Curriculum Development Centers Program

Awardee of The Office of the National Coordinator for Health Information Technology

HEALTH IT WORKFORCE CURRICULUM
COMPONENT BLUEPRINT
Version 2.0/Spring 2011

Component Number: 8
Component Name: Installation and Maintenance of Health IT Systems

Component Description (from FOA):
Instruction in installation and maintenance of health IT systems, including testing prior to implementation. Introduction to principles underlying system configuration. Hands-on experiences in computer labs and on-site in health organizations.

Assigned Institution: Duke University
Team Lead(s): Scott Neal, Durham Technical Community College
R. Clayton Musser, MD, Duke University
Team Members: Harry Bulbrook
Charlene West

Workforce Roles: Implementation support specialists
Implementation managers
Technical/software support staff

Component Objectives:
At the completion of this component, the student will be able to:

1. Articulate the elements of Health IT systems, including their advantages and disadvantages.
2. Justify criteria to be considered when recommending vendors and software
3. Design a comprehensive plan to install a health IT system
4. Design a comprehensive plan to maintain and troubleshoot a health IT system, incorporating system updates and user feedback
5. Implement project plans by installing and configuring hardware and software, interacting with vendors and users as needed
6. Verify plan implementation

This material was developed by Duke University, funded by the Department of Health and Human Services, Office of the National Coordinator for Health Information Technology under Award Number IU24OC000024.

Component Units with Objectives and Topics

Unit 1 (Elements of a Typical Electronic Health Record System):

Description:

Topics in this unit include: hardware, network, software and storage requirements needed to access EHRs

Objectives:

1. Describe the use of client and server hardware to access and store EHRs
2. Describe network needs to access and store EHRs
3. Identify application software and back-end data storage software in a Health IT System

Unit 2 (System Selection – Software and Certification):

Description:

Topics in this unit include: the differences in COTS (Commercial Off-the-Shelf) and in-house/homegrown systems and how to select the system to meet the needs of the end users

Objectives:

1. Define COTS (Commercial Off-The-Shelf) and in-house/homegrown systems and describe their relative advantages and disadvantages
    a. Identify financial benefits for initial creation, setup, customization (flexibility), maintenance, and integration with existing systems and processes
    b. Identify personnel or consultant costs for creation, customization, and maintenance
    c. Estimate cost impact on internal staff, including hiring, training, and lost productivity
    d. Identify training costs for developers and users, including development of training resources
2. Estimate costs and consider advantages and disadvantages of purchasing versus licensing hardware & software
3. Understand vendor documentation of system functionality and requirements
4. Determine system compliance with CCHIT certification
5. Determine whether systems meet ARRA “Meaningful Use” criteria
6. Compare and rank vendor systems
7. Evaluate and select system based on requirements and certification needs

Unit 3 (System Selection - Functional and Technical Requirements):

Description:

This material was developed by Duke University, funded by the Department of Health and Human Services, Office of the National Coordinator for Health Information Technology under Award Number IU24OC000024.

This Unit explores aspects of functional requirements of systems (by users) and technical requirements (by the system), including how to the determine, document, prioritize, and act on those requirements.

Objectives:

1. Identify 12 possible steps to choosing an EHR system
2. Gather functional requirements from institution and users
3. Document use-cases and relate them to functional requirements
4. Prioritize functional requirements, including grouping as essential versus desired
5. Identify minimum and recommended software and hardware requirements

Unit 4 (Structured Systems Analysis and Design):

Description:

This Unit includes: how to create a full project plan to incorporate all elements of design, implementation, data migration and conversion

Objectives:

1. Create project plan for system design and implementation, including data migration and conversion

Unit 5 (SDLC (Software Development Life Cycle) Model):

Description:

This Unit teaches the SDLC model and explores its application to well-known software and its utility for healthcare IT systems.

Objectives:

1. Define the steps of the SDLC and the purpose and importance of each
2. Choose a popular, commonly-known software application and describe how it might have gone through the SDLC
3. Describe how and why an HIT software application would go through the SDLC
4. Map project plan to SDLC model

Unit 6 (System Security Procedures and Standards):

Description:

Topics in this unit include: Federal, state, and local health information regulations for EHRs, computer and network system vulnerabilities and best practices for identification and mitigation of those vulnerabilities, information access and protection measures, and user security training.

Objectives:

This material was developed by Duke University, funded by the Department of Health and Human Services, Office of the National Coordinator for Health Information Technology under Award Number IU24OC000024.

1. Identify regulatory requirements (such as HIPAA) for EHRs and integrate into project plan
2. Identify best practices for OS and network system security installation and patches (such as those provided by vendors, SANS, and ISC2) and integrate into project plan
3. Identify and assess protection measures including access control, firewalls, intrusion detection, and encryption
4. Provide training for system users regarding the methods and importance of security compliance

Unit 7 (System Interfaces and Integration):
Description:
This Unit explores the issues and challenges involved in interfacing and integrating systems, including understanding system requirements and the messaging and other techniques used between various systems.

Objectives:
1. Determine and document system interfaces and integration requirements
2. Describe pitfalls of installing a new application in an environment of pre-existing applications
3. Give examples of interfacing modalities, e.g. HL7

Unit 8 (Troubleshooting, Maintenance and Upgrades, and Interaction with Vendors, Developers, and Users):
Description:
This Unit explores aspects of troubleshooting the system, including developing robust procedures, measuring system performance, and communication with vendors (or local developers).

Objectives:
1. Identify and implement an effective troubleshooting procedure for reporting, evaluating, fixing, deploying, and followup of errors, problems, or limitations for the system
2. Integrate downtime schedule for OS, network, database, and client application maintenance and updates
3. Develop a process for communicating requirements and supplying updates between vendors/developer and users
4. Create a baseline for system performance measurement and comparison for troubleshooting

This material was developed by Duke University, funded by the Department of Health and Human Services, Office of the National Coordinator for Health Information Technology under Award Number IU24OC000024.

Unit 9 (Creating Fault Tolerant Systems, Backups, and Decommissioning):
Description:
Topics in this unit include: Creating and maintaining redundant and fault-tolerant systems, implementing performance and reliability, backup, restore, and decommissioning

Objectives:
1. Create redundancy and fault-tolerance in systems for access and data storage, providing high performance and reliability
2. Backup and restore databases, applications, and operating systems
3. Develop a plan for decommissioning systems and data

Topics:

Unit 10 (Developing a Testing Strategy and Test Plan):
Description:
This Unit explores aspects of testing the system, including the use of performance baselines and the role of test plans.

Objectives:
1. Gather user feedback and performance baseline for system validation and testing
2. Document problems with their resolution status
3. Create, execute, and document a test plan

Unit 11 (Pilot Testing and Full-Scale Deployment):
Description:
This Unit explores aspects of deploying the system to end users, including communication, technical support, user feedback, and system resource evaluation including initial pilot testing to obtain feedback before full deployment, including planning, identifying the user group, setting up the system, and gathering feedback.

Objectives:
1. Identify pilot group and plan scope of pilot
2. Install pilot system, train pilot users, and make pilot available
3. Gather and prioritize feedback from pilot test, revising project plan if necessary
4. Develop and implement strategy for:
    a. Communicating deployment plan to end users and management
    b. Technical support of deployment (e.g. live on-site support versus phone/Internet support)

This material was developed by Duke University, funded by the Department of Health and Human Services, Office of the National Coordinator for Health Information Technology under Award Number IU24OC000024.

   c. Getting feedback from end users following deployment
   d. Evaluating usage and capacity of system resources under conditions of full deployment
5. Deploy revised system

This material was developed by Duke University, funded by the Department of Health and Human Services, Office of the National Coordinator for Health Information Technology under Award Number IU24OC000024.