Chapter 17
System Implementation

Learning Objectives

✓ Describe the process of coding, testing and converting an organizational information system
✓ Discuss four installation strategies
  ✓ Direct
  ✓ Parallel
  ✓ Single location
  ✓ Phased installation
✓ Describe the deliverables for documenting the system and for training and supporting the users
✓ Distinguish between system and user documentation and determine which types of documentation are necessary for a given information system
Learning Objectives

☑ Compare the many modes available for organizational system training, including self-training and electronic performance support systems
☑ Discuss the issues of providing support to end users
☑ Discuss system implementation failure
☑ Compare the factor and political models of the implementation process
☑ Show how traditional implementation issues apply to Internet-based systems

System Implementation and

✍ Seven major activities
  - Coding
  - Testing
  - Installation
  - Documentation
  - Training
  - Support

✍ Purpose
  - To convert final physical system specifications into working and reliable software
  - To document work that has been done
  - To provide help for current and future users
The Process of Coding, Testing and Installation

- **Coding**
  - Physical design specifications are turned into working computer code

- **Testing**
  - Tests are performed using various strategies
  - Testing can be performed in parallel with coding

- **Installation**
  - Process during which the current system is replaced by the new system

The Process of Coding, Testing and Installation: Deliverables

<table>
<thead>
<tr>
<th>Action</th>
<th>Deliverable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coding</td>
<td>Code</td>
</tr>
<tr>
<td></td>
<td>Program Documentation</td>
</tr>
<tr>
<td>Testing</td>
<td>Test scenarios (test plan) and test data</td>
</tr>
<tr>
<td></td>
<td>Results of program and system testing</td>
</tr>
<tr>
<td>Installation</td>
<td>User guides</td>
</tr>
<tr>
<td></td>
<td>User training plans</td>
</tr>
<tr>
<td></td>
<td>Installation and conversion plan</td>
</tr>
</tbody>
</table>
The Process of Documenting the System, Training Users and Supporting Users

- **Two audiences for documentation**
  - The information systems personnel who will maintain the system throughout its productive life
  - The people who will use the system as part of their daily lives

- **Deliverables**
  - Documentation
    - System documentation
    - User documentation
  - User training plan
    - Classes
    - Tutorials
  - User training modules
    - Training materials
    - Computer-based training aids
  - User support plan
    - Help desk
    - On-line help
    - Bulletin boards and other support mechanisms

Software Application Testing

- A test plan is developed during the analysis phase
- During the design phase, a unit test plan and a system test plan are developed
- The actual testing is done during implementation
- Test plans provide improved communication among all parties involved in testing
  - Serve as checklists
Software Application Testing

Types of Testing

- **Inspection**
  - A testing technique in which participants examine program code for predictable language-specific errors

- **Walkthrough**
  - A peer group review of any product created during the systems development process; also called a structured walkthrough

- **Desk Checking**
  - A testing technique in which the program code is sequentially executed manually by the reviewer

---

Software Application Testing

Types of Testing

- **Unit Testing**
  - Each module is tested alone in an attempt to discover any errors in its code, also called module testing

- **Integration Testing**
  - The process of bringing together all of the modules that a program comprises for testing purposes. Modules are typically integrated in a top-down, incremental fashion
Software Application Testing

Types of Testing

- **System Testing**
  - The bringing together of all the programs that a system comprises for testing purposes. Programs are typically integrated in a top-down, incremental fashion.

- **Stub Testing**
  - A technique used in testing, especially where modules are written and tested in a top-down fashion, where a few lines of code are used to substituted for subordinate modules.

The Testing Process

1. The purpose of the testing is confirming that the system satisfies requirements.
2. Testing must be planned.

- **Test Case**
  - A specific scenario of transactions, queries or navigation paths that represent a typical, critical or abnormal use of the system.
  - Test cases and results should be thoroughly documented so they can be repeated for each revision of an application.
Coding and testing are intimately related parts of the same process

Code is written, integrated into system and then tested

Iterative process of testing, fixing bugs and re-testing

All coding is done by two people working together

Software Application Testing
Acceptance Testing by Users

The process whereby actual users test a completed information system, the end result of which is the users' acceptance of it

Alpha Testing
- User testing of a completed information system using simulated data
- Recovery testing
  - Forces the software (or environment) to fail in order to verify that recovery is properly performed
- Security testing
  - Verifies that protection mechanisms built into the system will protect it from improper penetration
- Stress testing
  - Tries to break the system
- Performance testing
  - Determines how the system performs on the range of possible environments in which it may be used
Software Application Testing
Acceptance Testing by Users

**Beta Testing**
- User testing of a completed information system using real data in the real user environment

Installation

- The organizational process of changing over from the current information system to a new one
- Four approaches
  - Direct Installation
    - Changing over from the old information system to a new one by turning off the old system when the new one is turned on
  - Parallel Installation
    - Running the old information system and the new one at the same time until management decides the old system can be turned off
Installation

- Single location installation
  - Trying out an information system at one site and using the experience to decide if and how the new system should be deployed throughout the organization

- Phased Installation
  - Changing from the old information system to the new one incrementally, starting with one or a few functional components and then gradually extending the installation to cover the whole new system

Planning Installation

- Considerations
  - Data conversion
  - Error correction
  - Loading from current system
  - Planned system shutdown
  - Business cycle of organization
Documenting The System

System documentation
- Detailed information about a system’s design specifications, its internal workings and its functionality
- Internal documentation
  - System documentation that is part of the program source code or is generated at compile time
- External documentation
  - System documentation that includes the outcome of structured diagramming techniques such as data flow and entity-relationship diagrams

User Documentation
- Written or other visual information about an application system, how it works, and how to use it
- Preparing user documentation
  - Traditional source has been information systems department
  - Application-oriented documentation is now often supplied by vendors and users themselves
Training Information System

Users

Potential training topics
- Use of the system
- General computer concepts
- Information system concepts
- Organizational concepts
- System management
- System installation

Training methods
- Resident expert
- Computer-aided instruction
- Formal courses
- Software help components
- Tutorials
- Interactive training manuals
- External sources, such as vendors

Electronic performance support system (EPSS)
- Component of a software package or application in which training and educational information is embedded
Supporting Information System Users

Support is extremely important to users

- J.D. Power and Associates survey found user support to be number one criterion contributing to user satisfaction with personal computing

Most organizations provide support by two means

- Information center
- Help desk

Supporting Information System Users

Information Center

- An organizational unit whose mission is to support users in exploiting information technology
- Staff might perform the following tasks
  - Install new hardware or software and set up user accounts
  - Consult with users writing programs in fourth-generation languages
  - Extract data from organizational databases onto personal computers
  - Answer basic on-demand questions
  - Provide a demonstration site for viewing hardware and software
  - Work with users to submit system change requests
Supporting Information System Users
Help Desk

- A single point of contact for all user inquiries and problems about a particular information system or for all users in a particular department

Why Implementation Sometimes Fails

- Two conditions necessary for a successful implementation
  - Management support of the system under development
  - Involvement of users in the development process
Why Implementation Sometimes Fails

- Insights about implementation process
  - Risk
  - Commitment to the project
  - Commitment to change
  - Extent of project definition and planning
  - Realistic user expectations

- Implementation success factors
  - Extent to which system is used
  - User’s satisfaction with system

Electronic Commerce Application: Pine Valley Furniture

- System implementation and operation of an Internet-based electronic commerce project is no different than other projects
- Develop test cases
  - Simple functionality
  - Multiple functionality
  - Function chains
  - Elective function
  - Emergency/crisis
- Bug tracking and system evolution
- Alpha and beta testing the WebStore
- WebStore installation
Project Close Down

- Evaluate team
  - Reassign members to other projects
- Notify all affected parties that the development project is ending and that you are switching to operation and maintenance mode
- Conduct post-project reviews
- Close out customer contract
  - Formal signoff

Summary

- Process of coding, testing and converting an organizational information system
- Four installation strategies
  - Direct
  - Parallel
  - Single location
  - Phased installation
Summary

- Documentation
  - System
  - User
- User training
- Providing support for end users
- Systems implementation failures
- Internet development
- Project Closedown