**ITEC 630**

*Information Systems Analysis, Modeling, and Design*

***Lecture Notes***

**Quality Assurance and Implementation**

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**Learning objectives**

1. Recognize the importance of users and analysts taking a total quality approach to improve the quality of software design and maintenance.
2. Realize the importance of testing and maintenance.
3. Understand how client–server architectures and cloud computing is changing the nature of information system design.
4. Be familiar with the system construction process.
5. Explain different types of tests and when to use them.
6. Describe how to develop user documentation.
7. Explain the system installation process.
8. Describe the elements of a migration plan.
9. Explain different types of conversion strategies and when to use them.
10. Describe several techniques for managing change.
11. Outline postinstallation processes.

**Overview**

Quality is a very important factor in the analysis and design of the information systems and it should be concerned in the entire SDLC. Implementation of the information system is defined as “the process of ensuring that the information system is operational and then allowing users to take over its operation for use and evaluation”.

In this lecture “Quality Assurance and Implementation”, we will learn (1) approaches to quality assurance including designing systems and software with a top-down approach and modular approach, (2) several approaches to implementation including distributed computing, cloud computing, and service-oriented architecture, (3) the move into the implementation phase , and (4) the transition to the new system.

***Note #1: All links provided in this lecture can be activated with a "Ctrl + Click"; however, you can also activate these links by copy and paste the link content to the Web browser address bar, just in case.***

***Note #2: To access links associated with "http://library.books24x7.com.ezproxy.umuc.edu", you might have to log into UMUC Library and activate the link "Books24x7" first.***

**THE TOTAL QUALITY MANAGEMENT APPROACH**

**Total Quality Management (TQM)**

* The International Organization for Standardization (ISO) defines TQM as “a management approach for an organization, centered on quality, based on the participation of all its members, and aiming at long-term success through customer satisfaction and benefits to all members of the organization and to society.”
* ***Total Quality Management***

[**http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/software-testing/9781604276954/chapter-1-quality-assurance-basics/h1\_8\_xhtml?query=((%22TOTAL+QUALITY+MANAGEMENT%22))#snippet**](http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/software-testing/9781604276954/chapter-1-quality-assurance-basics/h1_8_xhtml?query=((%22TOTAL+QUALITY+MANAGEMENT%22))#snippet)

**Six Sigma**

* Six Sigma is a top-down approach to quality management and it is developed by Motorola in the 1980s. Systems analysts and systems users need should apply some of its principles to their systems analysis projects for quality assurance management.
* The goal of Six Sigma is to eliminate all defects and it consists of seven steps as follows:
  1. Define the problem
  2. Observe the problem
  3. Analyze the causes
  4. Act on the causes
  5. Study the results
  6. Standardize the changes
  7. Draw conclusions
* ***The Total Quality Management Approach – Six Sigma***

[**www.w3computing.com/systemsanalysis/total-quality-management-approach-six-sigma/**](http://www.w3computing.com/systemsanalysis/total-quality-management-approach-six-sigma/)

**Responsibility for TQM**

In order to apply the total quality management to systems projects, the full organizational support from management is required in action by measuring "how the quality of information systems and information itself affects people work." In addition, the systems analysts and business users of the system should make real commitment to quality throughout the systems development life cycle.

**Structured walkthrough**

In a total quality management approach, structured walkthroughs can be used by the systems analysis team for quality assurance. Structured walkthroughs offer ways to monitor the system’s programming and overall development, identify problems, and allow making suitable changes.

* ***Responsibility for Total Quality Management***

[**www.w3computing.com/systemsanalysis/responsibility-total-quality-management/**](http://www.w3computing.com/systemsanalysis/responsibility-total-quality-management/)

Three major approaches to quality assurance: designing systems and software with a top-down, modular approach, documenting systems and software, and testing systems and software. Several approaches to implementation considered by systems analysts in the area of distributed computing include client-server technology and cloud computing.

**DESIGNING SYSTEMS AND SOFTWARE WITH A TOP-DOWN AND MODULAR APPROACH**

Using the top-down design, the systems analysts consider at first the overall system and then they could divide that system into subsystems and further into manageable sized modules where modular programming techniques could be applied.

* ***Top-Down Systems Design and Development***

[**www.w3computing.com/systemsanalysis/top-systems-design-development/**](http://www.w3computing.com/systemsanalysis/top-systems-design-development/)

**Structure Charts**

The structure chart is an important top-down technique that helps the analyst design the program for the new system. It shows all the functional components of the program at a high level, arranged in a hierarchical format that implies order and control. The structure chart is the recommended tool for designing a modular, top-down system.

* + ***Structure Charts***

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**DISTRIBUTING PROCESSING**

Two technologies are considered in the area of distributing processing are: client-server technology and cloud computing.

**Client-Server Technology**

* + In Client–server architectures, the client is responsible for the presentation logic and the server is responsible for the data access logic and data storage.
  + In thin Client–server architectures, the server performs the application logic, while in thick Client–server architectures; the application logic is shared between the servers and clients.
  + In a two-tiered Client–server architecture, there are two groups of computers: one client and a set of servers.
  + In a three-tiered Client–server architecture, there are three groups of computers: a client, a set of application servers, and a set of database servers.

## ELEMENTS OF AN ARCHITECTURE DESIGN (Go to the section “Client–Server Architectures”)

[**http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/9781118057629/part-three-design-phase/chapter\_9\_user\_interface\_desig#X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTk3ODExMTgwNTc2MjklMkZuYXZwb2ludC0xMDMmcXVlcnk9KChhZ2lsZSUyMHBoYXNlcykp**](http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/9781118057629/part-three-design-phase/chapter_9_user_interface_desig#X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTk3ODExMTgwNTc2MjklMkZuYXZwb2ludC0xMDMmcXVlcnk9KChhZ2lsZSUyMHBoYXNlcykp)

**Cloud Computing**

* The cloud computing can be defined as the set of hardware, networks, storage, services, and interfaces that combine to deliver
* The cloud computing is applicable when organizations and users can use Web-based services such as database services, application services, etc. over the Internet without investing any hardware and software resources.
* Cloud computing can be implemented in three ways: private cloud, public cloud, and hybrid clouds.

## ELEMENTS OF AN ARCHITECTURE DESIGN (Go to the section “Cloud Computing”)

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**MOVING INTO IMPLEMENTATION**

As the implementation phase begins, the construction of the new system is started. A major component of building the system is writing programs and during this phase, it is the responsibility of the systems analysts to finalize the system documentation and develop the user documentation.

* ***Moving into Implementation***

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**MANAGING THE PROGRAMMING PROCESS**

Programming is done by programmers and the project manager or systems analyst must ensure that the process of programming is conducted successfully by executing the following tasks: assigning programming tasks, coordinating the activities, and managing the programming schedule.

* ***Managing the Programming Process***

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**TESTING**

Tests must be carefully planned to eliminate as much as possible the remaining system bugs because it usually costs too much if major bugs are discovered after the system is installed. A test plan contains several tests that examine different aspects of the system.

There are four general stages of tests as follows:

1. Unit tests: A unit test examines a module or program within the system.
2. Integration tests: An integration test examines how well several modules work together.
3. System tests: A system test examines the system as a whole.
4. Acceptance tests: An acceptance test is done by the users to determine whether the system is acceptable to them.

* ***Testing***

[**http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/9781118057629/part-four-implementation-phase/chapter\_12\_moving\_into\_impleme#X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTk3ODExMTgwNTc2MjklMkZuYXZwb2ludC0xNTgmcXVlcnk9**](http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/9781118057629/part-four-implementation-phase/chapter_12_moving_into_impleme#X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTk3ODExMTgwNTc2MjklMkZuYXZwb2ludC0xNTgmcXVlcnk9)

**DEVELOPING DOCUMENTATION**

There are two fundamentally different types of documentation: system documentation and user documentation. System documentation is intended to help programmers and systems analysts understand the application software. User documentation is designed to help the user operate the system. Today, documentation is moving away from paper-based documents to online documentation for easy access. There are three types of user documentation: reference documents, procedures manuals, and tutorials.

* ***Developing Documentation***

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**MAKING THE TRANSITION TO THE NEW SYSTEM**

The Lewin's three-step model of organizational change consisting of unfreeze, move, and refreeze is used to make the transition to the new system.

* ***Making the Transition to the New System***

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**THE MIGRATION PLAN**

The migration plan includes the decisions, plans, and procedures that will be used to guide the transition. In this plan, issues related to business, technology, and people are addressed. For preparing the business, two issues “select a conversion strategy” and “prepare a business contingency plan” are discussed. For preparing the technology, three issues “install hardware”, “install software”, and “convert data” are discussed. Finally, for preparing the people, four issues to be covered are “revise management policies”, “access costs and benefits”, “motivate adoption”, and “conduct training”. It is important for the project managers or systems analysts to know that “understanding the sources of resistance to change and the costs and benefits that the users perceive will help analysts develop a successful migration plan.”

* ***The Migration Plan***

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**POSTIMPLEMENTATION ACTIVITIES**

The goal of postimplementation stage is to institutionalize the use of the new system and there are three key activities in this stage: system support, system maintenance, and project assessment. System support is performed by the operations group by providing online and help-desk support to the users. System maintenance responds to change requests to fix bugs and improve the business value of the system. Project assessment measures what was successful about the system, what activities were good, and what activities need to be improved. The project assessment consists of two parts: project team review and system review.

* ***Postimplementation Activities***

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1. www.w3computing.com

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