Trivia for today...Operating systems

- Examples
  - DOS
  - Windows (95, 98, NT, 2000, XP, windows 7, windows 8, windows 10, server OS)
  - Mac OS X
  - Unix/Linux
    - Ubuntu, CentOS, Redhat
  - Android OS, iOS...

Fun names...

- Mac OS X & macOS version code names
  - OS X 10.3 Panther (Pinot) - 24 October 2003.
  - OS X 10.4 Tiger (Merlot) - 29 April 2005.
  - [OS X 10.4.4 Tiger (Chardonnay)]
  - OS X 10.5 Leopard (Chablis) - 26 October 2007.

- Android Version Names: Every Os From Cupcake to Android P
  - Android 1.6: Donut. ...
  - Android 2.0 and 2.1: Eclair. ...
  - Android 2.2: Froyo. ...
  - Android 2.3, 2.4: Gingerbread. ...
  - Android 3.0, 3.1, and 3.2: Honeycomb. ...
  - Android 4.0: Ice Cream Sandwich.
On google campus...

Operating system

- Allocates and assigns:
  - Memory
    - e.g. file system, virtual memory
  - Processor time
    - e.g. multitasking (threading), multiprocessing
  - I/O devices
    - e.g. printer, keyboard, etc.
- May also provide other capabilities useful to many users or programs
  - Graphical User Interface (GUI) capabilities
  - Fonts, network protocols, ...
  - Web browser, Database systems (EHR)
A Simplified Computer

- Input via keyboard / mouse / touch pad
- What you see on the monitor / printer
- Memory Address (where to store)
- Memory Value (What to store)

Operating System as Magician: The four illusions

- Multitasking (threading)
  - Many separate computers, one for each process
- Virtual memory
  - Large memory
- File Systems
  - Disks and other secondary storage are organized as collections of files
  - These days cloud storage (dropbox) too
- Graphical User Interface (GUI)
  - Windows and menus
Assessing and Achieving Value in Health Care Information Systems

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Learning Objectives

- Discuss the nature of IT-enabled value
- Review the components of the IT project proposal
- Understand steps to improve IT project value realization
- Discuss factors that ensure value delivery
Definition
IT-Enabled Value

- Tangible (measurable value) & intangible (difficult to measure value)
  - Tangible: Increases in revenue, fewer errors, reduction in turnover, etc.
  - Intangible: Improved decision making, communication, compliance, etc.
- Significant organizational value
  - Quality of diabetes care outcome: Use of EHR had 15% better care outcomes compared to paper-based sites
  - A cross-sectional study of hospitals in Texas found that higher levels of the automation of notes and patient records were associated with a 15% decrease in the adjusted odds of a fatal hospitalization
- Variable across organizations
  - Organizations may focus on different objectives
- Diverse across IT proposals
- Diverse value in a single investment
- Different analyses for different objectives (see next slide)

IT Objectives: National Research Council (NRC)

- Infrastructure
  - Enables other investments or applications to be implemented and deliver desired capabilities (e.g., data communication networks, workstations, clinical data repositories)
- Mandated
  - May be necessary in order to comply with initiatives of accrediting bodies
- Cost reduction: or increase revenue (e.g., claims processing)
- Specific new products and services
  - Involves consumer utilization, competitor response, and impact on related businesses
- Quality improvement
  - E.g., reduce waiting times, improve the ability of physicians to locate information, improve treatment outcomes, reduce errors in treatment
- Major strategic initiative
  - Intended to significantly change the competitive position of the organization or redefine the core nature of the enterprise
Classes of IT Investment

- Transformation
  - Effect a significant improvement in overall performance
  - Change the nature of the organization
- Renewal
  - Upgrade core IT infrastructure and applications
  - Reduce the costs
  - Improve the quality of IT services
- Process improvement
  - Improve the operations of a specific business entity
- Experiments
  - Evaluate new information technologies and test new types of applications

Sources of Value Information

- Conferences
- Industry publications
- Industry research organizations (e.g., Gartner and the Advisory Board)
- Consultants
- Vendors
- Formal financial analysis
Scoring: Comparing Different Types of Value

- Select key proposal areas for scoring
- Assign a score for each area & total the scores
  - Range: 1 (minimal or no contribution) to 5 (significant contribution)
- Benefits
  - Forces leadership to discuss why team members assigned different scores
  - Forces leadership to defend any decision not to fund a project with a high score or to fund one with a low score

Reducing the Budget
Deciding which Proposals to Fund

- Is it mandatory due to a regulation (e.g., a new Medicare rule)?
- Can the project be put off until next year?
- Does the IT staff have time to take on another project?
- Does the user department have stable management?
- Are the value proposition and resource estimate complete?
- Is there a less expensive application or non-IT approach?
- Can the progress occur at a slower pace?
Common Proposal Problems I

- Fractions of effort
  - Saving fractions of staff effort does not always lead to salary savings!
- Reliance on complex behavior
  - People do not always behave as we expect or want them to.
- Unwarranted optimism: IT projects always go wrong. Need to plan for it.
  - Nothing will go wrong
  - You’re in control of all variables that might affect the project
  - You know exactly what changes in work processes are needed and what system features must be present
  - Everyone can give full time to the project

Common Proposal Problems II

- Shaky extrapolations
  - Assuming that gains in the first year will continue during the remaining life of the project
- Underestimating the effort
  - Forgetting to account for the time users and managers devote to system design, developing workflow changes, and training
- Fairy-tale savings
  - Redeploying expenses instead of reducing the budget
- Failing to account for post implementation costs
  - Maintenance contacts, hardware upgrades, etc.
Problems with software development

- Computerworld magazine
  - “Nearly one-third of all projects fail”
  - “More than half come in over budget”
  - “Only 16% of all projects come in on time and on budget”
  - Survey of 8000 projects from 385 companies.
- Key factor for success or failure:
  - “User involvement/input”

Facts & Fallacies about SW Development

- Facts
  - The most important factor in software development is the quality of the programmers.
  - The best programmers are up to 28 times better than the worst.
  - Adding people to a late project makes it later.
  - One of the most common causes of runaway projects is poor estimation.
  - The other most common cause of runaway projects is unstable requirements.
  - Requirements errors are the most expensive to fix during production.
  - Maintenance typically consumes 40 to 80 percent of software costs.
  - Enhancements represent roughly 60 percent of maintenance costs.
- Fallacies
  - Software needs more methodologies.
  - You teach people how to program by showing them how to write programs.

Adapted from Robert L. Glass, Facts and Fallacies of Software Engineering, Addison Wesley, 2003
Ensuring Delivery of Value

- Make sure the homework was done
- Require formal project proposals
- Increase accountability for investment results
  - Business owner should defend the investment
  - Project sponsors and business owners must understand the accountability for successful completion of the project
  - Present projects in a forum that routinely reviews such requests
- Manage the project well
- Manage outcomes

Ensuring Delivery of Value

- Conduct post-implementation audits
  - Value is NOT automatically achieved because the implementation is over.
- Celebrate value achievement
- Leverage organizational governance
- Shorten the deliverables cycle: agile
- Benchmark value
  - Benchmark performance against the performance of peers
- Communicate value
  - Develop a communication plan for the 12 months ahead
Portfolio: Types of Portfolio Investments

1. Infrastructure
   - The core information technology that serves as the foundation for all applications

2. Transactional
   - Supports the core operations processes

3. Informational
   - Supports the decision making such as clinical decision support, quality measurement and analyses, market assessment, and budget performance

4. Strategic
   - Critical to the furthering of an organization’s strategy

The IT Value Challenge

- Factors that hinder value return
  - The overall strategy is wrong or its assessment of its competitive environment is inadequate
  - The necessary IT applications and infrastructure are not defined appropriately
  - The organization fails to identify all the investments and initiatives necessary to carry out its plans
  - The organization fails to execute the IT plan well
  - External factors (e.g., competitors’ actions, customers’ reactions, etc.)
The IT Value Challenge

- The investment-performance relationship
  - Spending more money on IT is no guarantee that the organization will be better off
  - Factors other than the appropriateness of the tool to the task also influence the relationship

- The value of the overall investment
  - Difficult to assess the value of its overall investments in IT

- Progressive realization of IT value
  - Requires innovation in business practices
  - Economic value comes from incremental innovations rather than “big bang” initiatives
  - The strategic impact comes from the cumulative effect of sustained initiatives to innovate business practices

Digital Maturity

- Defined by CapGemini as
  - **Digital intensity**: the extent to which the company had invested technology-enabled initiatives to change how the company operates
  - **Transformation management intensity**: the extent of the leadership capabilities necessary to drive digital transformation through the company

- Transformation management intensity is more important than digital intensity.
Summary

- Definition of IT-enable value
- Differing objectives for projects
  - Infrastructure
  - Mandated
  - Cost reduction
  - Specific new products and services
  - Quality improvement
  - Major strategic initiative
- Scoring objectives

- Reducing the budget
- Common proposal problems
  - Fractions of effort
  - Reliance on complex behavior
  - Unwarranted optimism
  - Shaky extrapolations
  - Underestimating the effort
  - Fairy-tale savings
  - Failure to account for post-implementation costs

Summary

- Ensuring the delivery of value
  - Make sure homework was done
  - Require formal project proposals
  - Increase accountability
  - Manage the project well
  - Manage outcomes
  - Conduct post-implementation audits
  - Celebrate value achievement
  - Leverage organizational governance

- Shorten the deliverables cycle
- Benchmark value
- Communicate value

- The IT value challenge
  - How to measure?
  - Progressive realization

- Digital maturity
  - Digital intensity
  - Transformation management intensity
During break, read assignment 5

Presentation

- Peer Review
- How well was the technology described in the presentation?
- How well did you understand the three take aways for hospital managers?
- How well did the presentation discuss the relevance and impact of the technology on health care?
  - Great
  - Good
  - Reasonable
  - Bad
Assignment 5

- Individual
- Read 4 papers: Answer the following questions for each paper you read.
  - Q1: What is the main point of the paper?
  - Q2: Write at least three facts that support the point
  - Q3: Do you agree with the point? Why or why not.
  - Q4: Write at least one other related opinion you had after reading the paper, and state evidence from the paper to support your opinion.
- Write one paper with 5 sections
  - One section for each paper
  - Conclude the submission with two subsections
    - a summary (one paragraph) of the adoption, use, and impact of HIT in the three papers you selected and read
    - an executive summary (one paragraph) synthesizing everything

Next week (AFTER spring break)

- Read Chapter 10-11
- Quiz 7
- Assignment 5: one week assignment, due 3/15 after spring break.