

PROJECT MANAGEMENT

Techniques for Managing a Project

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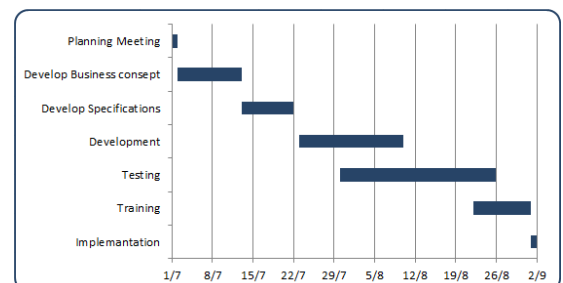
- The **methodical approach to guide all tasks and resources needed to develop a project.**
 - Defining the **requirements**, setting **budgets**, scheduling and assigning **tasks**, and specifying **lines of communication**.
- **Project triangle** – time, money and scope

COMMUNICATION SKILLS NECESSARY FOR DEALING WITH OTHERS

- There are various leadership and communication styles. Successful project managers adjust their style to fit.
- **Active listening** – It is the main source of info and provides better understanding of the speaker's message. Includes **mirroring, paraphrasing, summarising, clarifying Q (open/close ended) and motivation responses**.
- **Conflict resolution** – Conflicts are inevitable and should be solved in the best interest of the project. The aim is for all parties to accept the final outcome. Includes **attacking the problem not person, brainstorming, mediation and group solving**.
- **Negotiation skills** – Negotiation involves reaching a compromised situation that suits both parties. Includes **knowing info in advance, considering acceptable arrangements, approaching other party directly, lowering expectations during a meeting, being confident and assertive, and establishing trust and credibility**.
- **Interview techniques** – Interviews are used to **identify problems** in existing systems, **obtain feedback** during development and recruit and **assess staff** performance. Questions (**pairs**) should be planned ahead. The interview should be **relaxed, professional and private**.
 - **Interviewee** – They should **understand the subject** of the interview, have **time to prepare** and be put to **ease** when meeting.
 - **Interviewer** – They should be **polite, focus on topic**, use a **conversational tone, active listening** and **adjust the speed** of the interview to the interviewee.
- **Team building** – A team is **two or more people with complementary skills and personalities**, committed to a common goal. Members should feel their efforts are valued and communication should be honest and open.
 - **Tuckman** – Forming, storming, norming and performing
 - **Groups that function** – Increase productivity, enhanced job satisfaction and develop quality systems.
 - **Groups that fail to function** – Financial lose, employment losses, missed opportunities, bad system

PROJECT MANAGEMENT TOOLS

- Used to document **what each task is, who/when it's completed and time/budget available**.
- **Gantt charts** – Gantt charts are horizontal bar charts to **graphically schedule tasks in a project**. The **horizontal axis** is the total time taken, broken into time intervals. The **vertical axis** has the tasks. There are **milestones** to signify completion of task and progression of project.
- **Journals and diaries** – Journals and diaries **record the day-to-day progress and detail of completed tasks**.
 - **Diaries** – Arranged in chronological order with a **page/section for each day's events**
 - **Journals** – A more detailed analysis of **what happened each meeting, how tasks have been allocated and when tasks are completed**. It can also include **issues encountered, ideas** on possible future improvements.
- **Funding management plan** – It ensures the project is developed **within the budget**. This includes **allocation of funds, mechanisms for wise fund spending, accountability** of budget and procedure of reallocating funds.



- **Communication management plan** – It provides a **structure that reinforces ongoing communication**. This includes the **communication medium** used, **lines of communication**, method of **monitoring progress of SDLC** and **changing/emerging requirements**.

IDENTIFYING SOCIAL AND ETHICAL ISSUES

- Total work environment effects the worker’s productivity, morality and commitment.
- **Health and safety (social)**
 - **Ergonomics** – Ergonomics is the relationship between the person and working environment. It includes psychological, physical and emotional aspects.
 - **Ergonomic design of furniture**, appropriate **lighting** and **noise levels**, sound **climate**, varied **work routines**, procedures for **reporting** and **resolving OHS problems**
 - Or it can lead to **eye strain, head/back aches, fatigue, muscle pain and RSI**.
 - **Loss of social contact**
 - **Little sense of accomplishment**
- **Changing nature of work (social)**
 - **Retraining, redundancy or redeployment**
 - **Human/machine-centred** – **Machine-centred** simplify what computers do at the expense of humans. **Human-centred** allow people to work as effectively without machinery interfering (user friendly).
- **Security of data & info (ethical)**
 - **Mechanisms to prevent data loss** – offsite backup, physical barriers
 - **Accessibility and ownership of data**
 - **Piracy, hacking and viruses**
- **Copyright issues (ethical)**
 - **Contracts**
 - **Procedures for obtaining permission of copyrighted material** – software used in development and software incorporated in the solution
 - **Retaining rights of new system**
- **Rights/needs of individuals (ethical)**
 - **Privacy of individuals** – team members must respect confidentiality of data and not divulge content
 - **Flexibility of working hours**
 - **Equity** – equal access of all participants to the benefits of the info system

Understanding the Problems

Understanding the problem – The **purpose** and **requirements** of the new system is determined. The **system analyst** develops a **requirements report** based on **interviews** and **surveys**. A **requirements prototype** can be created.

APPROACHES TO IDENTIFY PROBLEMS WITH EXISTING SYSTEMS, INCLUDING:

- **Interviews and Surveys** – The collected data is organised into suitable form (Spreadsheets/DBs) for analysis to prioritize problems. A requirements report is created to summarise the info.
 - **Surveys** – Constructed in advance to draw out relevant info. It usually addresses **current problems** and **improvements** than revealing new needs and ideas
 - **Interview** – It is informal, time consuming and expensive. It finds new ideas and needs from users. It can be conducted in small groups.
- **Interviewing/surveying users of the information system** – It is the **primary tool to identify user needs**, experiences and new ideas to improve the system. The larger the sample, the more accurate it is.
- **Interviewing/surveying participants of the information system** – Participants in existing systems will have an understanding of the part of the system they work in. They can **identify problems, ideas to solve it** and **provide details** on the **info processes** occurring.

- **Analysing the existing system by determining** – How it works, what it does and who uses it.
- **Observing users and participants**

REQUIREMENTS REPORT

- **Requirement** – A feature, behaviour or property a system must have. Satisfying the requirements satisfies the system’s purpose.
- **Outlines aims and objectives of the new system** and how it’ll help the organisation.
- Doesn’t attempt to solve the problem
- **Two versions** to be understood by the client and system developers (communication interface).
- **Structure** – **Purpose of the system** (purpose, needs of users/participants, system scope), **analysis of the existing system** (system context, major system requirements, participants characteristics) and **definition of extra requirements** (physical, performance, security, data/info and system operations).
- **Requirements analysis** – Process of preparing a requirements report.
- **Usage in SDLC**
 - **Planning** – Helps determine possible solutions and their feasibility
 - **Designing the solution** – Each creation of the subsystem should meet a specific requirement.
 - **Implementation** – Describes what the system can do, when/which systems can be removed and areas of participant interaction that needs training.
 - **Testing, evaluating and maintaining** – Used to check each requirement has been met and accommodate emerging requirements.

REQUIREMENTS PROTOTYPE

- **A working model for an info system, built in order to understand the requirements of the system** – It stimulates the look and behaviour of the final application and **user interface**. It includes **screens, menus and screen elements** with the ability for users to enter sample data and view sample reports.
- **Used when problem is not easily identified** – Users can relate to the model to express what they want.
- **Repetitive process of prototype modification and participants’ feedback until the problem is understood** – A sequence of prototypes are made, each one more refined, based on participants’ feedback of the system.
- **Clarify participants’ understanding of the problem**
- **Can be the basis for further system development** – The model can act as a **guide** to its development. Refinement continues until all **requirements are fulfilled** and ready as **basis for development** of real system.
- **Create a requirements prototype from applications package that provide** – Screen and report generators

Planning

Planning – **feasibility report** is constructed to possibly choose a solution. The solution is decided on how it will be developed and managed. The **requirements report** should be **updated** to reflect the solution and SD approach.

A FEASIBILITY STUDY OF PROPOSED SOLUTIONS

- **Feasible** – Capable of being achieved using the available resources and meeting the requirements.
- **Economic feasibility** – It includes a **cost-benefit analysis** and **calculation of all the costs** involved during development and implementation of solution. It involves determining **NPV, ROI and break-even point**. The **development costs, ongoing operation costs, tangible benefits and intangible benefits**
- **Technical feasibility** – Whether we **currently possess the required technology, availability** of it, **ability to operate with other technology, technical expertise** needed and **IT trends** that exist currently.
- **Operational feasibility** – It will **work in practice**, if it is **supported** by users and participants, and concerns of **retraining and changing nature of work**. It is **operationally feasible** if it **meets the user’s needs**.

- **Schedule feasibility** – This is concerned with whether the solution will be completed on time and if it'll meet the deadlines (and consequences if not met). It also includes how long it'll take to obtain the required info, hiring new employees and retraining. It shows the timeframe with the help of Gantt charts.

CHOOSING THE APPROPRIATE DEVELOPMENT APPROACHES

- **Traditional** – **Formal step-by-step stages**, where each step must be completed for the next to occur (deliverables). This **increases errors** to feed through SDLC without detection, resulting in **exponential costs**. Requirements need to be determined in advance.
- **Outsourcing** – **Another company develops the system**. It can be more **cost effective**. All control is passed to the outsourcing, while time of completion is negotiated.
- **Prototyping** – **Extends the use of the requirements prototype**. It is used when requirements can't be known in advance. Each iteration produces a more enhanced prototype. U&Ps are able to **view the prototype** and **add modifications**. **Requirements are prioritised** so when time/budget is low, it can still be implemented.
- **Customisation** – Existing systems are **customised to suit specific needs** of the new system. Includes alteration of '**off the shelf**' hardware and software, in the underlying construction (**source code**).
- **Participant development** – **The same people who use the system develop the system**. The users must have **sufficient skills** and **documentation isn't required**. This is when **professional solutions are unaffordable** for small businesses and home users. '**Off the shelf**' hardware and software are used.
- **Agile method** – Agile method places **emphasis on a team developing system** than following a predefined process. It is suited for **web-based software** and **software apps**. It is usually made with a team less than six. It is used when minute **details can't be determined in advance**. When the budget and time has been exhausted, the current solution becomes the final solution.

COMPARE TRADITIONAL, ITERATIVE AND AGILE SYSTEM DEVELOPMENT APPROACHES

	Traditional	Agile	Iterative
Linear and sequential	Y	N	N
Assigns each stage is assigned to a separate team.	Y	N	N
Promotes teamwork and collaboration.	N	Y	Y
Breaks tasks into small increments with minimal planning.	N	Y	Y
Divides system functionality into increments.	N	Y	Y
Groups processes into phases.	Y	N	Y
Flexible	N	Y	Y

THE REQUIREMENTS REPORT

- Details the whole and each subproject (overall time frame and subject timeframe)
- Identifies participants, info tech, data/info and needs of users

Designing

Designing the Solution – The **solution is built**. The **info processes, system resources** (participants, data/info & I.T), **communication lines & network cabling** are identified. **System models** created to better understand the solution.

- **Clarifying with Users the Benefits of the New Information System** – So users feel comfortable and confident with using the hardware and see the software is **user friendly**.
- **Designing the Information System for Ease of Maintenance** – Whether **upgrades** will be considered, **ease of implementation** and **availability of spare parts** now and in the future should be considered.
- **Clarifying Each of the Relevant Information Processes within the System**
- **Detailing the Role of the Participants, the Data and the Information Technology Used in the System**
- **Refining Existing Prototypes** – **Software apps** that allow user interface and underlying processes to be modified, maintain versions of the solution and track changes. It should provide the provision for feedback.

PARTICIPANT DEVELOPMENT, WHEN PEOPLE WITHIN THE INFORMATION SYSTEM DEVELOP THE SOLUTION

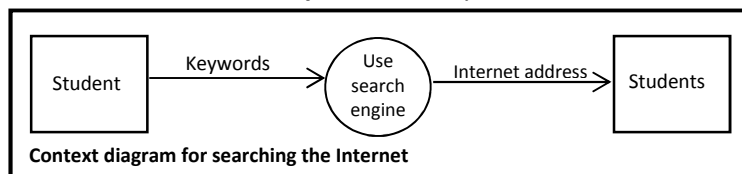
- **Participant designed solutions** – Ongoing feedback is critical for success.
- **Tools for participant development such as guided processes in application packages** – Software apps with wizards/assistants to guide users to perform tasks. They can create the whole or part of the solution.

DEVELOP A SOLUTION TO A PROBLEM FROM A PROTOTYPE

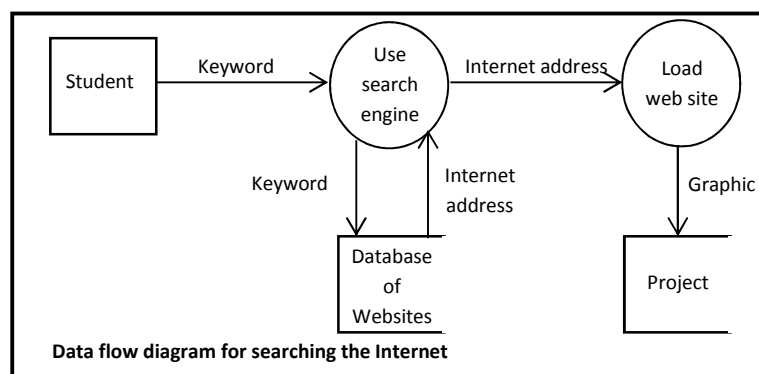
- Screen designs for **input** and **output** will be created.
- **Hardware** and **software specifications** will be made before purchasing them.
- The system is **tested** prior implementation
- **Documentation of the new system** is required, including a written description of the **development** and **operation** of the info system. **Backup** and **recovery** will also be documented.
- **Documentation for users** is made to provide **directions to info processes**. It can be on-screen help or a manual. It should be simple and user friendly.

TOOLS USED IN DESIGNING

- **Context diagram** – Context diagrams represent the **system as one process**, identifying data entry and exit via **sources and sinks**. It indicates where the system interfaces with the environment. It is a **top-level DFD**. Description of data and info can be further specified in **data dictionaries**.
 - **Process** → circle with label
 - **Data flow label** → labelled data flow arrows to show direction of data flow
 - **External entities** → Squares – Present in system's environment and doesn't perform any processes. It includes **sinks** and **sources**. **Participants** are only external entities if they provide/receive info

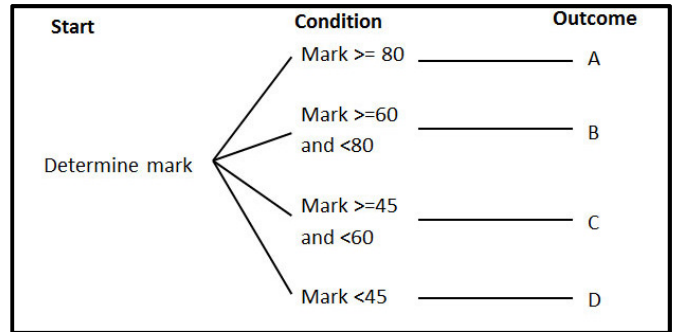


- **Data flow diagrams** – DFDs show the **movement of data between processes**. It represents systems by describing the changes in data as it passes through processes.
 - **Process** → circle with label
 - **Data flow arrows** → describes data and direction of arrow describes the movement
 - **Data stores** → Open rectangle with label – Where data is maintained prior to and after it has been processed. It is usually a file or DB stored on a secondary storage device.



- **Decision trees** – Diagrammatic way of **representing all possible combinations of decisions (branches) and their resulting actions**. The actions are listed right of the branches.
- **Decision tables** – 2D table that **represents all possible conditions and actions**. It indicates the alternatives for different conditions and actions based on rules. Rules are represented vertically, and conditions and actions horizontally. It is less user-friendly but lowers the number of rules column in decision trees.
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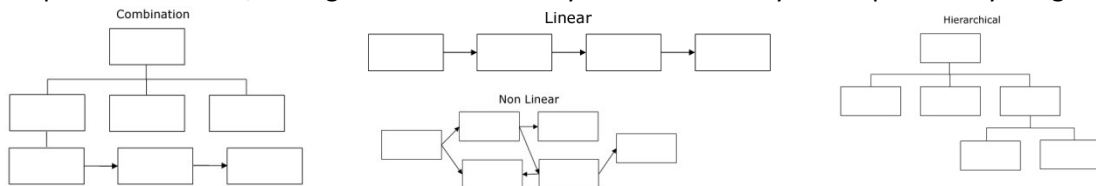
Conditions	Rules		
Number of web sites >10	✓	x	x
Number of Web sites <10	x	✓	x
No results	x	x	✓
Actions			
Use a more specific search	✓	x	x
Access each web site	x	✓	x
Try a new keyword	x		✓



- **Data dictionaries** – It details each of the data item used by the system. It usually describes **field name, data type, field size, description** and **example**. It is used in conjunction with other design tools.
- **Storyboard** – Storyboards are tools for **designing user interface in software**. It documents **the layout of elements** on each screen and **navigational links** through software or hand drawn. There are **linear, hierarchical** (more common for webpages), **non-linear** and **composite** storyboards.

Field name	Data type	Data Format	Field Size	Description	Example
UserID	Text	NNNNNNNN	8	Unique eight digit number represented as text	0001539
FirstName	Text		25	First name of employee	Bill
Surname	Text		25	Surname of employee	Smith
DOB	Date	DD/MM/YYYY	10	Date of birth as a short date format	15/07/1982
HourlyPayRate	Currency	#####.##	8	Rate of pay expressed in dollars per hour	34.50
Height	Real	#.##	3	Height in metres, with two decimal places	1.58
FeesPaid	Boolean		1	Y or N for Yes or No	Y

- **User Interface** – when designing user interface, it is important to consider who the users are, consistency with known software, legibility of data entry screens (colours and graphics), showing all possible function, having a reaction for every action and a way out of potentially dangerous actions.



- **Use system design tools to** – better understand the system, assist in explaining the operation of the new system and document the new system.

Implementation

Implementation – The **new system is installed** and **old system removed**. **Data is converted**, **retraining** occurs and the **new system is tested** prior implementation.

ACQUIRING INFORMATION TECHNOLOGY AND MAKING IT OPERATIONAL

- **Hardware** – **Network cabling** is installed. **Buying, installing** and **configuring** new hardware and **training**.
- **Software** – **Install** and **customise** the software. **Old data is converted**, and U&Ps are **trained** to use the software.

AN IMPLEMENTATION PLAN THAT DETAILS:

- **Participant training** – It is most effective with **motivational learners**. They are likely **open to change**, understand how the **new system meets their needs**, **provided input** during development and understand how their **task assists in achieving the purpose**.
 - **Traditional group** – Trainer (member of SD or outsourced specialist) performs on/offsite session.
 - **Peer training** – Users undergo training on how to operate the system and teach others. The trained users train their peers (one-on-one). It allows users to learn new skills when required.
 - **Online training such as tutorials and help systems** – Learn new skills at user's own pace and when needed. It is common in larger systems and to provide sample file and DBs.

- **Method of conversion** – Depends on the nature of work and the characteristics of the new system.
 - **Parallel conversion** – The **old and new system operate simultaneously for some time**. For systems with critical info to avoid data loss. Users familiarise themselves but have double the workload.
 - **Direct conversion** – The **old system is dropped and new system is implemented at one point**. The system must be error-free with all possible faults anticipated. Participants are trained in advance.
 - **Phased conversion** – The **new system is gradually introduced**, while old system is discarded. It is used when the system is still being developed (e.g. agile method). This method is more manageable.
 - **Pilot conversion** – The **new system is installed for a number of users**. Users learn, use and evaluate the new system. If deemed satisfactory, it is implemented completely. Developers and customers are ensured the requirements are met in an operational environment. Form of acceptance testing.
- **How the System will be Tested**
 - The new system must **be tested in its info tech** (using diagnostic software) **and info processes**.
 - **Onsite test data** is used to cover all possible issues to encounter.
 - **Info processes are continually tested**.
- **Conversion of Data for the New System** – Issues of whether there will be an **automated process** to simplify the conversion, **how long the conversion will be** and **accuracy** of converted data should be considered.
- **The Need for an Operation Manual Detailing Procedures Participants Follow When Using the New System** – It is similar to tutorials and help systems, providing an **overview of the system**, non-technical explanations of the **processes, tutorials for each of the tasks** and **instructions to use each aspect of the system**.

Testing, Evaluating and Maintaining

Testing – The system is tested (acceptance test) to ensure it meets requirements. The operation manual is trialled.

Evaluating – There is ongoing evaluation of monitor performance and review of the effects on people.

Maintaining – Maintain the system continues to meet its requirements and modify problematic parts of the system.

TESTING TO ENSURE THE SYSTEM MEETS THE REQUIREMENTS – **Acceptance testing** is a formal testing of an operational system to ensure all requirements are met. The results determine if the system is successful. When successful, payment is made. An outside specialist or the client can perform the testing.

TESTING AND EVALUATING THE SOLUTION WITH TEST DATA

- **Volume data** – Volume data is test data designed to ensure the **system still operates while dealing with large volumes of data**. Data can be **from the system** or **generated**. It measures the **response time**.
- **Simulated data** – Simulated data tests the **performance of the system under certain operational conditions**. Software is used to generate the simulation. It evaluates the **performance of the system**.
- **Live data** – Live data is **actual data used in the system**. It ensures it will operate under real conditions and meets all the requirements. This is usually the last step prior to client accepting the system.

CHECKING TO SEE THAT THE ORIGINAL SYSTEM REQUIREMENTS HAVE BEEN ACHIEVED

- Ongoing evaluation is monitored through a **technical and financial perspective**. It determines the **extent the system is meeting expectations**. If the system isn't performing, changes are needed and thus a new SDLC.
- **Technical performance monitoring** – This evaluates the continuing **achievements of meeting the requirements**. It also requires any changes that may require modification.
- **Financial performance monitoring** – It evaluates the **accuracy of the real economic situation to the predicted economic situation**. Environmental factors should be considered (e.g. new competitors).

TRIALLING AND USING THE OPERATION MANUAL

- **Operation manual** – The operation manual describes the **procedures participants follow** as they use the new system. It is used when the **new system is operational**. It can be **written** or **electronic, user friendly** and contain **screenshots**. It should be structured in terms of processes/tasks.
 - **What** the task is, **why** it's required and **how** it relates to other tasks.
 - **Who** is responsible for the task and who performs it
 - **When** the task needs to be completed by
 - **How** to complete the task
- **Trial period** – During the trial period, modifications will be made to reflect the system's policies of organisation and realities of the system's operations.

REVIEWING THE EFFECT ON USERS OF THE INFORMATION SYSTEM, PARTICIPANTS AND PEOPLE WITHIN THE ENVIRONMENT

– Surveys and interviews can be conducted for participants and users.

- **Decreased privacy** – Due to the **Privacy Act 1988**, organisations holding personal information must:
 - Explain **why personal info is collected** and **how it will be used** and managed
 - Provide individuals **access to their personal records** (to correct incorrect info)
 - **Divulge details of other organisations** that may be provided the info from the system
- **Changing nature of employment** – New systems will **alter the work perform by participants and users** who are affected by the system. It can be **positive or negative**. It may result in **deskilling, faster completion of work** and/or **working hours decreased** due to new technology.
- **Health and safety** – The legal documents **Occupational Health and Safety Act 2000** and **Occupational Health and Safety Regulation 2001** outline the responsibilities of employees and employers. Employers must set up **procedures to identify OHS issues** and an OHS representative/committee.
 - **Ergonomics**
- **Little or no sense of accomplishment, deskilling, loss of social contact**

MODIFYING PARTS OF THE SYSTEM WHERE PROBLEMS ARE IDENTIFIED

- Regular maintenance is conducted including **regular maintenance** and **repairs when fault occurs**
- **Maintenance during operation of system**
 - Maintaining **info technology inventory**
 - Perform **backups** and **protect against viruses**
 - Ensure **no illegal software** and all software licenced correctly
 - **Maintain hardware** (cleaning) and ensure consumables are stocked
 - **Purchase, replace, install and configure new hardware and software**
 - **Monitor peripheral devices**
 - Ensure all participants are **trained**
 - Set up **network access** for new users

MODIFYING PARTS OF THE SYSTEM WHERE PROBLEMS ARE IDENTIFIED – When problems are identified, modifications are made for the **new requirements emerging**. For **each modification, a new SDLC** is commenced. All **documentation should be updated** to reflect the current operational system.