Case Study for Information Management

Building Information Systems: Electronic Medical Records
(Chap. 13)

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Min-Yuh Day
戴敏育
Assistant Professor

Dept. of Information Management, Tamkang University

http://mail.tku.edu.tw/myday/
2013-12-24
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<td>103/01/07</td>
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<td>18</td>
<td>103/01/14</td>
<td>期末考試週</td>
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Chap. 13
Building Information Systems: Electronic Medical Records
Case Study: Electronic Medical Records
Are Electronic Medical Records a Cure for Health Care?
(Chap. 13)

1. What management, organization, and technology factors are responsible for the difficulties in building electronic medical record systems? Explain your answer.

2. What stages of system-building will be the most difficult for building electronic medical record systems? Explain your answer.

3. What is the business and social impact of not digitizing medical records (to individual physicians, hospitals, insurers, patients)?

4. What are business and social benefits of digitizing medical recordkeeping?

5. Name two important information requirements for physicians, two for patients, and two for hospitals that should be addressed by electronic medical records systems.

6. Diagram the "as-is" and "to-be" process for prescribing a medication for a patient if an EMR system is implemented.

Overview of Fundamental MIS Concepts

ORGANIZATIONAL CHANGE CARRIES RISKS AND REWARDS

Business Process Management (BPM)

• Business Process Management (BPM)
  – Variety of tools, methodologies to analyze, design, optimize processes
  – Used by firms to manage business process redesign

• Steps in BPM
  1. Identify processes for change
  2. Analyze existing processes
  3. Design the new process
  4. Implement the new process
  5. Continuous measurement

AS-IS BUSINESS PROCESS FOR PURCHASING A BOOK FROM A PHYSICAL BOOKSTORE

1. Customer: Go to bookstore → Search shelves → Book available?
   - Yes: Purchase book → Take book home
   - No: Clerk searches → Found
2. Clerk: Clerk searches → Found
   - Yes: Inquire about ordering
   - No: Able to order?
4. Clerk: Place order → Receive book → Notify customer

REDESIGNED PROCESS FOR PURCHASING A BOOK ONLINE

Business Process Redesign

• Variety of tools for BPM, to
  – Identify and document existing processes
    • Identify inefficiencies
  – Create models of improved processes
  – Capture and enforce business rules for performing processes
  – Integrate existing systems to support process improvements
  – Verify that new processes have improved
  – Measure impact of process changes on key business performance indicators

Systems Development (SD)

• Activities that go into producing an information system solution to an organizational problem or opportunity
  1. Systems analysis
  2. Systems design
  3. Programming
  4. Testing
  5. Conversion
  6. Production and maintenance

THE SYSTEMS DEVELOPMENT PROCESS
Systems Analysis (SA)

• Analysis of problem to be solved by new system
  – Defining the problem and identifying causes
  – Specifying solutions
    • Systems proposal report identifies and examines alternative solutions
  – Identifying information requirements

• Includes feasibility study
  – Is solution feasible and good investment?
  – Is required technology, skill available?

System Analysis (SA) (cont.)

• Establishing information requirements
  – Who needs what information, where, when, and how
  – Define objectives of new/modified system
  – Detail the functions new system must perform

• Faulty requirements analysis is leading cause of systems failure and high systems development cost

Systems Design (SD)

• Describes system specifications that will deliver functions identified during systems analysis
• Should address all managerial, organizational, and technological components of system solution
• Role of end users
  – User information requirements drive system building
  – Users must have sufficient control over design process to ensure system reflects their business priorities and information needs
  – Insufficient user involvement in design effort is major cause of system failure

## Systems Design: Design Specifications

<table>
<thead>
<tr>
<th><strong>OUTPUT</strong></th>
<th><strong>PROCESSING</strong></th>
<th><strong>DOCUMENTATION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>Computations</td>
<td>Operations documentation</td>
</tr>
<tr>
<td>Content</td>
<td>Program modules</td>
<td>Systems documents</td>
</tr>
<tr>
<td>Timing</td>
<td>Required reports</td>
<td>User documentation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>INPUT</strong></th>
<th><strong>MANUAL PROCEDURES</strong></th>
<th><strong>CONVERSION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Origins</td>
<td>What activities</td>
<td>Transfer files</td>
</tr>
<tr>
<td>Flow</td>
<td>Who performs them</td>
<td>Initiate new procedures</td>
</tr>
<tr>
<td>Data entry</td>
<td>When</td>
<td>Select testing method</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>USER INTERFACE</strong></th>
<th><strong>CONTROLS</strong></th>
<th><strong>TRAINING</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Simplicity</td>
<td>Input controls (characters, limit, reasonableness)</td>
<td>Select training techniques</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Processing controls (consistency, record counts)</td>
<td>Develop training modules</td>
</tr>
<tr>
<td>Logic</td>
<td>Output controls (totals, samples of output)</td>
<td>Identify training facilities</td>
</tr>
<tr>
<td>Feedback</td>
<td>Procedural controls (passwords, special forms)</td>
<td></td>
</tr>
<tr>
<td>Errors</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>DATABASE DESIGN</strong></th>
<th><strong>SECURITY</strong></th>
<th><strong>ORGANIZATIONAL CHANGES</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical data model</td>
<td>Access controls</td>
<td>Task redesign</td>
</tr>
<tr>
<td>Volume and speed</td>
<td>Catastrophe plans</td>
<td>Job redesign</td>
</tr>
<tr>
<td>requirements</td>
<td>Audit trails</td>
<td>Process design</td>
</tr>
<tr>
<td>File organization and</td>
<td></td>
<td>Organization structure design</td>
</tr>
<tr>
<td>design</td>
<td></td>
<td>Reporting relationships</td>
</tr>
<tr>
<td>Record specifications</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Completing the Systems Development Process

• Programming:
  – System specifications from design stage are translated into software program code

• Testing
  – Ensures system produces right results
  – Unit testing: Tests each program in system separately
  – System testing: Test functioning of system as a whole
  – Acceptance testing: Makes sure system is ready to be used in production setting
  – Test plan: All preparations for series of tests

# A Sample Test Plan to Test a Record Change

## Table

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Address and Maintenance “Record Change Series”</th>
<th>Test Series 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prepared By: Date: Version:</td>
<td></td>
</tr>
<tr>
<td>Test Ref.</td>
<td>Condition Tested Special Requirements</td>
<td>Expected Results Output On Next Screen</td>
</tr>
<tr>
<td>2.0</td>
<td>Change records</td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>Change existing record</td>
<td>Key field</td>
</tr>
<tr>
<td>2.2</td>
<td>Change nonexistent record</td>
<td>Other fields</td>
</tr>
<tr>
<td>2.3</td>
<td>Change deleted record</td>
<td>Deleted record must be available</td>
</tr>
<tr>
<td>2.4</td>
<td>Make second record</td>
<td>Change 2.1 above</td>
</tr>
<tr>
<td>2.5</td>
<td>Insert record</td>
<td>OK if valid</td>
</tr>
<tr>
<td>2.6</td>
<td>Abort during change</td>
<td>Abort 2.5</td>
</tr>
</tbody>
</table>

## SUMMARY OF SYSTEMS DEVELOPMENT ACTIVITIES

<table>
<thead>
<tr>
<th>CORE ACTIVITY</th>
<th>DESCRIPTION</th>
</tr>
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<tbody>
<tr>
<td>Systems analysis</td>
<td>Identify problem(s)</td>
</tr>
<tr>
<td></td>
<td>Specify solutions</td>
</tr>
<tr>
<td></td>
<td>Establish information requirements</td>
</tr>
<tr>
<td>Systems design</td>
<td>Create design specifications</td>
</tr>
<tr>
<td>Programming</td>
<td>Translate design specifications into code</td>
</tr>
<tr>
<td>Testing</td>
<td>Unit test</td>
</tr>
<tr>
<td></td>
<td>Systems test</td>
</tr>
<tr>
<td></td>
<td>Acceptance test</td>
</tr>
<tr>
<td>Conversion</td>
<td>Plan conversion</td>
</tr>
<tr>
<td></td>
<td>Prepare documentation</td>
</tr>
<tr>
<td></td>
<td>Train users and technical staff</td>
</tr>
<tr>
<td>Production and maintenance</td>
<td>Operate the system</td>
</tr>
<tr>
<td></td>
<td>Evaluate the system</td>
</tr>
<tr>
<td></td>
<td>Modify the system</td>
</tr>
</tbody>
</table>
DATA FLOW DIAGRAM FOR MAIL-IN UNIVERSITY REGISTRATION SYSTEM

HIGH-LEVEL STRUCTURE CHART FOR A PAYROLL SYSTEM

CLASS AND INHERITANCE

Employee

- id
- name
- address
- dateHired
- position
- pay

Salaried
- annualSalary
- bonus
- calcBonus

Hourly
- hourlyRate
- overtimeRate
- calcOvertime

Temporary
- dailyRate
- ytdHours
- determinePermEligibility

Alternative Systems-Building Methods

1. Traditional systems life-cycle
2. Prototyping
3. End-user development
4. Application software packages
5. Outsourcing

THE PROTOTYPING PROCESS

# TOTAL COST OF OFFSHORE OUTSOURCING

## Cost of outsourcing contract

<table>
<thead>
<tr>
<th>Hidden Costs</th>
<th>Best Case</th>
<th>Additional Cost ($)</th>
<th>Worst Case</th>
<th>Additional Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vendor selection</td>
<td>0%</td>
<td>20,000</td>
<td>2%</td>
<td>200,000</td>
</tr>
<tr>
<td>2. Transition costs</td>
<td>2%</td>
<td>200,000</td>
<td>3%</td>
<td>300,000</td>
</tr>
<tr>
<td>3. Layoffs &amp; retention</td>
<td>3%</td>
<td>300,000</td>
<td>5%</td>
<td>500,000</td>
</tr>
<tr>
<td>4. Lost productivity/cultural issues</td>
<td>3%</td>
<td>300,000</td>
<td>27%</td>
<td>2,700,000</td>
</tr>
<tr>
<td>5. Improving development processes</td>
<td>1%</td>
<td>100,000</td>
<td>10%</td>
<td>1,000,000</td>
</tr>
<tr>
<td>6. Managing the contract</td>
<td>6%</td>
<td>600,000</td>
<td>10%</td>
<td>1,000,000</td>
</tr>
<tr>
<td><strong>Total additional costs</strong></td>
<td></td>
<td><strong>1,520,000</strong></td>
<td></td>
<td><strong>5,700,000</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outstanding Contract ($)</th>
<th>Additional Cost ($)</th>
<th>Total Cost ($)</th>
<th>Additional Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cost of outsourcing (TCO) best case</td>
<td>10,000,000</td>
<td>11,520,000</td>
<td>15.2%</td>
</tr>
<tr>
<td>Total cost of outsourcing (TCO) worst case</td>
<td>10,000,000</td>
<td>15,700,000</td>
<td>57.0%</td>
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</table>

Application Development for the Digital Firm

• Rapid Application Development (RAD)
  – Joint Application Design (JAD)
  – Agile Development

• Component-based Development and Web Services
  – Component-based Development
  – Web Services and Service-Oriented Computing

Rapid Application Development (RAD)

• Process of creating workable systems in a very short period of time

• Utilizes techniques such as:
  – Visual programming and other tools for building graphical user interfaces
  – Iterative prototyping of key system elements
  – Automation of program code generation
  – Close teamwork among end users and information systems specialists

Joint Application Design (JAD)

• Used to accelerate generation of information requirements and to develop initial systems design

• Brings end users and information systems specialists together in interactive session to discuss system’s design

• Can significantly speed up design phase and involve users at intense level

Agile Development

• Focuses on rapid delivery of working software by breaking large project into several small sub-projects

• Subprojects
  – Treated as separate, complete projects
  – Completed in short periods of time using iteration and continuous feedback

• Emphasizes face-to-face communication over written documents, allowing collaboration and faster decision making

Component-based Development

• Groups of objects that provide software for common functions (e.g., online ordering) and can be combined to create large-scale business applications

• Web services
  – Reusable software components that use XML and open Internet standards (platform independent)
  – Enable applications to communicate with no custom programming required to share data and services
  – Can engage other Web services for more complex transactions
  – Using platform and device-independent standards can result in significant cost-savings and opportunities for collaboration with other companies

2014/12/31
Final Report (期末報告)

• 請各組組長整理期末報告資料檔案，
於2013/12/31 (週二) 早上9:00前，
完成Email寄出以下兩個壓縮檔的下載連結，
給所有組員和老師 (正本to:老師，副本cc:所有組員)。

- 1. 整組各次簡報的ppt (含整組期末報告目錄ppt) 壓縮檔
  • (例如：MI4B_資訊管理個案_第1組_學期各次簡報.zip)。

- 2. 整組各組員的
  [(1) 個人期末報告.ppt
   (2) 個人整學期的書面報告.pdf
   (3) 個人學期總心得.doc]
  之壓縮檔
  • (例如：MI4B_資訊管理個案_第1組_組員個人期末報告.zip)。
資訊管理個案
(Case Study for Information Management)

1. 請同學於資訊管理個案討論前
   應詳細研讀個案，並思考個案研究問題。

2. 請同學於上課前複習相關資訊管理相關
   理論，以作為個案分析及擬定管理對策的
   依據。

3. 請同學於上課前
   先繳交個案研究問題書面報告。
References


– 周宣光 譯 (2011)，資訊管理系統－管理數位化公司，第12版，東華書局