Seminar 4: The Systems Development Life Cycle
System Development Alternatives

Seminar Objectives

- to understand the problem-solving process
- to be aware of the main phases of the systems development lifecycle
- be aware of some alternative approaches to information systems development

Why is it important for you?
- Overview of what you are going to be involved in for the next 2.5 years of your BIS degree
- Provides you with a foundation for methodically developing an Information System

IMS1501: Unit framework
Business Information Problems and Opportunities

- The need to build new information systems or change existing ones comes about because either:
  - there are problems in the way in which existing systems operate; or
  - changes in circumstances create opportunities to improve things by doing them differently

Business Information Problems

- Information problems occur when the organisation’s systems fail to meet its information needs adequately. Some causes:
  - changing information needs
  - business expansion
  - cost pressure
  - competitive pressure
  - staff dependency

- Information problems can occur at any stage of the information processing cycle

How do you solve problems?

The ‘Intuitive’ Approach

versus

The ‘Scientific’ Approach
Historical Approach

- Historically, people building information systems have tended to use an intuitive approach.
- This is partly a reflection of the origins of computing and partly a reflection of the apparent conceptual simplicity of IS development - it looks easy, so who needs to follow a structured, 'scientific' approach? Just Do It!!
- The need for structured approaches grew out of the disasters which followed from people 'just doing it' without following any organised sequence of activities.

The Process of System Development

- There is no such thing as a 'universal' problem-solving process which meets all situations; our approach to problem-solving must be tailored to meet the needs of the situation.
- However, some elements of the problem-solving process can be 'standardised' to some extent.

The Systems Development Process

The systems development life cycle (SDLC) is an attempt at this standardisation. It provides:
- a systematic and orderly approach to solving business problems - automated option - CASE tools
- a means of managing, directing, monitoring and controlling the process of system building, including:
  - a description of the process - steps to be followed
  - deliverables - reports/programs/documentation/etc
  - milestones - dates of completion of steps or deliverables
The Systems Development Process

- It features several phases to mark the progress of the development process (many variations ..)
- It is often adapted to suit the business, social and political needs of organisations and projects
- We will use the generic waterfall model as a springboard for exploring system development issues

Benefits of SDLC

- Breaks the problem-solving process into manageable steps
- Identifies and defines everything which needs to be done, and how it should be done
- Identifies the resources needed in each step
- Identifies who will do each activity and when they will do it

The Systems Development Life Cycle (SDLC)
Initiation (Why?)

- Is this project worth doing?

Initiation

- A preliminary investigation of the problems, opportunities, constraints and available resources to decide on a course of action
  - Enhance existing system
  - Develop a new information system
  - Do nothing .. add it to the backlog
- Define the scope .. poor scope management often results in unsuccessful systems
  - Scope = identifying .. key client groups, perceived problems and opportunities, constraints, possible solutions & client expectations

Analysis (What?)

- Define the clients requirements (What?)
Analysis

• “Don’t try to fix it unless you understand it”
• Study the existing system, to thoroughly understand the problems and opportunities
• Review findings with clients and revise scope if necessary
• Clearly define WHAT the new system must do
• Agree on acceptance criteria for the new system (signed systems specification)
  — should the system spec. be frozen?
• Assess feasibility again

Design (How?)

• Define how the system will be implemented

Design

• Generate a number of design options based on technical, operational, economic, scheduling and tendering constraints (HOW?)
• The client selects the best option for their needs (assess feasibility again)
• Acquire the necessary hardware and software
• Design interfaces, databases, networks as required
• Specify integration requirements and software requirements (programs)
Implementation (Build)

- Build and deliver the system

Implementation

- Build/modify databases and networks as required
- Build and test programs
- Prepare users for new system
  - acceptance testing, user documentation, user training, maintenance procedures
- Finalise system and technical documentation
- Install the system

Review

- What went wrong/right? Why?

Prepared by:
Review

- How well were the system objectives met?
  - clients requirements met within budget, on time
- Can further benefits be realised?
- Are major changes required?
- How successful was the development process .. what can we learn?
- Review the maintenance effort

Maintenance

- Fix it / Make it better

  - Fixes and enhancements
  - Technical problems and new technology
  - Escalating maintenance
  - PRODUCTION SYSTEM
  - back to INITIATION

Maintenance

- Corrective - fix errors
- Adaptive - satisfy changing needs
- Perfective - enhance performance
- Preventative - fix potential problems

  - If the cost of maintenance is too high consider other options:
    - new development, purchase package, re-engineer
**Systems Development: Cross Life Cycle Activities**

Cross Life Cycle Activities are those which overlap many or all of the life cycle phases. Some of these are:

- **Quality** - must be embedded in the process of systems development to achieve a quality outcome
- **Project Management** - to monitor and control the project and ensure it stays on track
- **Documentation** - essential at every stage to help ensure project and system viability
- **Ethics** - voluntary compliance with guidelines of IS professional societies

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**Alternative Approaches to IS Development**

There are many different approaches to developing systems depending on the nature of the systems and the users needs. **YOUR JOB:** To investigate the usefulness and limitation of these alternatives

WILL BE AN EXAM QUESTION

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**Alternative Approaches to IS Development**

There are many different approaches to developing systems depending on the nature of the systems and the users needs. Some of these are:

- **SDLC (System Development Life Cycle)**
  - A detailed, well-planned development process
  - Provides a comprehensive formal framework, but time consuming
  - Long development lifecycle
  - Works best on project in which users have a clear idea about their requirements

- **SSADM (Structured Systems Analysis & Design Methodology)**
  - Originated from the UK (1981), mostly used by government agencies/department & its contractor
  - Use of multiple methods (which are cross-referenced & sometimes overlap) to provide a thorough, comprehensive, and complete view of the system
  - Potentially tedious + long development lifecycle + expensive
## Alternative Approaches to IS Development

### Prototyping (evolutionary development)
- Developers produce a prototype based on general indication of the user’s needs.
- The prototype contains portions of the system of most interest to the users or small scale working model of the system.
- Continual process of review-refine-extend until the final specifications specified by the user are reached.

### Application Packages
- Purchase commercially available software.

### Rapid Application Development (RAD)
- Cursory attempt at conceptual data modeling.
- Define database during development of initial prototype.
- Uses GUI development environment (e.g., ability to ‘drag & drop’ S/W components).
- Uses reusable components.
- Uses code-generator.
- Iterative process of implementation and maintenance with each new version of the module.

### X-Programming (XP)
- Based on values of simplicity, communication, and feedback.
- Developers produce the S/W in a series of small, fully integrated releases.
- Normally associated with RAD.

### Joint Application Development (JAD)
- Group based method for collecting user requirements & creating system designs.
- Analysts, a facilitator, and all the users meet simultaneously to define the requirements & reach agreement of the needs & requirements for the system.
- Might use a combination of different IS development methods.
- Commonly conducted within the Integrated Environment (IE) scope/concept.

### Object Oriented (OO) Development
- The proponents of OO dev claims that OO dev provides: faster development, greater reuse potential, increased quality, easier maintenance, enhanced modifiability.
- May be expensive in the earlier/starter years during the creation of the OO libraries.
- Training of the OO concept is needed.
Summary

There is no such thing as a 'correct' 'standard' development life-cycle, because all information problems are different and need different system development approaches.

References