 7.2 LO 2; 7.2 LO 4; and 7.2 LO 5)
	7.6 LO 6: Compare and contrast the models and methods of Business Case Analysis, both in government and in industry. (Examples: Ratio analysis, a typical business tool, could be used to assess against performance/outcomes against agencies of similar size and mission. GSA's Public Building Services have developed benchmarks against private industry real estate firms.)
Competency 7.7—Integrating performance with mission and budget process	7.7 LO 1: Evaluate the contribution of specific capital investment initiatives to mission performance. Example: If your organization is charged with safety, as is FAA, that mission aspect will be a qualitative factor in capital planning decisions.
	7.7 LO 2: Discuss the role of capital planning in an agency's strategic planning process.
	7.7 LO 3: Demonstrate the importance of alignment of capital planning with agency mission.
	7.7 LO 4: Develop approaches to assess the qualitative and quantitative contribution of capital planning investments to the agency mission. (See also 7.4 LO 4; 7.4 LO 5; 7.4 LO 6; and 7.6 LO 2.)
Competency 7.8—Investment review process	7.8 LO 1: Discuss the need for an investment review process. Include in the discussion, the role of the "decision makers" (and who they may be), and an identification of the types of information that will be needed.
	7.8 LO 2: Identify the information that will be needed for the investment review process. Include "checkpoints" that may trigger additional information.
	7.8 LO 3: Discuss different approaches to the investment review process. Include approaches that are oriented to the culture of the specific organization, e.g., some organizations are detailed and quantitative, others are consensus based, etc.
	7.8 LO 4: List the stages of an investment review process. Design an investment review process that includes each of these steps/stages.

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	7.8 LO 5: Describe the capital planning process in life-cycle terms. Include OMB Circular A11 in the discussion.
Competency 7.9—Intergovernmental, Federal, state, and local projects	7.9 LO 1: Assess the impact of regulation on state and local partners. Include budget impacts etc. Examples may include "Welfare to Work" and "Medicare."
	7.9 LO 2: Identify and/or design shared solutions across agencies (intraagency and interagency) to leverage investments.
8.0 ACQUISITION	*General Discussion: Acquisition links technology investment to the business outcomes and results, as defined by the end consumer. Acquisition needs to move from what has been a singular focus on process to one that considers both process and objectives. Acquisition anticipates what is needed before it is officially stated, and develops requirements that include the end users and must be linked to business outcomes.* *The CIO must understand the new dynamic, including moving from a risk averse process to one of risk management, and create an innovative acquisition environment throughout the organization. He/she should monitor changes in acquisition models and methods.* *Acquisition includes four stages—(1) Defining the business objective; (2) Requirements definition and approval; (3) Sourcing and (4) Post-Award management. The post-award management phase can be multi-year, and the CIO must be aware of technology cycles, and the impact of the length of the cycle. Acquisition needs to be seen as part of a larger structure or process in which it is one link in the capital planning and strategy process. It is the "cost" part of the cost/benefit analysis. The CIO must understand his/her role in business objectives, and forge a partnership with the other senior leaders of the organization. There needs to be a dynamic interplay between industry choices/resources and acquisition decisions.* *The CIO and senior management should understand the impact of government on industry, both in terms of laws and regulations, the impact of specific procedures, and the actual acquisition process.*
Competency 8.1—Alternative functional approaches (necessity, government, IT) analysis	8.1 LO 1: Describe the ways in which a strategic plan must drive the acquisition strategy.
	8.1 LO 2: Demonstrate the development of an acquisition strategy. Include interpretation of internal and external environments, the business, fiscal and political environments, and technological and environmental change in the development of the acquisition strategy.
	8.1 LO 3: Identify and describe the range of alternatives to acquisition which should be explored in the pre-phase of the

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	project. Include the role of technology, reengineering, training, processes, procedures, elimination of functions, etc., in the listing of alternatives.
	8.1 LO 4: Discuss alternative ways to translate the business objective into requirements. (IRS Example: Instead of acquiring a system, one option was to retain a company to do the acquisition.)
	8.1 LO 5: Since change may occur through technology or through organization, define the role of CIO as a change agent. (Note: See also Competencies 2.1 through 2.6 and 3.1 through 3.4)
	8.1 LO 6: Discuss the differences between acquisition as a planned event and as a reactive event. In particular, address reactive events that may be described as poor planning, i.e., a 5-year contract is due to expire in 6 weeks, and acquisition must react.
Competency 8.2—Alternative acquisition models	*Discussion: Competency 8.2 and Competency 8.3 examine different dimensions of the same concept.*
	8.2 LO 1: Define the components typically included in an acquisition model. These components might include relationship between government and supplier, internal relations, motivation of supplier, and elements of sourcing, etc.
	8.2 LO 2: List, then compare and contrast, various acquisition philosophies. Include, but do not limit the identification to: changing the operational process instead of purchasing; doing the work in house or outsourcing; outsourcing to one or to several contractors; intergovernmental outsourcing; unitary RFP or multiple awards; level at which the acquisition is managed (e.g., seat management—all desktop needs to one contractor, versus individual PC support contracts.)
	8.2 LO 3: Discuss the need to design acquisition philosophies and models that fit the organization's mission, needs and culture.
	8.2 LO 4: Design an acquisition philosophy or model that fits the organization's mission, needs, and culture. Among the factors considered include sourcing issues, type(s) of contract, award fees, use of subcontractors, etc.
	8.2 LO 5: Demonstrate the development acquisition model/plan for different acquisitions. Include the vehicle to be used, i.e., GSA schedule; contractor(s) motivation; unitary RSP or multiple awards etc.

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	8.2 LO 6: Evaluate the variety of processes or methods available for acquisition. Include the FAR (which includes several methods), UCC, etc.
Competency 8.3—Streamlined acquisition methodologies	8.3 LO 1: List and describe various acquisition models. Include among the models considered: traditional (DoD) milestones (5 phases or 4 phases); FAA model (spiral, 3 phases); IRS model (outsourcing acquisition—agency as super system's integrator); commercial best practices (off the shelf); SAP (Streamlined Acquisition Process); Defense Enterprise Program (C17); and USMC Compressed Acquisition.
	8.3 LO 2: Compare and contrast acquisition methodologies Include in the analysis: 1. Methodologies which establish internal decision-making process 2. Time, budget, performance, risk management as elements of analysis 3. Determination of resources or authority to acquire by self, e.g., single procurement vs. OMB circular A-109 Fly-off 4. Procuring an annual renewable service approach (as opposed to buying a thing) 5. Relations with users and industry during the process 6. Evaluation methodology to be used 7. Commercial item (COTS driven) 8. RFP/solicitation 9. Market research/RFI (request for information) 10. GWAC (Government Wide Acquisition Contract) 11. Delegate parts of process (Executive Agent needed) 12. GSA Schedules
	8.3 LO 3: Describe the process of creating/engineering streamlined acquisitions.
Competency 8.4—Post–award IT contract management models and methods, including past performance evaluation	8.4 LO 1: List and describe post-award contract management methods and strategies. Include the following in the listing and description: • Performance based service contracts • Methods of control (interfaces, checkpoints) • Benchmarks (agreed-upon) • Tracking performance -- build a system for tracking and rewarding good performance • Creating incentives for good performance (includes share in the savings, e.g., California Franchise Tax Board) • Managing changes in the contract—negotiation between users and contractors about requirements scope creep • Termination strategies
	8.4 LO 2: Discuss the management of partnering relationships. Include organizational interface, structure of

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	the relationship (motivation, checkpoints, information needs, metrics).
	8.4 LO 3: Discuss the importance of pre-termination and termination decision points.
Competency 8.5— IT acquisition best practices	8.5 LO 1: Devise systems for tracking and evaluating commercial and other public sector "best practices." Include state, local, and other Federal agency best practices. Discuss the importance of leading change and implementing appropriate best practices.
	8.5 LO 2: Discuss approaches to encouraging ethical acquisition behavior on the part of all involved in the acquisition process.
	8.5 LO 3: Discuss approaches that will create an environment of trust within the organization. (References: SA-CMM, Software Program Managers Network, both a repository and a network)
	8.5 LO 4: Define "knowledge management, knowledge sharing."
	8.5 LO 5: Explore the resources of the Project Management Institute and the Project Management Body of Knowledge (PMBOK) (Note: PMBOK has been adopted by the IEEE and serves as the de facto US standard for project management. See www.pmi.org to download the PMBOK. The Information Systems Specific Interest Group is the largest SIG in PMI and is experiencing the fastest growth Its URL is http://pmi-issig.org/.)
9.0 TECHNICAL	*General Discussion: One must distinguish between technical and technology. A CIO must have an integrative understanding of how technology works, but not be technical in the sense of a developer. The CIO must understand the strengths and weaknesses of tools, how they work, what they are good for, and also their limits.* *Communication skills are essential for CIOs. There is a huge dichotomy between the people and technology sides of an organization. The CIO must play the role of a "universal translator" especially regarding technical ideas and terms. The CIO must be able to ask the right technology questions and understand the answers since the CIO needs to make decisions and judgments.* *The CIO needs to know what the state-of-the-art technology is, and must have more breadth (rather than depth) in emerging technology.* *The CIO must be able to make use of analytical processes, including statistical measures, in order to make competent decisions.* *The CIO should bring technical vision (interaction between the business and technology) to guide the organization into new business directions while remembering that the business rules must be the drivers of the technology.*

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	It is critical that the CIO be "savvy" about the organizational culture and be able to manage not just the culture, but also the culture's expectations. Thus, interpersonal skills are as essential as technology in facilitating complex social and people issues. The CIO must distinguish between the technology itself and the process of applying the technology, and must take a ***systems-approach*** *to technical issues.*
Competency 9.1—Information Systems Architectures—client/server, collaborative processing, telecommunications	9.1 LO 1: Discuss the Clinger-Cohen mandate for developing IT systems according to architecture.
	9.1 LO 2: Compare and contrast the dimensions of different architectural frameworks. Include the DoD architecture framework displayed in C41SR with the corresponding Federal architecture framework.
	9.1 LO 3: List and discuss the main elements of IT architecture—what do we have now and designing for the future.
	9.1 LO 4: Discuss the need for, and the development of a transition plan to move IT from where it is to where it will be going. Note that this requires knowledge of available technology.
	9.1 LO 5: List and define the taxonomy of architecture. Include organization architecture and structure, and form vs. function. (Reference: Federal Enterprise Architecture Conceptual Framework; the State of Oregon at spr.info@state.or.us and irmd.info@state.or.us ; and DoD which uses analogy of systems=blueprint, technical=building codes; operational=requirements.)
	9.1 LO 6: Describe the multi-dimensional nature of architecture. Discuss the need for security with the architecture evolving over time.
	9.1 LO 7: Discuss the need to understand the history of the organization's current architecture.
	9.1 LO 8: List and discuss the Federal architecture guidance for business and technology drivers.
Competency 9.2—Emerging/developing technologies	9.2 LO 1: Classify technology by "state of the art" and by organization.
	9.2 LO 2: Design a system that monitors emerging technologies and provides some evaluation of the

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	technologies.
	9.2 LO 3: Distinguish between risk management approaches to legacy and pioneering technologies.
	9.2 LO 4: Identify ways to integrate emerging technologies into existing systems.
Competency 9.3 Information delivery technology (internet, intranet, kiosks, etc.)	9.3 LO 1: Discuss information delivery technology trends.
	9.3 LO 2: Discuss the legalities and subtleties of electronic communication technologies, including when to use written, verbal, fax, e-mail, etc., as well as hardware and software considerations.
	9.3 LO 3: Compare and contrast communication media, considering impact and architecture. Include Net-iquette, iconographic communication, layers of meaning, etc.
	9.3 LO 4: Describe protocols, and evaluate the strengths and limitations of the media.
	9.3 LO 5: Discuss current ethical and intellectual property issues.
	9.3 LO 6: Evaluate the public policy implications of media choices.
	9.3 LO 7: Describe and evaluate potential liabilities inherent in adopting new technology.
	9.3 LO 8: Discuss the equal access issues in technology delivery.
Competency 9.4—Security policy, disaster recovery, and business resumption	*General Discussion: This competency addresses IT security and needs to include identifiable security risks to IT resources including deliberate or accidental misuse, loss, disruption or destruction in addition to those risks more typically discussed under risk management. See also Competency 1.6.*
	9.4 LO 1: Discuss the dimensions of risk management. Include time that the system can be down, optimizing cost vs. functionality, using cost/benefit analysis to determine level of risk, probability of event and impact/cost of the event.
	9.4 LO 2: Demonstrate the importance of understanding the different models that are used to maintain an organization's data.

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	9.4 LO 3: Design contingency plans to cover the inherent risks to IT. Include both IT security contingency plans as well as disaster recovery, business resumption, etc.
	9.4 LO 4: Evaluate the tradeoffs between security and access.
	9.4 LO 5: Discuss opportunity cost issues. Include the cost of doing nothing and the cost/benefits of different options.
	9.4 LO 6: Describe the techniques of the security discipline. Include encryption, access control, physical security, training, threat analysis, authentication, and policy issues.
	9.4 LO 7: Describe the learning opportunities that may arise from "incidents." Develop feedback processes to maximize these learning opportunities.
Competency 9.5—System life cycle	9.5 LO 1: List and describe the components of the system life cycle. Include costs in the discussion.
	9.5 LO 2: List and describe the standards such as SEI, ISO 12207, STD-16, ISO 9000 etc., that apply to the life cycle.
	9.5 LO 3: Discuss the life cycle as a discipline.
	9.5 LO 4: Distinguish between system development life cycle and the system life cycle.
	9.5 LO 5: Describe the interrelationships among different parts, i.e., systems, hardware, software, and communications.
	9.5 LO 6: Schematize the different parts of the life cycle to achieve a useful and cost effective outcome.
	9.5 LO 7: Describe the impact of Commercial-Off-The-Shelf (COTS) availability to the build or buy decision.
	9.5 LO 8: Discuss the heuristics of life cycle—when to know when you have enough etc. (Note: See Defense Staff Management College information.)
	9.5 LO 9: Discuss the importance of managing change.
Competency 9.6—Software development	9.6 LO 1: Identify different models (such as CMM, emerging best practices, IDEF, RAD, JAD, IBT) and evaluate strengths and weaknesses.
	9.6 LO 2: Define CMM.

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	9.6 LO 3: Discuss the importance of adopting and applying a systems engineering perspective and process to software development.
	9.6 LO 4: Describe a multi-dimensional software environment.
	9.6 LO 5: Develop a system to analyze the make vs. buy decision. Understand statistical measures as a tool to make informed decisions.
	9.6 LO 6: Discuss Pareto's law and the impact of core requirements—i.e., 80% of the design is up front before coding begins.
Competency 9.7—Data management	9.7 LO 1: Discuss the value of relating data management plans to the use of information in the agency.
	9.7 LO 2: Discuss the criticality of data standardization.
	9.7 LO 3: Evaluate reliability and validity of data, including source of the data.
	9.7 LO 4: List and describe the attributes (availability, accessibility, security, volatility, usability, manipulability, etc.) of data management.
	9.7 LO 5: Discuss both traditional and emerging concepts and technologies of data management including data modeling, data mining, data warehousing, data exchange and interchange, etc.
	9.7 LO 6: Describe and analyze problems of scale.
	9.7 LO 7: Measure, evaluate and justify the cost and value of data.
10.0 DESK TOP TECHNOLOGY TOOLS	*General Discussion: It is expected that the CIO and his/her staff will be familiar with and competent in the use and applications of desktop technology tools.*