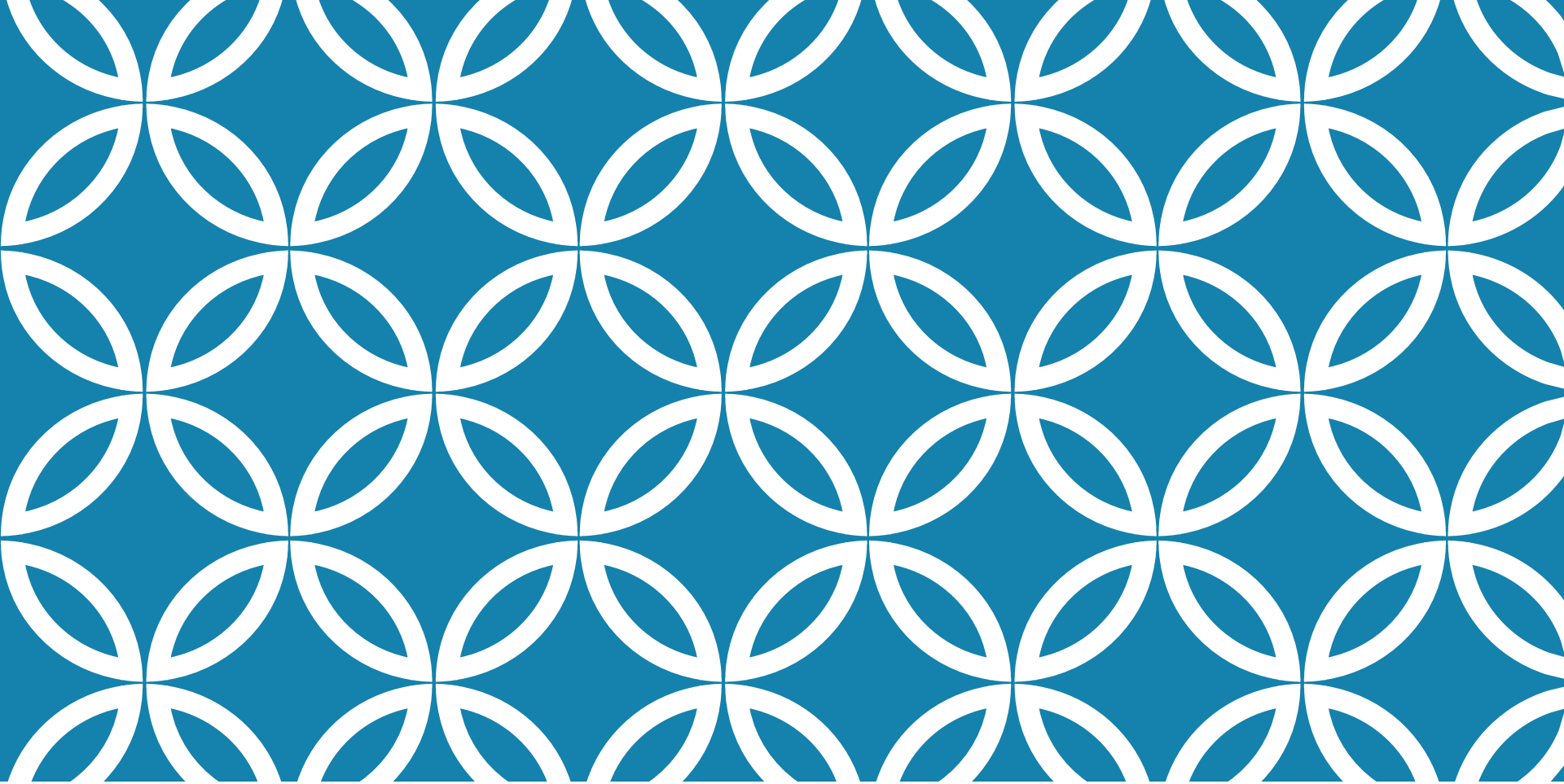

FEASIBILITY ANALYSIS & THE SYSTEM PROPOSAL

System Analysis & Design Course
Sharif University of Technology

Feasibility Analysis

Feasibility – the measure of how beneficial or practical an information system will be to an organization.

Feasibility analysis – the process by which feasibility is measured.

Creeping Commitment – an approach to feasibility that proposes that feasibility should be measured throughout the life cycle.

Six Tests For Feasibility

Operational feasibility – a measure of how well a solution meets the system requirements.

Cultural (or political) feasibility - a measure of how well a solution will be accepted in an organizational climate.

Technical feasibility – a measure of the practicality of a technical solution and the availability of technical resources and expertise.

Schedule feasibility – a measure of how reasonable the project timetable is.

Economic feasibility - a measure of the cost-effectiveness of a project or solution.

Legal feasibility - a measure of how well a solution can be implemented within existing legal/contractual obligations.

Operational Feasibility

- How well proposed system solves the problems and takes advantage of opportunities identified during the scope definition and problem analysis phases
- How well proposed system satisfies system requirements identified in the requirements analysis phase
- Is the problem still worth solving?

Cultural (or political) feasibility

- Does management support the system?
- How do end users feel about their role in the system?
- What end users may resist or not use the system? How can this be overcome?
- How will the working environment change? Can users and management adapt to the change?

Technical feasibility

- Is the proposed technology or solution practical?
- Do we currently possess the necessary technology?
- Do we possess the necessary technical expertise?

Schedule feasibility

- Are specified deadlines mandatory or desirable?
- Are mandatory deadlines realistic for proposed solution?

Economic feasibility

- During Scope Definition
  - Do the problems or opportunities warrant the cost of a detailed study and analysis of the current system?
- During Problem Analysis
  - After a detailed study of the current system
  - Better estimates of development costs and benefits
- During Decision Analysis
  - Requirements now defined
  - Development costs can be better estimated

Legal feasibility

- Copyrights
- Union contracts
- Legal requirements for financial reporting
- Antitrust laws
- National data and work laws

Information System Costs

- Development costs - one time costs that will not recur after the project has been completed.
  - Personnel
  - Computer usage
  - Training
  - Supply, duplication, and equipment
  - Computer equipment and software
- Operating costs - costs that recur throughout the lifetime of the system.
  - Fixed costs — occur at regular intervals but at relatively fixed rates.
  - Variable costs — occur in proportion to usage.

Information System Benefits

- Tangible benefits are those that can be easily quantified.
- Intangible benefits are those benefits believed to be difficult or impossible to quantify.
  - Fewer processing errors
  - Increased throughput
  - Decreased response time
  - Elimination of job steps
  - Increased sales
  - Reduced credit losses
  - Reduced expenses

Costs for a Proposed Solution

Estimated Costs for Client-Server System Alternative

DEVELOPMENT COSTS

Personnel:

2	Systems Analysts (400 hours/ea $50.00/hr)	$40,000
4	Programmer/Analysts (250 hours/ea $35.00/hr)	$35,000
1	GUI Designer (200 hours/ea $40.00/hr)	$8,000
1	Telecommunications Specialist (50 hours/ea $50.00/hr)	$2,500
1	System Architect (100 hours/ea $50.00/hr)	$5,000
1	Database Specialist (15 hours/ea $45.00/hr)	$675
1	System Librarian (250 hours/ea $15.00/hr)	$3,750

Expenses:

4	Smalltalk training registration ($3,500.00/student)	$14,000

New Hardware & Software:

1	Development Server	$18,700
1	Server software (operating system, misc.)	$1,500
1	DBMS server software	$7,500
7	DBMS client software ($950.00 per client)	$6,650

Total Development Costs: $143,275

PROJECTED ANNUAL OPERATING COSTS

Personnel:

2	Programmer/Analysts (125 hours/ea $35.00/hr)	$8,750
1	System Librarian (20 hours/ea $15.00/hr)	$300

Expenses:

1	Maintenance Agreement for server	$995
1	Maintenance Agreement for server DBMS software	$525
	Preprinted forms (15,000/year @ .22/form)	$3,300

Total Projected Annual Costs: **$13,870**

Three Popular Techniques to Assess Economic Feasibility

- Payback Analysis
- Return On Investment
- Net Present Value

Return-on-Investment Analysis (ROI)

Return-on-Investment (ROA) analysis – a technique that compares the lifetime profitability of alternative solutions.

> The ROI for a solution or project is a percentage rate that measures the relationship between the amount the business gets back from an investment and the amount invested.

Lifetime ROI =
(estimated lifetime benefits – estimated lifetime costs) / estimated lifetime costs

Annual ROI = lifetime ROI / lifetime of the system

Time Value of Money

- Used with all three cost-effectiveness techniques.
- Concept that recognizes that a dollar today is worth more than a dollar one year from now.
  - Invest $100 at 2% for one year yields $102.
  - So $100 today and $102 one year from today represent the same value.
  - Given $20,000 benefit from information system two years from now and 10% return from other investments, means that benefit is worth $16,528 today.

Present Value Formula

Present value – the current value of a dollar at any time in the future.

$$PV_n = 1/(1 + i)^n$$

Where ***n*** is the number of years and **i** is discount rate

Discount rate – a percentage similar to interest rates that you earn on your savings.

- In most cases the discount rate for a business is the **opportunity cost** of being able to invest money in other projects or investments

Net Present Value (NPV) Analysis

Net present value – analysis technique that compares annual discounted costs and benefits of alternative solutions.

	A	B	C	D	E	F	G	H	I	J
1	Net Present Value Analysis for Client-Server System Alternative									
2	(Numbers rounded to nearest $1)									
3										
4	Cash flow description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total	
5	Development cost:	($418,040)								
6	Operation & maintenance cost:		($15,045)	($16,000)	($17,000)	($18,000)	($19,000)	($20,000)		
7	Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.567	0.507		
8	Present value of annual costs:	($418,040)	($13,435)	($12,752)	($12,104)	($11,448)	($10,773)	($10,140)		
9	Total present value of lifetime costs:								($488,692)	
10										
11	Benefits derived from operation of new	$0	$150,000	$170,000	$190,000	$210,000	$230,000	$250,000		
12	Discount factors for 12%:	1.000	$0.893	$0.797	$0.712	$0.636	$0.567	$0.507		
13	Present value of annual benefits:	$0	$133,950	$135,490	$135,280	$133,560	$130,410	$126,750		
14	Total present value of lifetime benefits:								$795,440	
15										
16	NET PRESENT VALUE OF THIS ALTERNATIVE:								$306,748	
17										

Payback Analysis

Payback analysis – a technique for determining if and when an investment will pay for itself.

Payback period – the period of time that will lapse before accrued benefits overtake accrued and continuing costs.

Payback Analysis for a Project

	A	B	C	D	E	F	G	H	I
4	Cash flow description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
5	Development cost:	($418,040)							
6	Operation & maintenance cost:		($15,045)	($16,000)	($17,000)	($18,000)	($19,000)	($20,000)	
7	Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.567	0.507	
8	Time-adjusted costs (adjusted to present value):	($418,040)	($13,435)	($12,752)	($12,104)	($11,448)	($10,773)	($10,140)	
9	Cumulative time-adjusted costs over lifetime:	($418,040)	($431,475)	($444,227)	($456,331)	($467,779)	($478,552)	($488,692)	
10									
11	Benefits derived from operation of new system:	$0	$150,000	$170,000	$190,000	$210,000	$230,000	$250,000	
12	Discount factors for 12%:	1.000	$0.893	$0.797	$0.712	$0.636	$0.567	$0.507	
13	Time-adjusted benefits (current of present value):	$0	$133,950	$135,490	$135,280	$133,560	$130,410	$126,750	
14	Cumulative time-adjusted benefits over lifetime:	$0	$133,950	$269,440	$404,720	$538,280	$668,690	$795,440	
15		0	1	2	3	4	5	6	
16	Cumulative lifetime time-adjusted costs + benefits:	($418,040)	($297,525)	($174,787)	($51,611)	$70,501	$190,138	$306,748	
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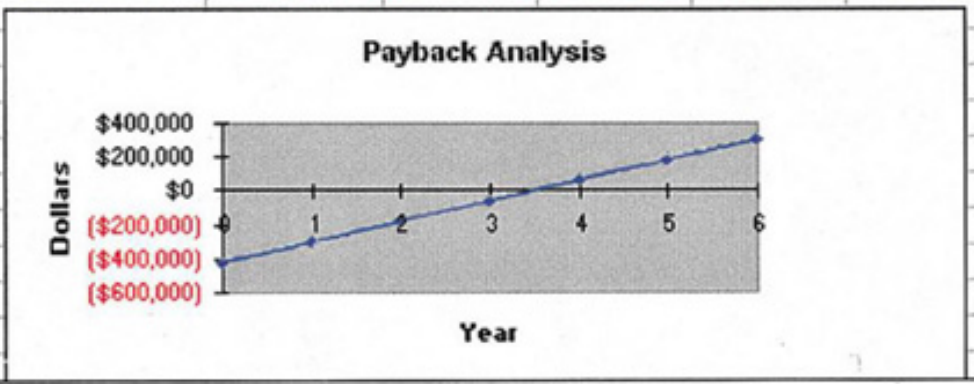


Candidate Systems Matrix

	Candidate 1 Name	Candidate 2 Name	Candidate 3 Name
Stakeholders			
Knowledge			
Processes			
Communications			

Candidate Systems Matrix – a tool used to document similarities and differences between candidate systems.

- **Stakeholders** - how system will interact with people and other systems.
- **Knowledge** - how data will be implemented, how inputs will be captured, how outputs will be generated.
- **Processes** - how processes will be built and implemented.
- **Communications** - how processes and data will be distributed.

Sample Candidate Systems Matrix

Characteristics	Candidate 1	Candidate 2	Candidate 3
Portion of System Computerized Brief description of that portion of the system that would be computerized in this candidate.	COTS package Platinum Plus from Entertainment Software Solutions would be purchased and customized to satisfy Member Services required functionality.	Member Services and warehouse operations in relation to order fulfillment.	Same as candidate 2.
Benefits Brief description of the business benefits that would be realized for this candidate.	This solution can be implemented quickly because it's a purchased solution.	Fully supports user required business processes for SoundStage Inc. Plus more efficient interaction with member accounts.	Same as candidate 2.
Servers and Workstations A description of the servers and workstations needed to support this candidate.	Technically architecture dictates Pentium III, MS Windows 2000 class servers and workstations (clients).	Same as candidate 1.	Same as candidate 1.
Software Tools Needed Software tools needed to design and build the candidate (e.g., database management system, emulators, operating systems, languages, etc.). Not generally applicable if applications software packages are to be purchased.	MS Visual C++ and MS Access for customization of package to provide report writing and integration.	MS Visual Basic 5.0 System Architect 2001 Internet Explorer	MS Visual Basic 5.0 System Architect 2001 Internet Explorer

Sample Candidate Systems Matrix (cont.)

Characteristics	Candidate 1	Candidate 2	Candidate 3
Application Software A description of the software to be purchased, built, accessed, or some combination of these techniques.	Package solution	Custom Solution	Same as candidate 2.
Method of Data Processing Generally some combination of: on-line, batch, deferred batch, remote batch, and real-time.	Client/Server	Same as candidate 1.	Same as candidate 1.
Output Devices and Implications A description of output devices that would be used, special output requirements, (e.g., network, preprinted forms, etc.), and output considerations (e.g., timing constratints)	(2) HP4MV department laser printers (2) HP5SI LAN laser printers	(2) HP4MV department laser printers. (2) HP5SI LAN laser printers (1) PRINTRONIX bar-code printer (includes software & drivers) Web pages must be designed to VGA resolution. All internal screens will be designed for SVGA resolution.	Same as candidate 2.

Sample Candidate Systems Matrix (cont.)

Characteristics	Candidate 1	Candidate 2	Candidate 3
Input devices and Implications A description of input methods to be used, input devices (e.g., keyboard, mouse, etc.), special input requirements (e.g., new or revised forms from which data would be input), and input considerations (e.g., timing of actual inputs).	Keyboard & mouse.	Apple "Quick Take" digital camera and software (15) PSC Quickscan laser bar-code scanners (1) HP Scanjet 4C Flatbed Scanner Keyboard and mouse	Same as candidate 2.
Storage Devices and Implications Brief description of what data would be stored, what data would be accessed from existing stores, what storage media would be used, how much storage capacity would be needed, and how data would be organized.	MS SQL Server DBMS with 1000GB arrayed capability.	Same as candidate 1.	Same as candidate 1.

Feasibility Analysis Matrix

Feasibility Analysis Matrix – a tool used to rank candidate systems.

	Weighting	Candidate 1	Candidate 2	Candidate 3
Description				
Operational Feasibility				
Cultural Feasibility				
Technical Feasibility				
Schedule Feasibility				
Economic Feasibility				
Legal Feasibility				
Ranking				

Sample Feasibility Analysis Matrix

	Wt	Candidate 1	Candidate 2	Candidate 3
Description		Purchase commercial off-the-shelf package for member services.	Write new application in-house using new company standard VB.NET and SQL Server database	Rewrite current in-house application using Powerbuilder.
Operational feasibility	15%	Supports only Member Services requirements. Current business process would have to be modified to take advantage of software functionality. Also there is concern about security in the system. Score: 60	Fully supports user-required functionality. Score: 100	Fully supports user-required functionality. Score: 100
Cultural Feasibility	15%	Possible user resistance to non-standard user interface of proposed purchased package. Score: 70	No foreseeable problems. Score: 100	No foreseeable problems. Score: 100

Sample Feasibility Analysis Matrix (cont.)

	Wt	Candidate 1	Candidate 2	Candidate 3
Technical feasibility	20%	Current production release of Platinum Plus package is version 1.0 and has been on the market for only 6 weeks. Maturity of product is a risk, and company charges and additional monthly fee for technical support. Required to hire or train Java J2EE expertise to perform modifications for integration requirements. Score: 50	Solution requires writing application in VB .NET. Although current technical staff has only Powerbuilder experience, it should be relatively easy to find programmers with VB .NET experience. Score: 95	Although current technical staff is comfortable with Powerbuilder, management is concerned about acquisition of Powerbuilder by Sybase Inc. MS SQL Server is the current company standard for database, which competes with Sybase DBMS. We have no guarantee that future versions of Powerbuilder will "play well" with our current version of SQL Server. Score: 60

Sample Feasibility Analysis Matrix (cont.)

	Wt	Candidate 1	Candidate 2	Candidate 3
Economic feasibility	30%			
Cost to develop:		Approx. $350.000	Approx. $418.000	Approx. $400.000
Payback (discounted):		Approx. 4.5 years	Approx. 3.5 years	Approx. 3.3 years
Net present value:		Approx. $210,000	Approx. $307,000	Approx. $325,000
Detailed calculations:		See Attachment A	See Attachment A	See Attachment A
		Score: 60	Score: 85	Score: 90

Sample Feasibility Analysis Matrix (cont.)

	Wt	Candidate 1	Candidate 2	Candidate 3
Schedule feasibility	10%	Less than 3 months Score: 95	9-12 months Score: 80	9 months Score: 85
Legal feasibility	10%	No foreseeable problems Score: 100	No foreseeable problems Score: 100	No foreseeable problems Score: 100
Weighted score	100%	67	92.5	87.5

The System Proposal

System proposal – a report or presentation of a recommended solution.

- Usually formal written report or oral presentation
- Intended for system owners and users

Typical System Proposal Outline

I. Introduction
   A. Purpose of the report
   B. Background of the project leading to this report
   C. Scope of the report
   D. Structure of the report
II. Tools and techniques used
   A. Solution generated
   B. Feasibility analysis (cost-benefit)
III. Information systems requirements
IV. Alternative solutions and feasibility analysis
V. Recommendations
VI. Appendices

Length of the Written Report

- To Executive-level managers - one or two pages
- To Middle-level managers - three to five pages
- To Supervisory-level managers - less than 10 pages
- To clerk-level personnel - less than 50 pages.

Formats for Written Reports

- **factual format** - traditional and best suited to readers interested in facts and details as well as conclusions.
- **administrative format** - modern, result-oriented format preferred by managers and executives.

Factual Format	Administrative Format
I. Introduction	I. Introduction
II. Methods and procedures	II. Conclusions and recommendations
III. Facts and details	III. Summary and discussion of facts and details
IV. Discussion and analysis of facts and details	IV. Methods and procedures
V. Recommendations	V. Final conclusion
VI. Conclusion	VI. Appendixes with facts and details

Organization of the Written Report

- **Primary elements** present the actual information that the report is intended to convey.
- **Secondary elements** package the report so the reader can easily identify the report and its primary elements.

Secondary Elements for a Written Report

Letter of transmittal

Title page

Table of contents

List of figures, illustrations, and tables

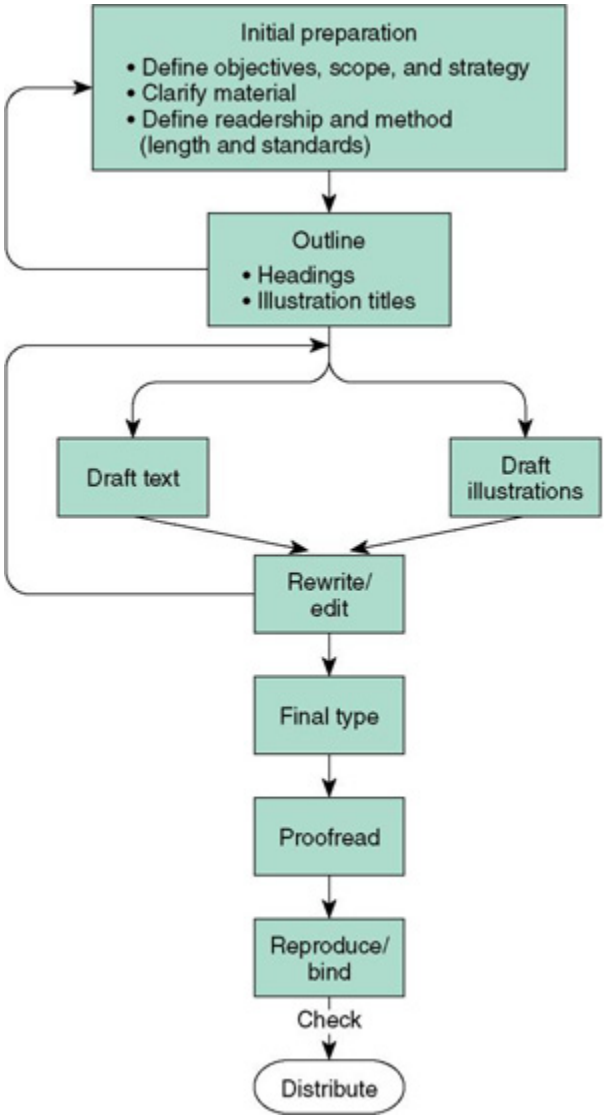
Abstract or executive summary

(The primary elements--the body of the report, in either the factual or administrative format--are presented in this portion of the report.)

Appendices

Writing the Report

- Paragraphs should convey a single idea.
- Sentences should not be too complex.
- Write in active voice.
- Eliminate jargon, big words, and deadwood.



System Proposal – formal presentations

Formal presentation – a special meeting used to sell new ideas and gain approval for new systems. They may also be used for any of these purposes:

- Sell new system
- Sell new ideas
- Head off criticism
- Address concerns
- Verify conclusions
- Clarify facts
- Report progress

Typical Outline and Time Allocation for an Oral Presentation

I. Introduction (one-sixth of total time available)

- A. Problem statement
- B. Work completed to date

II. Part of the presentation (two-thirds of total time available)

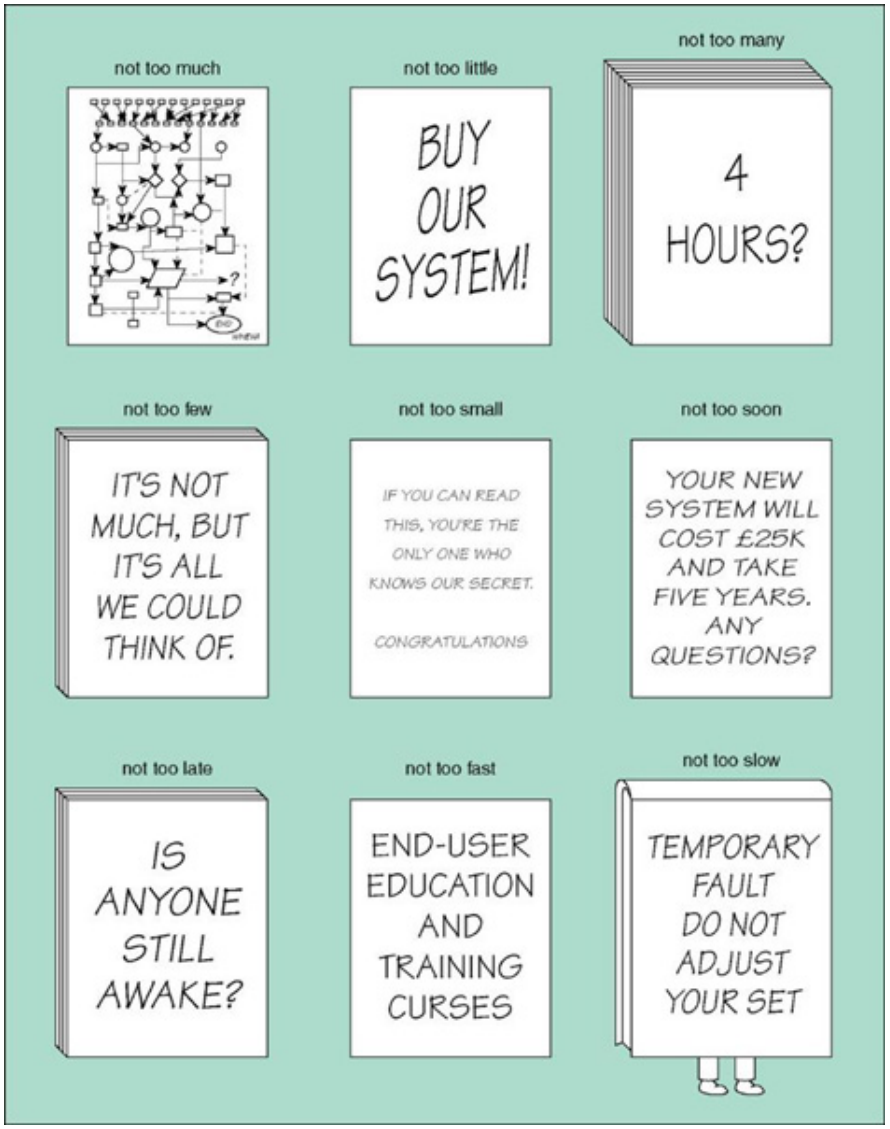
- A. Summary of existing problems and limitations
- B. Summary description of the proposed system
- C. Feasibility analysis
- D. Proposed schedule to complete project

III. Questions and concerns from the audience (time here is not to be included in the time allotted for presentation and conclusion; it is determined by those asking the questions and voicing their concerns)

IV. Conclusion (one-sixth of total time available)

- A. Summary of proposal
- B. Call to action (request for whatever authority you require to continue systems development)

Guidelines for Visual Aids



Source: Copyright Keith London

Conducting the Formal Presentation

- Dress professionally.
- Avoid using the "I" word when making the presentation.
- Maintain eye contact with the group and keep an air of confidence.
- Be aware of your own mannerisms.

When Answering Questions

- Always answer a question seriously, even if you think it is a silly question.
- Answer both the individual who asked the question and the entire audience.
- Summarize your answers.
- Limit the amount of time you spend answering any one question.
- Be honest.