CSIT 214 GOD TIER NOTES

Created By

Owen Harris, Daniel Hines, Jake Mellon, Olivia Followes

Lecture 1 Summary

Explain what a project is, provide examples of IT projects, list various attributes of projects, and describe the triple *constraint of project management.*

What a project is

- *A project is a temporary endeavor undertaken to create a unique product, service, or result.*
- *Projects can be large or small and involve one person or thousands of people. They can be done in one day or take years to complete.*

Examples of IT projects

- *IT projects involve using hardware, software, and networks to create a product, service, or result.*
- *Examples of IT Projects*
    - *Develop a driverless car.*
    - *Create a smartphone application and sell it online.*
    - *Upgrade technology infrastructure to provide wireless Internet access across a whole building.*

Attributes of projects

- *The following* ***attributes help define a project further****:*
    - ***A project has a unique purpose.***
        - *Every project should have a well-defined objective.*
    - ***A project is temporary****.*
        - *A project has a definite beginning and end.*
    - ***A project is developed using progressive elaboration.***
        - *Projects are often defined broadly when they begin, and as time passes, the specific details of the project become clearer.*
        - *Projects should be developed in increments.*
    - ***A project requires resources, often from various areas.***
        - *Resources include people, hardware, software, and other assets.*
        - *Many projects cross departmental or other boundaries to achieve their unique purposes.*
    - ***A project should have a primary customer or sponsor.***
        - *Most projects have many interested parties or stakeholders, but for a project to succeed someone must take the primary role of sponsorship.*
        - *The project sponsor usually provides the direction and funding for the project.*
    - ***A project involves uncertainty****.*
        - *Every project is unique, it is sometimes difficult to define its objectives clearly, estimate how long it will take to complete, or determine how much it will cost.*
        - *External factors also cause uncertainty, such as a supplier going out of business or a project team member needing unplanned time off.*

Triple *constraint of project management*

- ***Scope***
    - *What work will be done as part of the project?*
    - *What unique product, service, or result does the customer or sponsor expect from the project?*

- *How will the scope be verified?*

- ***Time***
  - *How long should it take to complete the project?*
  - *What is the project's schedule?*
  - *Who can approve changes to the schedule?*
- ***Cost***
  - *What should it cost to complete the project?*
  - *What is the project's budget?*
  - *How will costs be tracked?*
  - *Who can authorize changes to the budget?*

Describe project management *and discuss* ***key elements of the project management framework****, e.g. project stakeholders, the project management knowledge areas, common tools and techniques, and project success.*

Describe project management

- *Project management is the application of knowledge, skills, tools, and techniques to project activities to meet project requirements.*

key elements of the project management framework

- ***Project Stakeholders***
  - *Stakeholders are the people involved in or affected by project activities, and include the project sponsor, project team, support staff, customers, users, suppliers, and even opponents of the project.*
- ***Project management knowledge areas***
  - *The 10 key competencies that project managers must develop:*
    - ***i. Project scope management***
      - *Defining and managing all the work required to complete the project successfully.*
    - ***ii. Project time management***
      - *Includes estimating how long it will take to complete the work, developing an acceptable project schedule, and ensuring timely completion of the project.*
    - ***iii. Project cost management***
      - *Consists of preparing and managing the budget for the project.*
    - ***iv. Project quality management***
      - *Ensures that the project will satisfy the stated or implied needs for which it was undertaken.*
    - ***v. Project human resource management***
      - *Is concerned with making effective use of the people involved with the project.*
    - ***vi. Project communications management***
      - *Involves generating, collecting, disseminating, and storing project information.*
    - ***vii. Project risk management***

- *Includes identifying, analyzing, and responding to risks related to the project.*

viii. ***Project procurement management***
- *Involves acquiring or procuring goods and services for a project from outside the performing organization.*

ix. ***Project stakeholder management***
- *Includes identifying and analyzing stakeholder needs while managing and controlling their engagement throughout the life of the project.*

x. ***Project integration management***
- *Is an overarching function that affects and is affected by all of the other knowledge areas.*

- ***Project management tools and techniques***
  - *Assist project managers and their teams in carrying out work in all 10 knowledge areas.*

i. ***Integration management tools***
- *Work requests*
- *Project charters*
- *Project management plans*
- *Project review meetings*
- *Project management software*
- *Change requests*
- *Lessons-learned reports*

ii. ***Scope management tools***
- *Work breakdown structures*
- *Scope management plans*
- *Scope verification techniques*
- *Scope change controls*
- *Scope statements*

iii. ***Time management tools***
- *Gantt charts*
- *Project network diagrams*
- *Critical path analysis*
- *Fast tracking*
- *Schedule performance measurements*

iv. ***Cost management tools***
- *Project budgets*
- *Cost estimates*
- *Cost management plans*
- *Cost baselines*

v. ***Quality management tools***
- *Quality metrics*
- *Checklists*
- *Quality control charts*
- *Test plans*

vi. ***Human resource management tools***
- *Motivation techniques*
- *Project organizational charts*
- *Team building exercises*

vii. ***Communications management tools***

- *Communications management plans*
- *Status reports*
- *Virtual communications*
- *Templates*
- *Project websites*
- *Kick-off meetings*
- *Progress reports*

viii. ***Risk management tools***

- *Risk management plans*
- *Risk registers*
- *Probability/impact matrices*
- *Risk rankings*

ix. ***Procurement management***

- *Contracts*
- *Requests for proposals or quotes*
- *Source selections*

- ***Project Success***
  - *There are several ways to define project success:*
    i. *The project met scope, time, and cost goals*
    ii. *The project satisfied the customer/sponsor*
    iii. *The results of the project met its main objective, such as making or saving a certain amount of money, providing a good return on investment, or simply making the sponsors happy*

*Discuss the **relationship between project, program, and portfolio management** and the contributions each makes to enterprise success.*

- ***Program***
  - *A program is a group of related projects, subprograms, and program activities managed in a coordinated way to obtain benefits and control not available from managing them individually.*
  - *It is often more economical to group projects together to help streamline management, staffing, purchasing, and other work.*
- ***Common programs in the IT field***
  - ***Infrastructure***
    - *This program could encompass several projects, such as providing more wireless Internet access, upgrading hardware and software and enhancing computer security,*
  - ***Applications development***
    - *This program could include several projects, such as purchasing a new off-the-shelf billing system, or developing a new capability for a customer relationship management system.*
  - ***User support***
    - *This program may have several projects to support users. A project might provide a better email system or develop technical training for users.*
- ***Program manager***

    - *provides leadership and direction for the project managers heading the projects within the program*
- ***Project portfolio management***
    - *Organizations group and manage projects and programs as a portfolio of investments that contribute to the entire enterprise's success.*
    - *Portfolio managers help their organizations make wise investment decisions by helping to select and analyze projects from a strategic perspective.*
- ***Project Portfolio Management VS Project Management***
    - ***The main distinction is a focus on meeting tactical or strategic goals****.*
        - *Individual projects often address tactical goals, whereas portfolio management addresses strategic goals.*
    - ***Project Portfolio***
        - *Strategic goals generally emphasise long-term goals for an organisation.*
            - *Are we working on the right projects?*
            - *Are we investing in the right areas?*
            - *Do we have the right resources to be competitive?*
    - ***Project Management***
        - *Tactical goals are generally more specific and short-term*
            - *Are we carrying out the projects well?*
            - *Are projects on time and on budget?*
            - *Do project stakeholders know what they should be doing?*

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Lecture 2 Summary

*Describe the **systems view of project management** and how it applies to information technology (IT) Projects*

- **Systems approach**
  - A more analytical approach to management and problem solving.
- **3 Parts include**
  - **Systems Philosophy**: An overall model for thinking about things as systems
  - **Systems Analysis:** Problem solving approach
  - **Systems Management:** Address business, technological and organizational issues before making changes to systems.

Understand organizations, including the four frames, organizational structures, and organizational culture

- **The Four Frames**
  - **Structural Frame:**
    - Roles and responsibilities, coordination and control. Organization charts help describe this frame.
  - **Human Resource Frame:**
    - Providing harmony between needs of the organisation and needs of the people.
  - **Political Frame:**
    - Coalitions composed of varied individuals and interest groups. Conflict and power are key issues.
  - **Symbolic Frame:**
    - Symbols and meanings related to events. Culture, language, traditions and image are all parts of this frame.
- **Organisational Structures**
  - **Functional:**
    - Functional managers report to the CEO.
  - **Project:**
    - Program managers report to the CEO.
  - **Matrix:**
    - Middle group between functional and project structures: personnel often report to two or more bosses; structure can be weak, balanced, or strong matrix.

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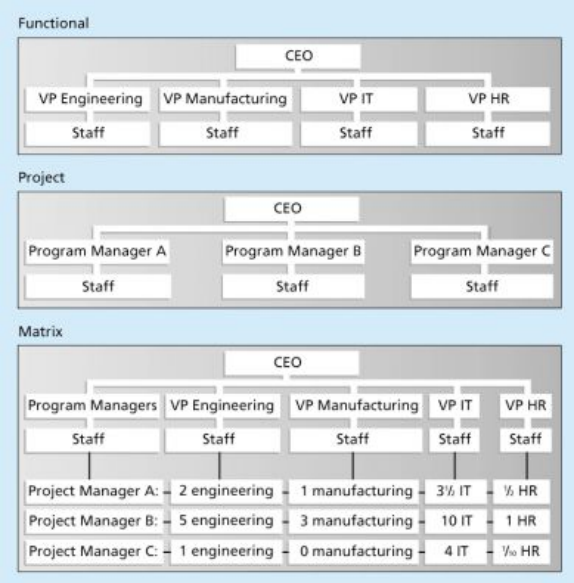

- **Organisational Culture**
  - Is a set of assumptions, values, and behaviours that characterize the function of an organisation.
  - Many experts believe the underlying causes of many companies' problems are not the structure or staff, but the culture.

*Explain why **stakeholder management** and **top management** commitment are critical for a project's Success*

Stakeholder management

- *The purpose of project stakeholder management is to identify all people or organizations affected by a project, to analyze stakeholder expectations, and to effectively engage stakeholders in project decisions throughout the life of a project.*
- *Using the four frames, organizations can help meet stakeholder needs and expectations*
- *Senior executives/top management are very important stakeholders*

Top management

- *A very important factor in helping project managers successfully lead projects is the level of commitment and support they receive from top management.*
- *Top management commitment is crucial to project managers for the following reasons:*
  - *Project managers need adequate resources.*
  - *Project managers often require approval for unique project needs in a timely manner.*
  - *Project managers must have cooperation from people in other parts of the organization.*
  - *Project managers often need someone to mentor and coach them on leadership issues.*

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*Understand the concept of a **project phase** and the **project life cycle**, and distinguish between **project development** and **product development**.*

Project phase

- *It is good practice to divide projects into several phases.*
- *General phases in traditional project management are often called the*
    - *Concept phase*
        - *In the concept phase, managers usually develop a business case, which describes the need for the project and basic underlying concepts.*
        - *A preliminary or rough cost estimate is developed in this first phase, and an overview of the required work is created.*
    - *Development phase*
        - *In the development phase, the project team creates more detailed project management plans, a more accurate cost estimate, and a more thorough WBS*
        -
    - *Implementation phase*
        - *In the implementation phase, the project team creates a definitive or very accurate cost estimate, delivers the required work, and provides performance reports to stakeholders.*
    - *Closeout phase.*
        - *In the closeout phase, all of the work is completed, and customers should accept the entire project.*
        - *The project team should document its experiences on the project in a lessons-learned report.*
- *Each phase of a project should be successfully completed before the team moves on to the next phase.*

Project life cycle

- *A project life cycle is a collection of phases.*
- *Project life cycles defines:*
    - *what work will be performed in each phase,*
    - *what deliverables will be produced and when,*
    - *who is involved in each phase,*
    - *how management will control and approve work produced in each phase.*

Product development

- *A systems development life cycle (SDLC) is a framework for describing the phases of developing information systems.*
- *Predictive life cycle examples:*
    - *The waterfall life cycle model*
        - *Well-defined, linear stages of systems analysis, design, construction, testing, and support.*
        - *This life cycle model assumes that requirements will remain stable after they are defined.*
    - *The spiral life cycle model*
        - *Developed based on refinements of the waterfall model as applied to large government software projects.*

        - *This approach is suitable for projects in which changes can be incorporated with reasonable cost increases or with acceptable time delays.*
    - *The incremental build life cycle model*
        - *Provides for progressive development of operational software, with each release providing added capabilities.*
        - *This type of approach is often used by software companies, which issues a specific release of a software package while working on future revisions that will be distributed later in another release.*
    - *The prototyping life cycle model*
        - *Used for developing software prototypes to clarify user requirements for operational software.*
        - *This approach is often used in systems that involve a great deal of user interface design, such as website projects or in systems that automate previously manual functions.*
    - *The Rapid application development model*
        - *Uses an approach in which developers work with an evolving prototype.*
        - *This life cycle model also requires heavy user involvement and helps produce systems quickly without sacrificing quality.*

*Discuss the **unique attributes** and diverse **nature of IT projects***

- *IT projects are diverse.*
    - *Some may involve a small number of people installing off-the-shelf hardware and associated software.*
    - *Others may involve hundreds of people analyzing several organizations' business processes and then developing new software in a collaborative effort with users to meet business needs.*
- *IT Project Team Members.*
    - *People involved come from diverse backgrounds and possess different skills.*
    - *Diverse project teams provide a significant advantage because they can analyze project requirements from a more robust systems view.*
- *Diverse Technologies.*
    - *Differences in technical knowledge can make communication between professionals challenging.*
    - *Hardware specialists might not understand the language of database analysts, and vice versa.*
    - *A problem with diverse technologies is that they change rapidly.*
    - *New technologies have also shortened the time frame many businesses have to develop, produce, and distribute new products and services.*

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*Describe **recent trends affecting IT project management**, including globalization, outsourcing, virtual teams, and agile project management.*

Recent trends such as increased globalization, outsourcing, virtual teams, and agile project management are creating additional challenges and opportunities for IT project managers and their teams. Globalization has significantly affected the field of IT.

Globalization

- Globalization is the process by which businesses or other organizations develop international influence or start operating on an international scale.
- **Challenges**
  - **Communications**
    - Because people work in different time zones and speak different languages, it is important to address how people will communicate in an efficient and timely manner.
    - A communications management plan is vital.
  - **Trust**
    - Trust is an important issue for all teams, especially when they are global teams.
    - It is important to start building trust immediately by recognizing and respecting others' differences and the value they add to the project.
  - **Achieving Common work practices**
    - It is important to align work processes and develop a modus operandi with which everyone agrees and is comfortable.
    - Project managers must allow time for the team to develop these common work practices.
  - **Tools**
    - IT plays a vital role in globalization, especially in enhancing communications and work practices.
    - Many people use free tools such as Skype, Google Docs, or social media to communicate.
    - Security is often a key factor in deciding which tools to use.
- **Opportunities**
  - **Lower trade and political barriers** and the **digital revolution** have made it possible to interact almost instantaneously with billions of other people across the planet
  - Provides a stage for individuals and small companies to compete with large corporations.

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Outsourcing

- Outsourcing is an organization's acquisition of goods and services from an outside source.

- IT projects continue to rely more and more on outsourcing, both within and outside their country boundaries.

- **Offshoring**:
    - Offshoring is sometimes used to describe outsourcing from another country and is a natural outgrowth of globalization.

- Because of the increased use of outsourcing for IT projects, Issues including working on and managing virtual teams become more mainstream.

Virtual teams

- A virtual team is a group of people who work together despite time and space boundaries using communication technologies.

- Team members might all work for the same company in the same country, or they might include:
    - Employees
    - independent consultants
    - Suppliers
    - Volunteers

  From around the world.

- **Advantages of virtual teams include:**
    - Lowering costs because many virtual workers do not require office space
    - Having team members across the globe working any time of day or night.
    - Improving the balance between work and life for team members by eliminating fixed office hours and the need to travel to work.
- **Disadvantages of virtual teams include:**
    - Isolating team members
    - Increasing the potential for communications problems
    - Reducing the ability for team members to network and transfer information informally.
    - Increasing the dependence on technology to accomplish work.

Agile Project Management

- Agile project management means using a method based on iterative and incremental development, in which requirements and solutions evolve through collaboration.

- Agile Management is characterised by requirements being unknown or change quickly.

- **In terms of the triple constraint:**
    - an agile approach **sets time and cost goals** but **leaves scope goals flexible.**
    - Allows project sponsors or product owners to prioritize and reprioritize the work they want done.

- The person implementing Agile Management is responsible for interpreting and applying the following values:
    - Individuals and interactions over processes and tools
    - Working software over comprehensive documentation
    - Customer collaboration over contract negotiation
    - Responding to change over following a plan

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Lecture 3 Summary

Describe an **overall framework for project integration management** as it **relates** to the other **project management** knowledge areas and the **project life cycle**

Project Integration Management (Six Main Processes)

- **Developing the project charter**
  - Involves working with stakeholders to create the “Project Charter” document that formally authorizes a project.
- **Developing the project management plan**
  - Involves coordinating all planning efforts to create a consistent, coherent document known as a project management plan.
- **Directing and Managing project work**
  - involves carrying out the project management plan by performing the activities included in it. The **outputs** of this process are:
    - Deliverables
    - Work performance information
    - Change requests
    - Project management plan updates
    - Project documents updates.
- **Monitoring and Controlling Project work**
  - Involves overseeing activities to meet the performance objectives of the project.
  - The **outputs** of this process are:
    - Change requests
    - Project management plan updates
    - Project documents updates.
- **Performing integrated change control**
  - Involves identifying, evaluating, and managing changes throughout the project life cycle.
  - The **outputs** of this process include:
    - Change request status updates
    - Project management plan updates
    - Project documents updates.
- **Closing the project or phase**
  - Involves finalizing all activities to formally close the project or phase.
  - The **outputs** of this process include:
    - Final product
    - Result transition and organizational process assets updates.

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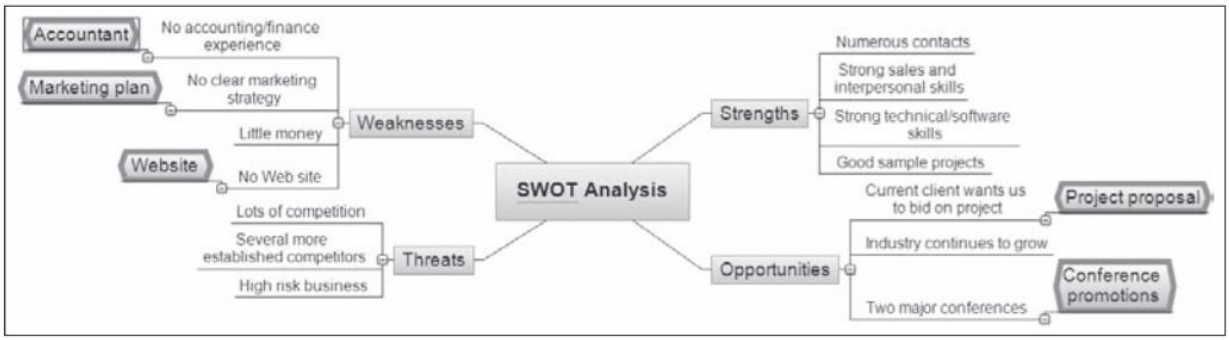
Discuss the **strategic planning process** and apply different **project selection methods**

Strategic planning involves:

- Determining long-term objectives by analyzing the strengths and weaknesses of an organization
- Studying opportunities and threats in the business environment, predicting future trends, and projecting the need for new products and services.
- Strategic planning provides important information to help organizations identify and then select potential projects.

Project Selection Methods:

- **S.W.O.T Analysis:**
  - The node at the end of tree e.g. “Accountant” show plans to combat the situation.



- **Focusing on broad organizational needs:**
  - Involves focusing on project that are considered important to the board
  - This can be difficult to access, there the following are compared together to try and value the decision roughly in terms of its success:
    - Do people in the organization agree that the project needs to be done?
    - Does the organization have the desire and capacity to provide adequate funds to perform the project.
    - Is there a strong will to make the project succeed?
- **Categorizing IT projects:**
  - Selecting projects is based on various categorizations such as:
    - The project’s impetus
      - Problems:
        - Involves initiating a project to correct and / or prevent a Problem.
      - Opportunities:
        - Initiating a project to improve the organisation. E.g. a make or break new feature.
      - Directives:
        - New tasks given by management, government or other external influences, can cause a project to be initiated to perform these tasks.
    - Time window
      - Projects are given a certain time window. Such a potential projects must be finished within the given specific time window; otherwise, they are no longer valid projects.

    - General priority.
        - Having high, medium, or low priority based on the current business environment.

- **Performing net present value or other financial analyses:**
    - Net present value (NPV) analysis is a method of calculating the expected net monetary gain or loss from a project by calculating the value of all expected future cash inflows and outflows at the present time.
    - Positive NPV projects will be considered over others if financial value is a key criterion for project selection.
- **Using a weighted scoring model:**
    - A weighted scoring model is a tool that provides a systematic process for selecting projects based on many criteria.
    - These criteria can include factors such as:
        - Meeting broad organizational needs
        - Addressing problems,opportunities, or directives
        - The amount of time needed to complete the project
        - The overall priority of the project
        - Projected financial performance of the project.
    - Example:

	A	B	C	D	E	F
1	**Criteria**	**Weight**	**Project 1**	**Project 2**	**Project 3**	**Project 4**
2	Supports key business objectives	25%	90	90	50	20
3	Has strong internal sponsor	15%	70	90	50	20
4	Has strong customer support	15%	50	90	50	20
5	Uses realistic level of technology	10%	25	90	50	70
6	Can be implemented in one year or less	5%	20	20	50	90
7	Provides positive NPV	20%	50	70	50	50
8	Has low risk in meeting scope, time, and cost goals	10%	20	50	50	90
9	**Weighted Project Scores**	**100%**	**56**	**78.5**	**50**	**41.5**

- **Implementing a balanced scorecard:**
    - A balanced scorecard is a strategic planning and management system that helps organizations align business activities to strategy, improve communications, and monitor performance against strategic goals.

Explain the **importance of creating a project charter** to formally initiate projects

- **What is a project charter:**
    - A project charter is a document that formally recognizes the existence of a project and provides direction on the project's objectives and management.

- **What does a project charter do:**
    - It authorizes the project manager to use organizational resources to complete the project. Ideally, the project manager plays a major role in developing the project charter.

- **Why is it important:**
    - The primary purpose of the charter is to formally authorize the project and most importantly, gives management's stamp of approval for the project and the project manager.

    - The act of creating a charter shows management support for the project and the project manager. The Project Sponsor is named and gives their backing to the project.

    - Forces senior management to spell out clearly what the project should do and sets out management's expectations for results.

    - Reduces the potential for projects to grow in scope without control, a process called scope-creep.

    - Keeps the direction of the project aligned with what was originally attended

Describe **project management plan development,** understand the content of these plans, and review approaches for creating them.

What is a project management plan development:

- A project management plan is a document used to coordinate all project planning documents and help guide a project's execution and control.

Content:

- The main inputs for developing a project management plan include the project charter, outputs from planning processes, enterprise environment factors, and organizational process assets.

Creating:

- To create and assemble a good project management plan, the project manager must practice the art of project integration management, because information is required from all of the project management knowledge areas.

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Explain **project execution**, its **relationship to project planning**, the factors related to successful results, and **tools and techniques to assist** in directing and managing project work.

The whole point of a project is to produce deliverables of some sort and the execution phase is where this happens. Essentially, work is done according to the project plan and that work is monitored and the results fed back to the people responsible for the plan so that it can be updated to reflect the progress made.

Project managers can use specific tools and techniques to perform activities that are part of execution processes.
These include:

- Expert judgment
- Meetings
- Project management information systems

Describe the **process of monitoring and controlling a project.**

Monitoring:

What does it do:

- Monitoring project work includes collecting, measuring, and disseminating performance information
- It also involves assessing measurements and analyzing trends to determine what process improvements can be made.

How does monitoring occur:

- The project team should continuously monitor project performance to assess the overall health of the project and identify areas that require special attention.
- Important outputs of monitoring and controlling project work include change requests and work performance reports.

Controlling:

How monitored work is controlled:

- Important outputs of monitoring and controlling project work include change requests and work performance reports.

Leads to:

- Corrective actions should result in improvements in project performance.
- Preventive actions reduce the probability of negative consequences associated with project risks.

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Understand the **integrated change control process,** planning for and managing changes on information technology (IT) projects, and **developing and using a change control system**.

What is integrated change control:

- Integrated change control involves identifying, evaluating, and managing changes throughout the project life cycle.

What are the characteristics:

- The three main objectives of integrated change control are:
  - Influencing the factors that create changes to ensure that changes are beneficial
  - Determining that a change has occurred
  - Managing actual changes as they occur

Planning and Managing changes:

- Change requests are common on projects and occur in many different forms. They can be oral or written, formal or informal.
- Change requests can have a major impact on a project.
- Examples of changes:
- Technologies change
  - Personnel change
  - Organisational priorities change.

What is a Change Control System

- A change control system is a formal, documented process that describes when and how official project documents may be changed.

What does it do:

- It describes the people authorized to make changes, the paperwork required for these changes, and any automated or manual tracking systems the project will use.

How does change occur:

- A change control board (CCB) can make official changes

What is a change control board(CCB):

- A change control board (CCB) is a formal group of people responsible for approving or rejecting changes to a project.

What does a CCB do:

- The primary functions of a CCB are to provide guidelines for preparing change requests, evaluating change requests, and managing the implementation of approved changes.

How does this change get controlled:

- Configuration management ensures that the descriptions of the project's products are correct and complete.

What do they do:

- It involves identifying and controlling the functional and physical design characteristics of products and their support documentation.

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Explain the **importance of developing and following good procedures for closing projects**

What does it do:

- Closing the project or phase requires that you finalize all activities and transfer the completed or cancelled work to the appropriate people.

What are the good procedures:

- **Project Sponsor Acceptance**
  - What is it:
    - Involves meeting with the project sponsor to discuss closure around the acceptance criteria for the project that was defined at the beginning.
  - What does it do:
    - should not include any big surprises, but may reveal a short list of items that need to be finished up before final acceptance.
- **Conduct Project Assessment**
  - What is it:
    - Getting feedback from all project stakeholders, including your project team members.
  - What does it do:
    - You can capture lessons learned as you move along the project life cycle that will provide valuable information for the project assessment.
- **Complete Project History / Archive**
  - What is it:
    - Managing the files that go along with the project
  - What does it do:
    - Provide project team members with guidelines for handling project documents as the project progresses.

The outputs of closing projects are:

- Final product, service, or result transition
  - making sure sponsors receive delivery of the final products, services, or results they expected when they authorized the project.
- Organizational process asset updates
  - project team should provide a list of project documentation, project closure documents, and historical information produced by the project
  - write a lessons-learned report at the end of a project

Describe how **software** can assist in **project integration management**

Several types of software products are available to assist in project integration management:

- **Word-processing software** helps create several scope-related documents
- **Spreadsheets** help to perform financial calculations, weighted scoring models, and develop charts and graphs
- Communication software like **e-mail** and the **Web help** clarify and communicate scope information
- Project management software helps in creating a **WBS**, the basis for tasks on a **Gantt chart**
- Specialized software is available to assist in project scope management

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Owen Harris, Daniel Hines, Jake Mellon, Olivia Followes

Lecture 4 Summary

Understand the importance of good project scope management

What is it Project Scope Management:

- Project scope management includes the processes involved in defining and controlling what work is or is not included in a project.

- Six main processes are involved in project scope management
    - **Planning scope management**
        - Involves determining how the project's scope and requirements will be managed.
    - **Collecting requirements**
        - Involves defining and documenting the features and functions of the products as well as the processes used for creating them.
    - **Defining scope**
        - Involves reviewing the scope management plan, project charter, requirements documents, and organizational process assets to create a scope statement, adding more information as requirements are developed and change requests are approved
    - **Creating the WBS**
        - Involves subdividing the major project deliverables into smaller, more manageable components
    - **Validating scope**
        - Involves formalizing acceptance of the project deliverables
    - **Controlling scope**
        - Involves controlling changes to project scope throughout the life of the project

Describe the process of planning scope management

Scope management plan includes the following information:

- How to prepare a detailed project scope statement
    - Are there templates or guidelines to follow?
    - How much detail is needed to describe each deliverable?
- How to create a WBS
- How to maintain and approve the WBS
- How to obtain formal acceptance of the completed project deliverables
- How to control requests for changes to the project scope

This document often includes:

- A product scope description
- product user acceptance criteria
- detailed information on all project deliverables
- Information on project boundaries, constraints, and assumptions.
- There are often several versions of the project scope statement to keep scope information detailed and up to date.

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Discuss methods for collecting and documenting requirements to meet stakeholder needs and expectations

Interviewing:

- What is it:
  - An interview is a conversation where questions are asked and answers are given.
- What does it do:
  - Allow interviewer to understand the requirements and what is expected of them through face-to-face meetings, either in person or through communications software such as Skype.

Questionnaires and surveys:

- What is it:
  - A set of printed or written questions with a choice of answers, devised for the purposes of a survey or statistical study.
- What does it do:
  - Allow written information to be gathered from a large cohort of stakeholders, and from their can be averaged to find what expectations are more common and popular.

Prototyping:

- What is it:
  - Involves making a prototype of the documenting requirements, to display to the stakeholders
- What does it do:
  - Allows them to see and gain understanding of a base documenting requirements, of which they can add to further to make sure the majorities of stakeholders expectations have been met.

Explain the scope definition process and describe the contents of a project scope statement

What does a Scope Definition do:

- Scope Definition helps improve the accuracy of time, cost, and resource estimates, it defines a baseline for performance measurement and project control, and it aids in communicating clear work responsibilities.

Contents of a Project Scope statement:

- Project scope statements should include at least:
  - **A product scope description**
    - The characteristics of the products, services, and/or results your project will expect to produce.
  - **Product user acceptance criteria**
    - The conditions that must be met before project deliverables are accepted.
  - **Detailed information on all project deliverables.**
    - The products, services, and/or results your project will produce (also referred to as *objectives*).
  - **Project Exclusions:**
    - Statements about what the project will not accomplish or produce.

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Discuss the process for creating a work breakdown structure using the analogy, top-down, bottom-up, and mind-mapping approaches.

The top-down approach:

- **What is it:**
  - Top-down approach states that you need to take the biggest task or module in the project and break them down.
- **What are the characteristics:**
  - It requires more logic and structure and generally it is a preferred method for creating WBS.
  - This approach will identify the solution first and then dissect the solution into smaller steps required to implement it.

The bottom-up approach:

- **What is it:**
  - Pick the specific task that can be easily done and complete it.
- **What are the characteristics:**
  - Bottom up method is ideal for brainstorming a solution to a problem.

Mind-mapping approach:

- **What is it:**
  - Mind mapping is a technique that uses branches radiating out from a core idea to structure thoughts and ideas

The analogy approach:

- **What does it do:**
  - Using past Work Breakdown Structure (WBS) of similar projects. These can be tailored to a current project where overlap exists.

Explain the importance of validating scope and how it relates to defining and controlling scope

What is Validating scope:

- Validating scope involves formal acceptance of the completed project deliverables.

What is Controlling scope:

- Controlling scope involves controlling changes to the project scope.

How does validating scope relate to defining and controlling scope:

- Validating scope involves gaining acceptance of complete project deliverables, Once accepted the deliverable can be added to the scope statement, If the deliverable was validated and changes were requested by stakeholders, controlling of the scope would occur. This would repeat until the desired deliverable gets successfully validated, and so on until the scope statement was completed.

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Understand the importance of controlling scope and approaches for preventing scope-related problems on information technology (IT) projects

What is the issue:

- Even when the project scope is fairly well defined, many IT projects suffer from **scope creep**, the tendency for project scope to keep getting bigger and bigger.

How controlling scope prevents scope creep:

- To prevent scope creep from occurring it is very important to verify the project scope with users throughout the life of the project and develop a process for controlling scope changes.
    - Example of controlling scope changes:
        - Managing and Monitoring changes to the project scope while keeping project goals and business strategy in mind, and checking with stakeholders for validation of goals being met.

Overall Goal of scope control:

- The goal of scope control is to influence the factors that cause scope changes, to ensure that changes are processed according to procedures developed as part of integrated change control, and to manage changes when they occur.

Describe how software can assist in project scope management

Software can be used to assist in project scope management, this can be achieved by focusing on areas of the scope and using appropriate software. Examples:

- **Management**
    - Microsoft Project, can be used to track expenses, Staffing work times, and hourly rates, Start and expected finish times of tasks throughout the project etc, aid in the project manager in building the project.
- **Modeling**
    - Google Draw, Adobe Photoshop, Microsoft Project (WBS) outputs, are examples of program which can be used to create WBS or other important models such as mind maps, column graphs etc. Using these allows graphic representation of trends which can used to depict deliverables of the project within the scope management plan to allow better understanding for stakeholders, or investors.

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Lecture 5 Summary

Understand the importance of project schedules and good project time management

What is a project schedule:

- The project schedule is the tool that communicates what work needs to be performed, which resources of the organization will perform the work and the timeframes in which that work needs to be performed.

Why are issues:

- Managers often cite delivering projects on time as one of their biggest challenges
- Schedule issues are the main reason for conflicts on projects

How does the project schedule solve them:

- Project time management, simply defined, involves the processes required to ensure timely completion of a project. The application of a project schedule allows time management to occur through dividing task, organising the appropriate timeframes and depicting to staff what work needs to be completed.

Discuss the process of planning schedule management

What are the characteristics:

- Planning schedule management involves determining the policies, procedures,and documentation that will be used for planning, executing, and controlling the project schedule.
- The main output of this process is a schedule management plan.

A schedule management plan includes the following information:

- **Project schedule model**
  - Contains project activities with estimated durations, dependencies, and other planning information that can be used to produce a project schedule.
- **Level of accuracy and units of measure:**
  - This section discusses how accurate schedule estimates should be and determines whether time is measured in hours, days, or another unit.
- **Control thresholds**
  - Variance thresholds, such as ±10%, are established for monitoring schedule performance.
- **Rules of performance measurement**
  - Tracking of each member's performance as a percentage
- **Reporting formats**
  - This section describes the format and frequency of schedule reports required for the project.
- **Process Descriptions**
  - The schedule management plan also describes how all of the schedule management processes will be performed.

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Define activities as the basis for developing project schedules

What are activities:

- Activities involves identifying the specific activities that the project team members and stakeholders must perform to produce the project deliverables.

What are the characteristics:

- An activity or task is an element of work normally found on the work breakdown structure (WBS) that has expected duration, cost, and resource requirements.

The main outputs of this process are:

- Activity list
- Activity attributes
- Milestone list
- Project management plan updates.

Describe how project managers use network diagrams and dependencies to assist in activity sequencing

What is activity sequencing:

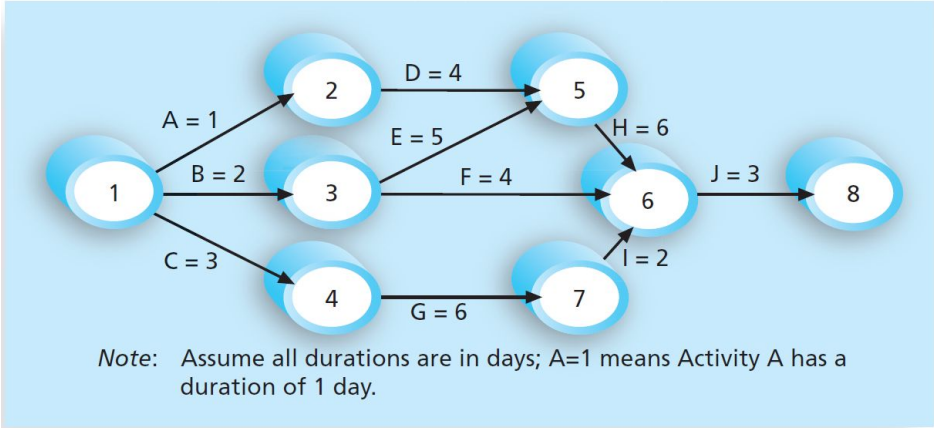
- Sequencing activities involves identifying and documenting the relationships between project activities.

What are the characteristics of activity sequencing:

- The main outputs of this process include:
  - Project schedule network diagrams
  - Project documents updates.

What is a network diagram:

- A network diagram is a schematic display of the logical relationships among project activities and their sequencing. Example:



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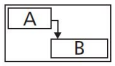
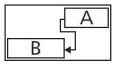
The four types of dependencies or relationships between activities include:

- **Finish-to-start dependency:**
  - A relationship in which the “from” activity or predecessor must finish before the “to” activity or successor can start.
  - Finish-to-start is the most common type of relationship or dependency.
- **Start-to-start dependency:**
  - A relationship in which the “from” activity cannot start until the “to” activity or successor is started.
- **Finish-to-finish dependency:**
  - A relationship in which the “from” activity must be finished before the “to” activity can be finished.
- **Start-to-finish dependency:**
  - A relationship in which the “from” activity must start before the “to” activity can be finished.

Task dependencies

The nature of the relationship between two linked tasks. You link tasks by defining a dependency between their finish and start dates. For example, the “Contact caterers” task must finish before the start of the “Determine menus” task. There are four kinds of task dependencies in Microsoft Project.

Task dependency	Example	Description
Finish-to-start (FS)		Task (B) cannot start until task (A) finishes.
Start-to-start (SS)		Task (B) cannot start until task (A) starts.
Finish-to-finish (FF)		Task (B) cannot finish until task (A) finishes.
Start-to-finish (SF)		Task (B) cannot finish until task (A) starts.

Understand the relationship between estimating resources and project schedules

What is it:

- A project’s schedule management plan is a required input to estimate the duration for each activity.

How does it do it:

- You must have a good idea of the quantity and type of resources (people, equipment, and materials) that will be assigned to each activity, this allows more accurate time estimates causing less issues with scheduling to occur.

Explain how various tools and techniques help project managers perform activity duration estimates

What is it:

- Estimating activity durations involves estimating the number of work periods that are needed to complete individual activities.
- Outputs include:

- Activity duration estimates
- Project documents updates.

What are tool and techniques to help project managers estimate:

- Schedule management plan
- Activity list
- Activity attributes
- Activity resource requirements
- Resource calendars
- Project scope statement
- Risk register
- Resource breakdown structure
- Enterprise environmental factors
- Organizational process assets.

Use a Gantt chart for planning and tracking schedule information, find the critical path for a project, and describe how critical chain scheduling and the Program Evaluation and Review Technique (PERT) affect schedule development

What does a Gantt chart do:

- A Gantt chart compares planned and actual project schedules
    - Baseline
        - Planned start and finish
    - Actual start and actual finish
        - To monitor schedule progress

Tasks can be:

- On schedule
- Ahead of schedule
- Behind of schedule (slipped)

Critical Path Method

- **What is it:**
    - CPM is a network diagramming technique used to predict total project duration
- **What are the characteristic:**
    - A critical path for a project is the series of activities that determines the earliest time by which the project can be completed
    - The critical path is the longest path through the network diagram and has the least amount of slack or float (Slack or float is the amount of time an activity may be delayed without delaying a succeeding activity or the project finish date)

Calculate Critical Path

- Develop a good network diagram
- Add the duration estimates for all activities on each path through the network diagram
- The longest path is the critical path
- If one or more of the activities on the critical path takes longer than planned, the whole project schedule will slip unless the project manager takes corrective action

What is Critical Chain Scheduling:

- Critical chain scheduling is an application theory of constraints that uses critical path analysis, resource constraints and buffers to help meet project completion dates.

Program Evaluation and Review Technique(P.E.R.T)

What is it:

- PERT is a network analysis technique used to estimate project duration when there is a high degree of uncertainty about the individual activity duration estimates.

What does it do:

- PERT uses optimistic, most likely, and pessimistic estimates of activity durations.

Advantages:

- The main advantage of PERT is that it attempts to address the risk associated with duration estimates.
- PERT is seldom used today.

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Owen Harris, Daniel Hines, Jake Mellon, Olivia Followes

Lecture 6 Summary

Understand the importance of project cost management

Project cost management is one of the most important aspects of project management that you need to master. It includes activities and tools to help you complete your project within the approved budget.

What are the characteristic:
There are four processes for project cost management

- **Planning cost management**
  - Involves determining the policies, procedures, and documentation that will be used for planning, executing, and controlling project cost.

- **Estimating costs**
  - Involves developing an approximation or estimate of the costs of the resources needed to complete a project.

- **Determining the budget**
  - Involves allocating the overall cost estimate to individual work items to establish a baseline for measuring performance.

- **Controlling costs**
  - Involves controlling changes to the project budget.

Explain basic project cost management principles, concepts, and terms

Most members of an executive board have a greater understanding and interest with business jargon, in contrast to IT information.

Principles Of Cost Management

- Life cycle costing provides a big-picture view of the cost of a project throughout its life cycle.
- Cash flow analysis is a method for determining the estimated annual costs and benefits for a project and the resulting annual cash flow.

Term of Cost management

- Profits are revenues minus expenditures.
- Profit margin is the ratio of revenues to profits
- Tangible and intangible costs and benefits are categories for determining how well an organization can define the estimated costs and benefits for a project.
- Sunk cost is money that has been spent in the past.
- Indirect costs are not directly related to the products or services of the project, but are indirectly related to performing work on the project

Concepts of Cost management:

- Learning curve theory can help estimate costs on projects that involve the production of large quantities of items.
- Reserves are dollar amounts included in a cost estimate to mitigate cost risk by allowing for future situations that are difficult to predict.

- **Contingency reserves** allow for future situations that may be partially planned for and are included in the project cost baseline.
- **Management reserves** allow for future situations that are unpredictable

Describe the process of planning cost management

What is it:

- The project cost management is planning how the costs will be managed throughout the life of the project.

A cost management plan includes:

- **Level of accuracy**
  - Activity cost estimates normally have rounding guidelines
- **Units of measure**
  - Each unit used in cost measurements, such as labor hours or days, should be defined.
- **Organizational procedure links**
  - Each control account is often assigned a unique code that is used in the organization's accounting system.
- **Control thresholds**
  - costs often have a specified amount of variation allowed before action needs to be taken, such as ±10 percent of the baseline cost.
- **Rules of performance measurement**
  - measurement rules, such as how often actual costs will be tracked and to what level of detail.
- **Reporting formats**
  - format and frequency of cost reports required for the project
- **Process descriptions**
  - how to perform all of the cost management processes.

Discuss different types of cost estimates and methods for preparing them

After developing and agreeing on resource requirements, a list of these are created. Project managers and their project teams must develop several estimates of the costs for these resources, with a large percentage of total project costs are often labor costs.

Estimates are usually done at various stages of a project and should become more accurate as time progresses

Three basic types of estimates include the following:

- **Rough order of magnitude (ROM) estimate**
  - Provides an estimate of what a project will cost
- **Budgetary estimate**
  - Allows allocation of money into an organization's budget.
- **Definitive estimate**
  - Provides an accurate estimate of project costs.

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Owen Harris, Daniel Hines, Jake Mellon, Olivia Followes

TABLE 7-1 Types of cost estimates

Type of Estimate	When Done	Why Done	How Accurate
Rough order of magnitude (ROM)	Very early in the project life cycle, often 3–5 years before project completion	Provides estimate of cost for selection decisions	−50% to +100%
Budgetary	Early, 1–2 years out	Puts dollars in the budget plans	−10% to +25%
Definitive	Later in the project, less than 1 year out	Provides details for purchases, estimates actual costs	−5% to +10%

Basic tools and techniques for cost estimates:

- **Analogous or top-down estimates:**
  - Use the actual cost of a previous, similar project as the basis for estimating the cost of the current project.
- **Bottom-up estimates:**
  - Involve estimating individual work items or activities and summing them to get a project total.
- **Parametric modeling**
  - Uses project characteristics (parameters) in a mathematical model to estimate project costs.

Understand the processes of determining a budget and preparing a cost estimate for an information technology (IT) project.

What is determining a budget:

- Cost budgeting involves allocating the project cost estimate to individual work items over time.

How to prepare a cost estimate for IT project:

- The WBS is a required input to the cost budgeting process since it defines the work items Important goal is to produce a cost baseline. This presents a time-phased budget that project managers use to measure and monitor cost performance.

Understand the benefits of earned value management and project portfolio management to assist in cost control

Project cost control includes: (Many organizations around the globe have problems with cost control**)**

- Monitoring cost performance
- Ensuring that only appropriate project changes are included in a revised cost baseline
- Informing project stakeholders of authorized changes to the project that will affect costs

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What is Earned Value Management(EVM):

- Earned Value Management(EVM)is a project performance measurement technique that integrates scope, time, and cost data.

What are the characteristic of Earned Value Management:

- You must enter actual information periodically to use EVM
- More and more organizations around the world are using EVM to help control project costs
- **EVM Terms**
    - **Planned value (PV)**
        - Is that portion of the approved total cost estimate planned to be spent on an activity during a given period
    - **Actual cost (AC)**
        - Is the total of direct and indirect costs incurred in accomplishing work on an activity
        - during a given period
    - **Earned Value (EV)**
        - Is an estimate of the value of the physical work actually completed
    - **Rate of performance (RP)**
        - Is the ratio of actual work completed to the percentage of work planned to have been completed at any given time during the life of the project or activity

How does it do it:

- Given a baseline you can determine how well the project is meeting its goals through comparison between actual cost and baseline expected cost.

What is Portfolio Management:

- Portfolio management is the making of decisions about investment mix and policy, matching investments to objectives, asset allocation for individuals and institutions, and balancing risk against performance.

What does Portfolio management do:

- By providing a centralized and consolidated view of programs and projects, the user can evaluate and prioritize activities across the organization.

Why does Portfolio Management Happen:

- This feature makes it possible to maximize productivity, minimize costs, and keep activities aligned with strategic objectives.

Describe how project management software can assist in project cost management

- **Spreadsheets** are a common tool for resource planning, cost estimating, cost budgeting, and cost control
- Many companies use more **sophisticated and centralized financial applications** software for cost information
- **Project management software e.g Microsoft Project** has many cost related features, especially enterprise PM software

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Lecture 7 Summary

Understand the importance of project quality management for information technology (IT) products and services

What is Quality management:

- **Quality management** is the act of overseeing all activities and tasks needed to maintain a desired level of excellence.

What are the characteristics:

- This includes:
  - The determination of a quality policy
  - Creating and implementing quality planning and assurance
  - Quality control and Quality improvement.

Why is Quality Management Important:

- Mistakes in several mission-critical IT systems have caused deaths
- Quality problems in many business systems have resulted in major financial losses.

Define project quality management and understand how quality relates to various aspects of IT projects

What is Project quality management:

- includes planning quality management, performing quality assurance, and controlling quality.

What does Project Quality Management do:

Planning quality management identifies which quality standards are relevant to the project and how to satisfy them.

How does Quality Management achieve higher quality:

- Performing quality assurance involves evaluating overall project performance to ensure that the project will satisfy the relevant quality standards.

- Controlling quality includes monitoring specific project results to ensure that they comply with quality standards and identifying ways to improve overall quality.

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Describe quality management planning and how quality and scope management are related

Project quality management ensures that the project will satisfy the needs for which it was undertaken.

Processes of Quality Management includes:

- **Planning quality management:**
  - Identifying which quality standards are relevant to the project and how to achieve them.

- **Performing quality assurance:**
  - Periodically evaluating overall project performance to ensure the project will satisfy the relevant quality standards.

- **Performing quality control:**
  - Monitoring specific project results to ensure that they comply with the relevant quality standards.

- **Design of experiments**
  - a Technique that helps identify which variables have the most influence on the overall outcome of a process.

Important scope aspects of IT projects that affect quality include:

- **Functionality**
  - The degree to which a system performs its intended function
- **Features**
  - The system's special characteristics that appeal to users
- **System outputs**
  - The screens and reports the system generates
- **Performance**
  - Addresses how well a product or service performs the customer's intended use
- **Reliability**
  - The ability of a product or service to perform as expected under normal conditions
- **Maintainability**
  - Addresses the ease of performing maintenance on a product

Discuss the importance of quality assurance

What is Quality Assurance:

- Quality assurance includes all the activities related to satisfying the relevant quality standards for a project
- Another goal of quality assurance is continuous quality improvement.

How does it do it:

- Benchmarking is used to generate ideas for quality improvements by comparing specific project practices or product characteristics to those of other projects or products within or outside the performing organization
- A quality audit is a structured review of specific quality management activities that help identify lessons learned that could improve performance on current or future projects

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Explain the main outputs of the quality control process

The main outputs of quality control are:

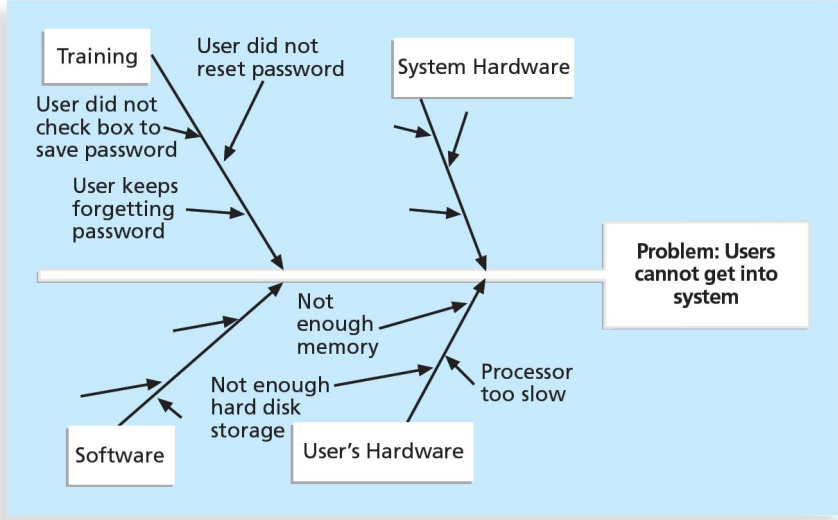
- Acceptance decisions
- Rework
- Process adjustments

Understand the tools and techniques for quality control, such as the Seven Basic Tools of Quality, statistical sampling, Six Sigma, and testing

There are Seven Basic Tools of Quality that help in performing quality control

Cause-and-effect diagrams

- trace complaints about quality problems back to the responsible production operations



A control chart

- A graphic display of data that illustrates the results of a process over time.

- **What do control charts do:**
  - The main use of control charts is to prevent defects, rather than to detect or reject them

- **How do control Charts improve quality:**
  - Quality control charts allow you to determine whether a process is in control or out of control:

    When a process is in control:
    - Any variations in the results of the process are created by random events; processes that are in control do not need to be adjusted

    When a process is out of control:
    - Variations in the results of the process are caused by non-random events; you need to identify the causes of those non-random events and adjust the process to correct or eliminate them

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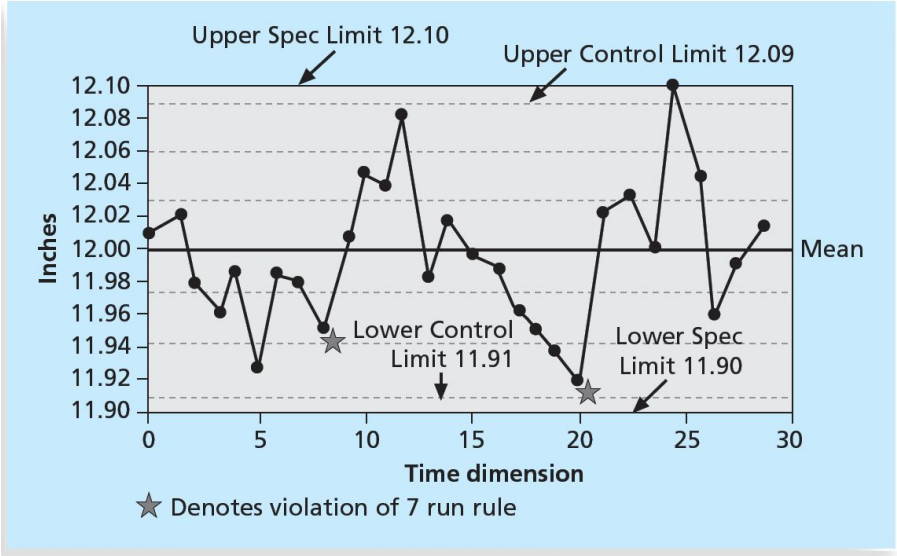

The seven run rule:

- States that if seven data points in a row are all below the mean, above the mean, or are all increasing or decreasing, then the process needs to be examined for non-random problems.
- You can use quality control charts and the seven run rule to look for patterns in data

A checksheet

- is used to collect and analyze data. This information might be useful in improving the process for handling complaints

System Complaints

Source	Day							
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
E-mail	𝍸	𝍸	𝍸	𝍸	𝍸		𝍸	12
Text	𝍸 𝍸	𝍸	𝍸	𝍸	𝍸	𝍸	𝍸	29
Phone call	𝍸	𝍸	𝍸	𝍸	𝍸	𝍸		8
Total	11	10	8	6	7	3	4	49

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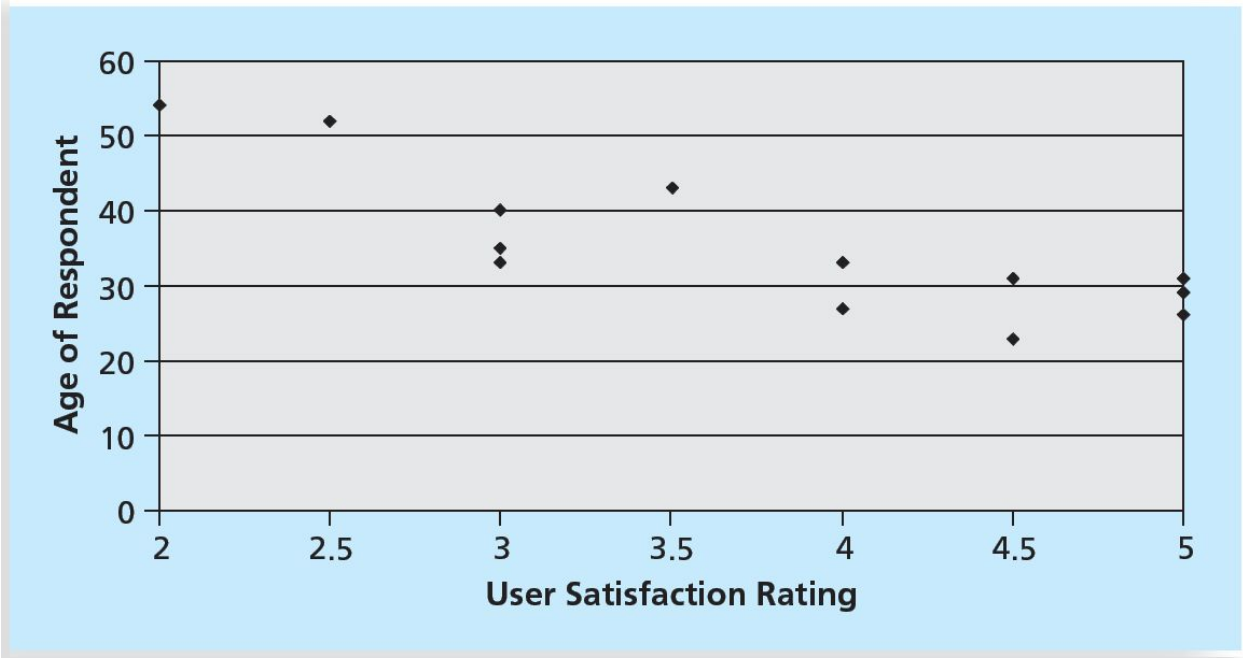
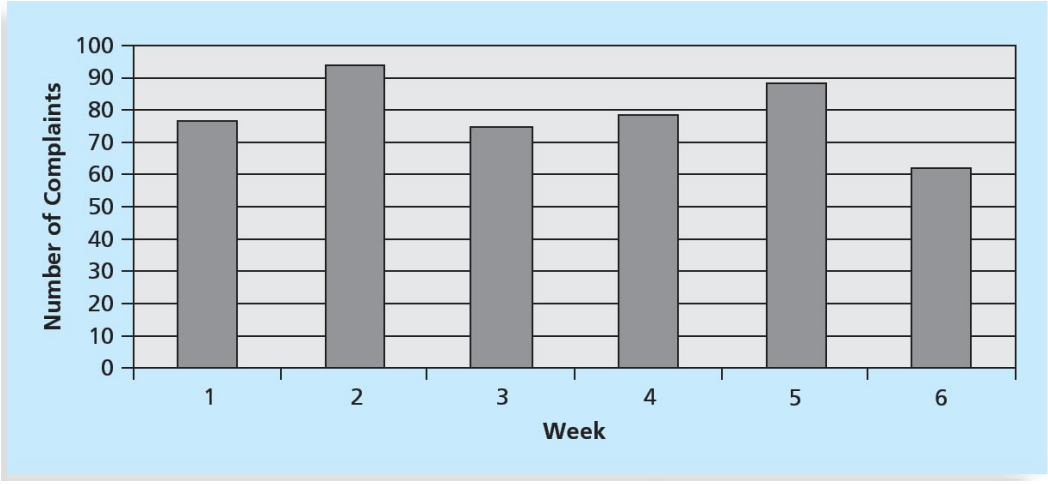
A scatter diagram

- Shows if there is a relationship between two variables.
- The closer data points are to a diagonal line, the more closely the two variables are related.



A histogram

- **What is histogram:**
  - Is a bar graph of a distribution of variables
- **What does it do:**
  - Each bar represents an attribute or characteristic of a problem or situation, and the height of the bar represents its frequency



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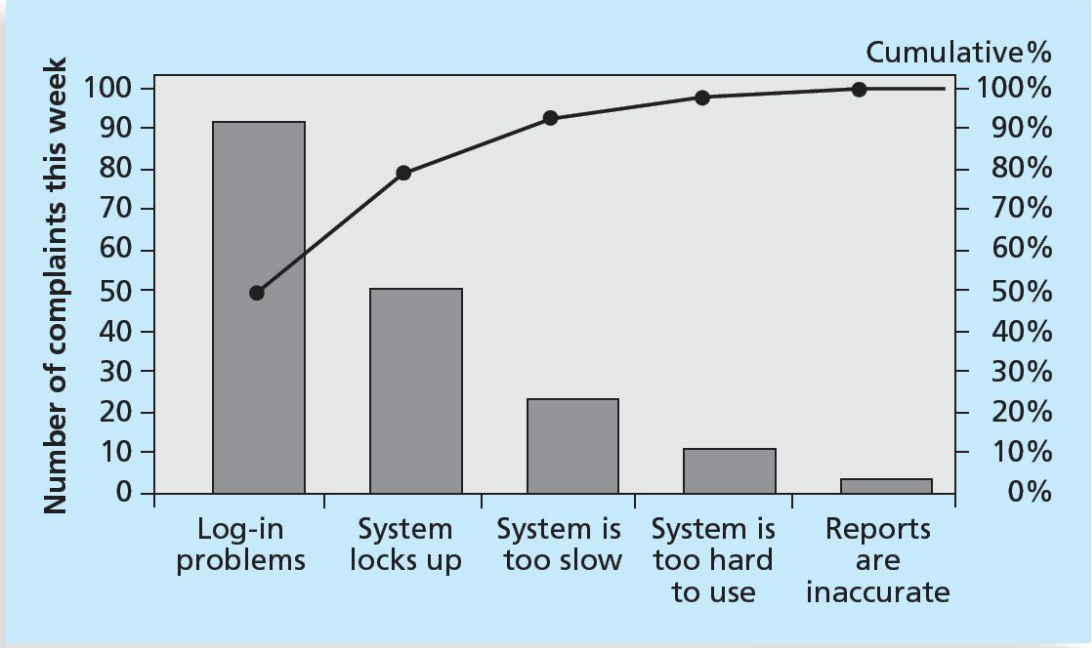
A Pareto chart

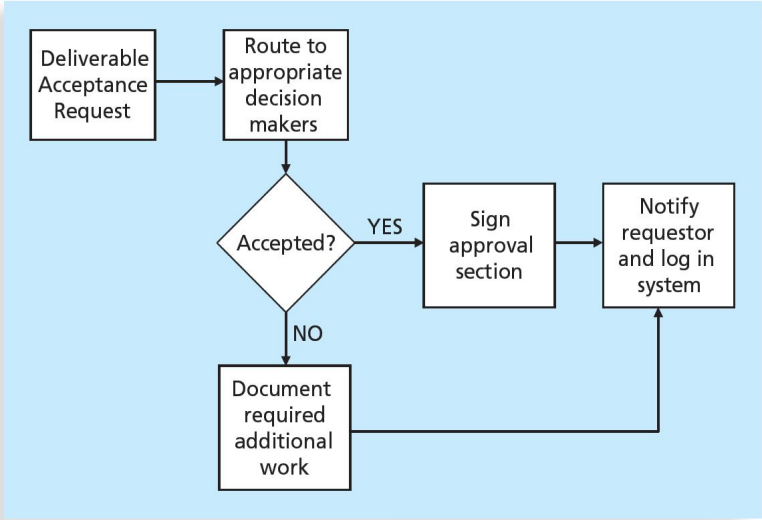
- **What is it:**
  - Is a histogram that can help you identify and prioritize problem areas
  - Pareto analysis is also called the 80-20 rule, meaning that 80 percent of problems are often due to 20 percent of the causes



Flowcharts

- **What is it**
  - Flowcharts are graphic displays of the logic and flow of processes that help you analyze how problems occur and how processes can be improved.

- **What do flowchart do:**
  - They show activities, decision points, and the order of how information is processed.



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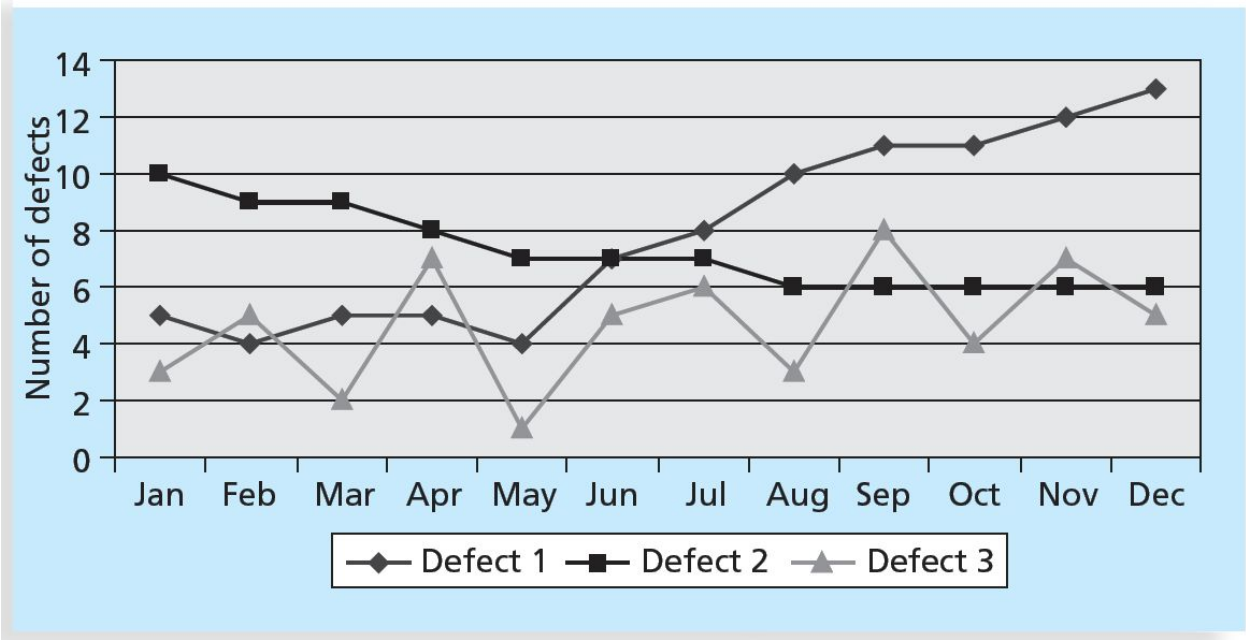
Run charts

- **What are Run charts**
  - Charts used for stratification, a technique that shows data from a variety of sources to see if a pattern emerges.

- **What do run charts do**
  - A run chart displays the history and pattern of variation of a process over time.
  - You can use run charts to perform trend analysis and forecast future outcomes based on historical results.



- **Statistical sampling**
  - What is it
    - Limited number of observations selected from a population on a systematic or random basis, which yield generalizations about the population.
  - **What does it do:**
    - Helps define a realistic number of items to include when analyzing a population.

- **Six Sigma**
  - **What is it:**
    - A set of management techniques.
  - **What does it do:**
    - Intends to improve business processes by greatly reducing the probability that an error or defect will occur.
- **Testing**
  - **What is it:**
    - Assessing something through running it through scenarios attempting to find errors.
  - **What does it do:**
    - Allows the development and delivering high-quality IT products.

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Summarize the contributions of noteworthy quality experts to modern quality management

Modern quality management:

- **What are the characteristics:**
  - Requires customer satisfaction
  - Prefers prevention to inspection
  - Recognizes management responsibility for quality

Example:

- ISO 9000 is a quality system standard that:
  - Is a three-part, continuous cycle of planning, controlling, and documenting quality in an organization
  - Provides minimum requirements needed for an organization to meet its quality certification standards
  - Helps organizations around the world reduce costs and improve customer satisfaction

Describe how leadership, the cost of quality, organizational influences, expectations, cultural differences, and maturity models relate to improving quality in IT projects

Leadership

- **What is it:**
  - The action of leading a group of people or an organization, or the ability to do this.
- **What are the characteristics:**
  - It is most important that top management be quality-minded.
  - A large percentage of quality problems are associated with management, not technical
  - issues.
- **Why:**
  - In the absence of sincere manifestation of interest at the top, little will happen below.
  - I.e. you need good leadership to make everyone interested.

The cost of quality

- **What is it:**
  - The **cost of quality** is the cost of conformance plus the cost of nonconformance.
  - **Cost of Conformance** means delivering products that meet requirements and fitness for use
  - **Cost of nonconformance** means taking responsibility for failures or not meeting quality expectations

What are the characteristics:

- Cost Categories related to quality
  - **Prevention cost:**
    - Cost of planning and executing a project so it is error-free or within an acceptable error range.
  - **Appraisal cost:**
    - Cost of evaluating processes and their outputs to ensure quality
  - **Internal failure cost:**
    - Cost incurred to correct an identified defect before the customer receives the product

- **External failure cost:**
  - Cost that relates to all errors not detected and corrected before delivery to the customer
- **Measurement and test equipment costs:**
  - Capital cost of equipment used to perform prevention and appraisal activities

Organizational influences

- **What is it:**
  - Refers to the influence of an organization on their members.
- **Example:**
  - A dedicated workspace and a quiet work environment were key factors to improving programmer productivity, and hence Quality IT projects

Cultural Differences

- Project managers must understand and manage stakeholder expectations.
- Expectations vary by:
  - Organization's culture
  - Geographic regions

Maturity models:

- **What is it:**
  - **Maturity Models** are frameworks for helping organizations improve their processes and systems.
- **What are the characteristics:**
  - models have five levels:
    - **First level** describing characteristics of the least organized or mature organizations.
    - **TO**
    - **Fifth level** describing characteristics of the most organized or mature organizations.

Discuss how software can assist in project quality management

- **Spreadsheet and charting** software helps create Pareto diagrams, fishbone diagrams

- **Statistical software packages** help perform statistical analysis

- **Specialized software products** help manage Six Sigma projects or create quality control charts **Example: MATLAB**

- **Project management software** helps create Gantt charts and other tools to help plan and track work related to quality management **Example: Microsoft Project**

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Lecture 8 Summary

Explain the importance of good human resource management on projects, including the current state of the global IT workforce and future implications for it.

What is it:

- **Human Resource Management** (**HRM**) is the term used to describe formal systems devised for the management of people within an organization.

What does it do:

- Project human resource management is a vital component of project management, It can aid in keeping well suited qualified people who are often hard to find and keep.

Why does it do it:

- Because people are the most important assets in organisations and on projects. Therefore, it is essential for project managers to be good human resources managers.

The Global IT workforce:

- The global job market for IT workers is expanding, and the demand for project managers continues to increase

Current and Future Implications:

- Proactive organizations address current and future human resource needs by improving benefits, redefining work hours and incentives, for finding future workers, and keeping current quality worker.

Define project human resource management and understand its processes

What is it:

- **Project human resource management** includes the processes required to make the most effective use of the people involved with a project.

What are the characteristics:

Human resource management includes the following four processes:

Planning human resource management

- Involves identifying and documenting project roles, responsibilities, and reporting relationships.

Acquiring the project team

- Involves assigning the needed personnel to work on the project.

Developing the project team

- Involves building individual and group skills to enhance project performance.

Managing the project team

- Involves tracking team member performance, motivating team members, providing timely feedback, resolving issues and conflicts, and coordinating changes to help enhance project performance.

Summarize key concepts for managing people by understanding theories of motivation, influence, and power; how people and teams can become more effective;emotional intelligence; and leadership

Psychosocial issues that affect how people work and how well they work include motivation, influence and power, effectiveness, emotional intelligence, and leadership.

Motivation

- What is it:
  - A reason or reasons for acting or behaving in a particular way.
- What are the characteristics:
  - **Intrinsic motivation**
    - **Intrinsic motivation** causes people to participate in an activity for their own enjoyment.
  - **Extrinsic motivation**
    - **Extrinsic motivation** causes people to do something for a reward or to avoid a penalty.

Influence

- **What is it:**
  - Things that influence people to act a certain way
- **What are the characteristics:**
  - **Authority:** The legitimate hierarchical right to issue orders
  - **Assignment:** The project manager's perceived ability to influence a worker's later work assignments
  - **Budget:** The project manager's perceived ability to authorize others' use of discretionary funds
  - **Promotion:** The ability to improve a worker's position
  - **Money:** the ability to increase a worker's pay and benefits
  - **Penalty:** The project manager's perceived ability to dispense or cause punishment
  - **Work challenge:** The ability to assign work that capitalizes on a worker's enjoyment of doing a particular task, which taps an intrinsic motivational factor
  - **Expertise:** The project manager's perceived special knowledge that others deem important
  - **Friendship:** The ability to establish friendly personal relationships between the project manager and others.

Power

- **What is it:**
  - Power is the potential ability to influence behavior to get people to do things they would not otherwise do
- **What are the characteristics:**
  - Types of power include:
    - **Coercive**
      - Involves using punishment, threats, or other negative approaches to get people to do things they do not want to do.
    - **Legitimate**
      - Is getting people to do things based on a position of authority.

- **Expert**
  - Involves using personal knowledge and expertise to get people to change their behavior.
- **Reward**
  - Involves using incentives to induce people to do things.
- **Referent**
  - Is based on a person's own charisma.

Project managers can apply **Covey's 7 habits** to improve effectiveness on projects:

Be proactive
- Anticipating and planning for problems and inevitable changes on projects.

Begin with the end in mind
- Focus on values, what they want to accomplish, and how they want to be remembered in their lives.

Put first things first
- Use a time management system and matrix to help people prioritize their time.

Think win/win
- When you use a win/win paradigm, parties in potential conflict work together to develop new solutions that benefit all parties.

Seek first to understand, then to be understood
- Listening with the intent to understand.

Synergize
- Creating collaborative products that are much better than a collection of individual efforts.

Sharpen the saw
- Project teams have time to retrain, re energize, and occasionally even relax to avoid burnout.

Emotional Intelligence
- **What is it:**
  - **Emotional intelligence** is knowing and managing one's own emotions and understanding the emotions of others for improved performance.

Leadership

There are many different leadership styles, and the one thing most experts agree on is that the **best leaders are able to adapt their style to needs of the situation.**

Six different styles of leadership
- **Visionary:**
  - The leader articulates where the group is going, but lets them decide how to get there.
- **Coaching:**
  - One-on-one style that focuses on developing individuals, showing them how to improve their performance.
- **Affiliative**:

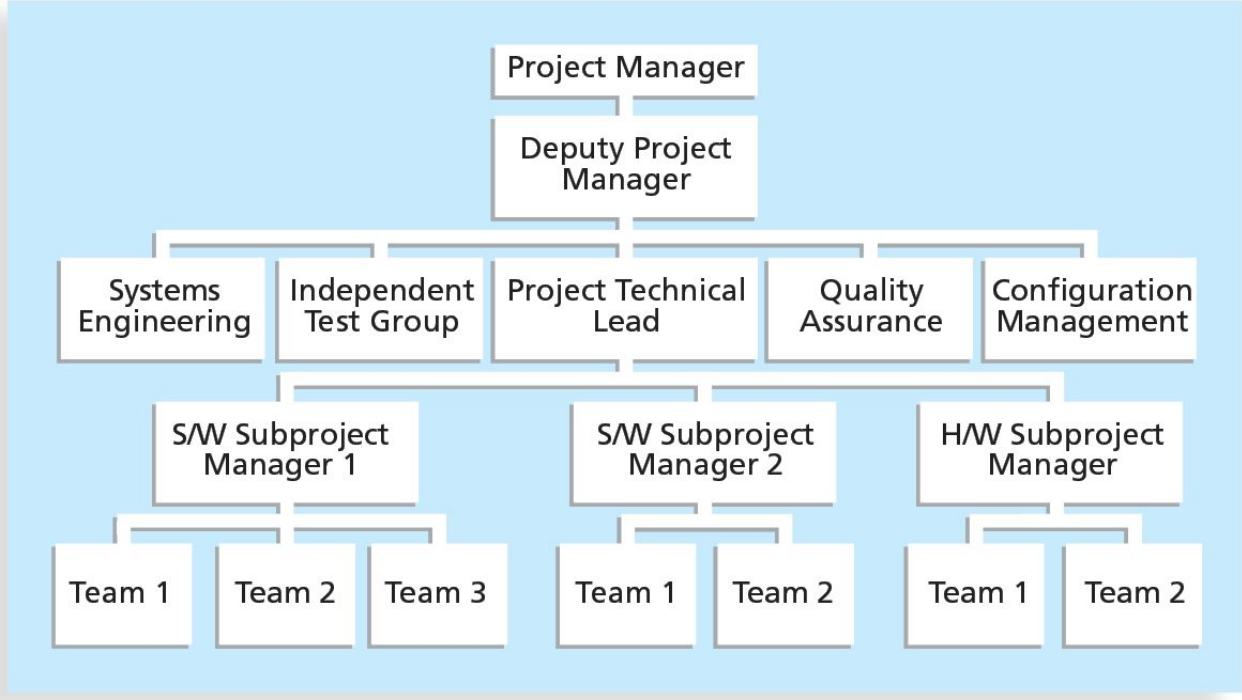
- Emphasizes the importance of teamwork and creating harmony by connecting people to each other.
- **Democratic:**
  - Focuses on people's knowledge and skills and creates a commitment to reaching shared goals.
- **Pacesetting:**
  - Used to set high standards for performance.
- **Commanding:**
  - Most often used, also called autocratic or military style leadership.

Discuss human resource management planning and be able to create a human resource plan, project organizational chart, responsibility assignment matrix, and resource histogram

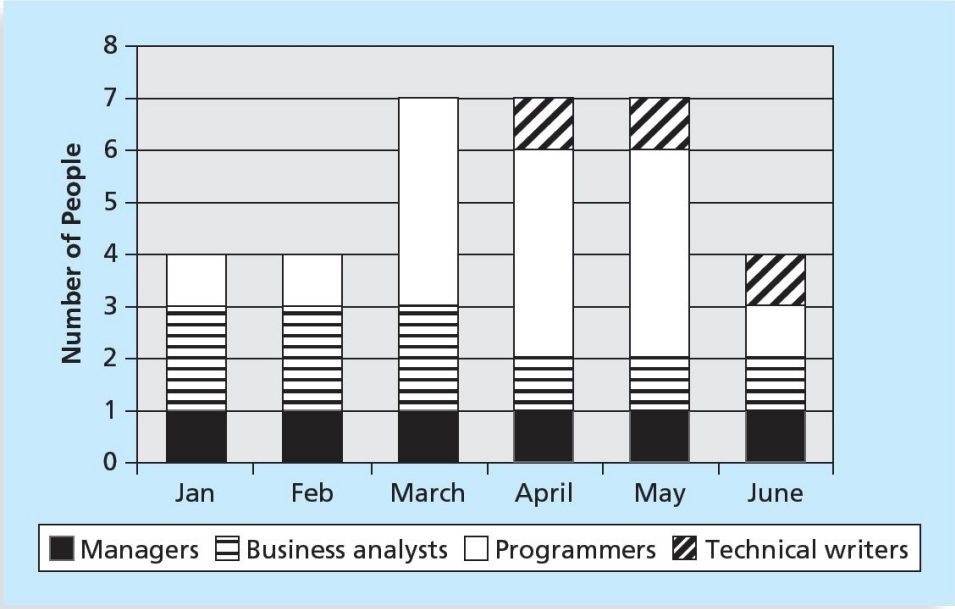
Human Resource Plan

- **What is it:**
  - Involves identifying and documenting project roles, responsibilities, and reporting relationships

- **What are the contents:**
  - **Project Organizational Charts**
    - After identifying important skills and the types of people needed to staff a project, the project manager should work with top management and project team members to create an organizational chart for the project.



- **Staffing management plan and resource histograms**
  - A staffing management plan describes when and how people will be added to the project team and taken off it.
  - The staffing management plan often includes a resource histogram, which is a column chart that shows the number of resources assigned to a project over time.



- **Responsibility Assignment Matrices**
  - responsibility assignment matrix (RAM) maps the work of the project, as described in the WBS, to the people responsible for performing the work, as described in the Organisational Breakdown Structure
  - The RAM allocates work to responsible and performing organizations, teams, or individuals, depending on the desired level of detail.

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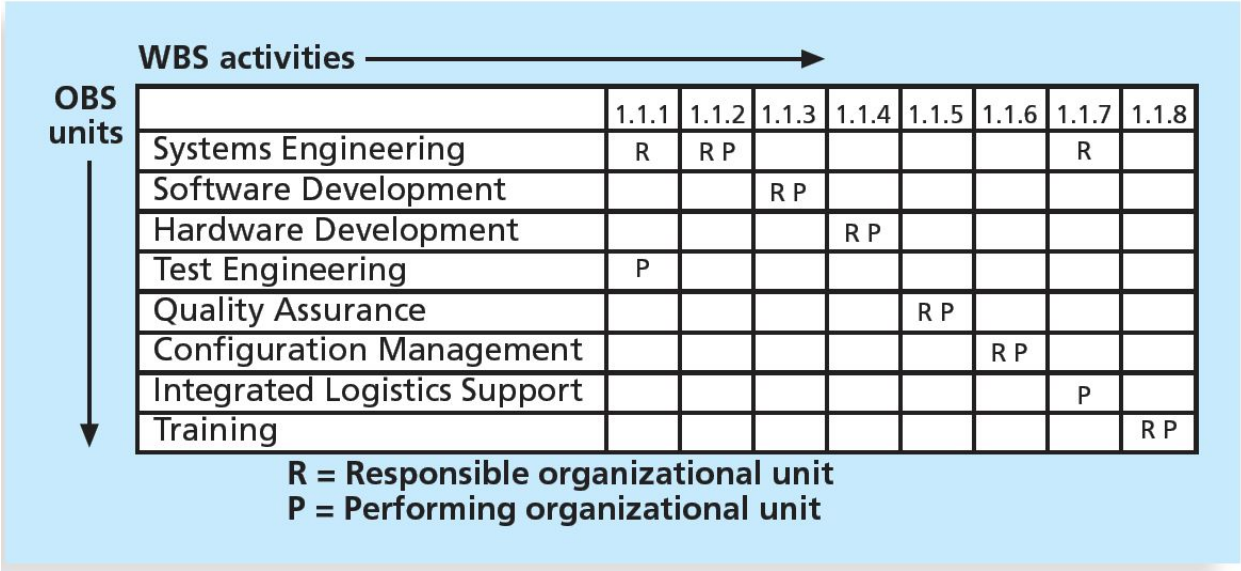

Understand important issues involved in project staff acquisition and explain the concepts of resource assignments, resource loading, and resource leveling

Acquisition

- **What is it:**
  - Acquiring qualified people for teams is crucial. It's important to assign the appropriate type and number of people to work on projects at the appropriate times.

Resource Assignments

- Staffing plans and good hiring procedures are important, as they are incentives for recruiting and retention

- The project manager's goal must be to achieve project success without increasing the costs or time required to complete the project. The key to accomplishing this goal is effectively managing human resources on the project.

Two techniques are available to project managers that help them use project staff most effectively:

Resource loading

- **What is it:**
  - Resource Loading refers to the amount of individual resources that an existing schedule requires during specific time periods.
- **What does it do:**
  - Resource loading helps project managers understand the demands of a project on the organization's resources and on individual people's schedules.

Resource leveling

- **What is it:**

- Resource leveling is a technique for resolving resource conflicts by delaying tasks. It is a form of network analysis in which resource management concerns drive scheduling decisions.
- **What does it do:**
  - The main purpose of resource leveling is to create a smoother distribution of resource usage.

Assist in team development with training, team-building activities, and reward systems

Main Goal Of Team Development:

- The main goal of team development is to help people work together more effectively to improve project performance. Training, team-building activities, and reward systems allow for improved project performance.

Training:

- **What is it:**
  - The action of teaching a person or animal a particular skill or type of behaviour.
- **What does it do:**
  - Training can help people understand themselves, each other, and how to work better in teams.

Team building / Rewarding Activities

- **What is it:**
  - The action or process of causing a group of people to work together effectively as a team
- **What does it do:**
  - Team-based reward and recognition systems can promote teamwork through focus on rewarding teams for achieving specific goals.
  - Allows time for team members to mentor and help each other to meet project goals and develop human resources
  - These can include (Examples):
    - Physical challenges
    - Psychological preference indicator tools

Explain and apply several tools and techniques to help manage a project team and summarize general advice on managing teams

Managing terms:

After assessing team performance and related information, the project manager must decide

- If changes should be requested to the project
- If corrective or preventive actions should be recommended
- If updates are needed to the project management plan or organizational process assets.

Several tools and techniques are available to assist in managing project teams:

Observation and conversation

- Project managers need to observe team members at work to assess how they are performing and ask team members how they feel about their work.

Project performance appraisals

- Just as managers provide performance appraisals for their workers, so can project managers.
- The need for project performance appraisals and the types required vary depending on the length of the project, its complexity, organizational policies, contract requirements, and related communications.

Interpersonal skills:

- To be effective, it is especially important to focus on leadership, influencing, and decision-making skills.

Conflict management:

- It's important for project managers to understand strategies for handling conflicts and to proactively manage conflict.

Describe how project management software can assist in project human resource management

- Software can help in producing RAMS and resource histograms

- Project management software e.g. **Microsoft Project** includes several features related to human resource management such as:
  - Assigning resources
  - Identifying potential resource shortages or underutilization
  - Leveling resources

Lecture 9 Summary

Understand the importance of good communications on projects and the need to develop soft skills, especially for IT project managers and their teams.

What:

- Being able to communicate with those who are proficient with computers and also those who are not.
- Research shows that IT professionals must be able to communicate effectively to succeed in their positions

Characteristics:

- In projects you'll often communicate with people who are highly regarded in their field though this does not mean they are proficient with technology and its jargon.
- Technical jargon can complicate matters and create confusion.
- This gap in knowledge and experience causes some of the communication problems between technical professionals and their business colleagues.
-

How/Why it Achieves:

- Organizations are looking for workers with the correct mix of technical, soft, and business skills.
  - This means being able to communicate well is a desired skill set.

Review key concepts related to communications.

Focusing on Group and Individual Communication Needs:

- You can't just add more people to lower the time it takes to complete a certain task.
- You cannot assume that a task scheduled to take two months of one person's time can be done in one month by two people.

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What is it:

- Groups and Individuals need to be communicated to differently.

Characteristics:

It is important to understand individual and group preferences for communication, these include:

- Some i**ndividuals may be an introvert**
  - Praise them in private.
- Some **individuals may be an extrovert**.
  - Praise them where everyone can hear/see.
- An **intuitive person** would want to understand how something fits into the big picture
- A **sensing person** would prefer to have more focused, step-by-step details.
- **Strong thinkers** would want to know the logic behind information
- **Judging people** are driven to meet deadlines while perceiving people need more help in developing and following plans.
- Receivers of information rarely interprets it exactly as the sender intended. Therefore, it is important to provide several methods of communication
- If geographic locations are different, problem can occur with communication.

How/Why it achieves:

- Having multiple channels of communication ensures the individuals/groups understand what you are saying.
- Understanding how individuals/groups like being praised keeps them comfortable in the workplace.
- Project managers and team members must be patient if someone doesn't understand something. Giving them an understanding increases project success.
- Pre determining any measurements (kg or lbs, km or miles) and a date and time format lets any individual or group in any geographic location know what is expected.

<u>Formal and Informal Methods for communicating:</u>

What:

- Face to Face Communication
- Reports
- Emails
- Meetings (stand up/short or long)
- Messaging
- Phone calls

Characteristics:

- Research says that in a face-to-face interaction:
  - 58 percent of communication is through body language.
  - 35 percent of communication is through how the words are said
  - 7 percent of communication is through the content or words that are spoken
  - Pay attention to more than just the actual words someone is saying
  - A person's tone of voice and body language say a lot about how he or she really feels

- Short, frequent meetings are often very effective in IT projects.
- Stand-up meetings force people to focus on what they really need to communicate

- Some companies have policies preventing the use of email between certain hours or even entire days of the week

How/Why it Achieves:

- Face to Face has studies with results above
- Stand up meetings force people to engage quickly what is important (as people are literally standing in a circle and no one wants to stand for a long time)
- Different roles may communicate differently i.e Project sponsor may want emails, John Doe from IT may enjoy face to face.

Distributing Important Information in an Effective and Timely Manner:

What:

- Important to include detailed technical information that affects critical performance features of products or services developed in a project.
- It is even more important to document any changes in technical specifications that might affect product performance

Characteristics:

- People have a tendency to avoid reporting bad news
- Because IT projects often require a lot of coordination, it is a good idea to have short, frequent meetings

How/Why it Achieves:

- Stand-up meetings have no chairs, which forces people to focus on what they need to communicate
- Relaying important information ASAP allows any issue to be corrected in a timely manner.
- Individuals and Groups need to be informed ASAP especially if it's a functionality change.

Setting the Stage for Communicating Bad News:

What:

- It is important to put information in context, especially if it’s bad news. If there is a problem, know how it will affect the whole project and the organization.

Characteristics:

- May seem like a major setback but you can recommend steps to take to mitigate a problem.

How/Why it Achieves:

- Project sponsors and other senior managers want to know that you have evaluated the impact of the situation, considered alternatives, and made a recommendation based on your expertise.
- Project managers should know how a major problem might affect the bottom line of the organization and be able to use their leadership skills to handle the challenge.

Determining the Number of Communication Channels:

What:

- Number of channels individuals/group use to communicate through the project.

Characteristics

- Number of communication channels = (N * (n-1)) / 2
- As the number of people increases above three, the number of communication channels increases rapidly.
- Project managers should try to limit the size of teams or subteams to avoid making communications too complex

- People often send e-mail messages that are quickly written and therefore not as carefully planned as they should be

How/Why it Achieves:

- Creating subteams/groups rather than every individual having a communication channel on large scale project makes communication much less complex.
- Email messages are better the smaller the group of recipients is.
- Communication is the oil that keeps everything working properly.

Explain the elements of planning project communications and how to create a communications management plan.

What:

- A document that guides project communications. This plan should be part of the overall project management plan.
- The communications management plan varies with the needs of the project, but some type of written plan should always be prepared.
- Small projects the communications management plan can be part of the team contract.
- Large projects it should be a separate document.

Characteristics:

The communications management plan should address the following items:

1. Stakeholder communications requirements
2. Information to be communicated, including format, content, and level of detail
3. Who will receive the information and who will produce it
4. Suggested methods or technologies for conveying the information
5. Frequency of communication
6. Escalation procedures for resolving issues
7. Revision procedures for updating the communications management plan
8. A glossary of common terminology

sample stakeholder communications analysis that shows which stakeholders should get particular written communications

Stakeholders	Document Name	Document Format	Contact Person	Due
Customer management	Monthly status report	Hard copy and meeting	Tina Erndt, Tom Silva	First of month
Customer business staff	Monthly status report	Hard copy	Julie Grant, Sergey Cristobal	First of month
Customer technical staff	Monthly status report	E-mail	Li Chau, Nancy Michaels	First of month
Internal management	Monthly status report	Hard copy and meeting	Bob Thomson	First of month
Internal business and technical staff	Monthly status report	Intranet	Angie Liu	First of month
Training subcontractor	Training plan	Hard copy	Jonathan Kraus	November 1
Software subcontractor	Software implementation plan	E-mail	Najwa Gates	June 1

- Contents of essential project communications comes from the work breakdown structure (WBS). In fact, many WBSs include a section for project communications to ensure that reporting key information is a project deliverable.

How/Why it Achieves:

- Defining channels of communication removes confusion.
- Communications analysis is an easy visual for everyone to know what each stakeholder expects and how often.
- If an organization works on many projects, developing some consistency in handling project communications helps the organization run smoothly.

Describe how to manage communications, including communication technologies, media, and performance reporting.

What:

- Managing communications is a large part of a project manager's job.
- Project managers and their teams must decide who receives particular information, but they must also determine the best way to create and distribute the information.
- **Technology** can facilitate the process of creating and distributing information, when used effectively.
- Using a **project management information system**, you can create and organize project documents, schedules, meeting minutes, and customer requests, and make them available in an electronic format.
- Three broad classifications for communication methods:
    - Interactive communication:
    - Push communication:
    - Pull communication:
- Reporting progress can be in **Progress Reports** or **Status Reports**.
- Forecasts predict future project statuses.

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Characteristics:

- Ways to distribute could be:
  - Written reports.
  - Visuals.
  - Videos
  - Meetings
- Most people and businesses rely on **technology including** email, instant messaging, websites, telephones, cell phones, texting, and other technologies to communicate.
- You can store this information locally or in the cloud. Storing templates and samples of project documents electronically can make accessing standard forms easier, thus making information distribution easier for your **Project Management Information System**
- Three broad classifications for communication methods:
  - Interactive communication:
    - As the name implies, two or more people interact to exchange information via meetings, phone calls, or video conferencing. This method is usually the most effective way to ensure common understanding.
  - Push communication:
    - Information is sent or pushed to recipients without their request via reports, e-mails, faxes, voice mails, and other means. This method ensures that the information is distributed, but does not ensure that it was received or understood.
  - Pull communication:
    - Information is sent to recipients at their request via websites, bulletin boards, e-learning, knowledge repositories like blogs and wikis, and other means.

- **Progress reports** describe what the project team has accomplished during a certain period. Many projects have each team member prepare a monthly report or sometimes a weekly progress report. Team leaders often create consolidated progress reports based on the information received from team members.
- **Status reports** describe where the project stands at a specific point in time. Status reports address where the project stands in terms of the triple constraint, meeting scope, time, and cost goals. How much money has been spent to date? How long did it take to do certain tasks? Is work being accomplished as planned? Status reports can take various formats depending on the stakeholders' needs.
- **Forecasts** predict future project status and progress based on past information and trends. How long will it take to finish the project based on how things are going?
- An important technique for performance reporting is the status review meeting.

How/Why It Achieves:

- Knowing which interactive communication method to use for each stakeholder at any time communication is necessary also means you need to know which media to use. The right combination will purvey exactly what is needed to said stakeholder.
  - A worker two offices down may prefer face to face rather than wait on email.
  - Projects can be global, often video conferences will be used rather than engaging in physical meetings.
- An important technique for performance reporting is the status review meeting.
  - Status review meetings are a good way to highlight information provided in important project documents, empower people to be accountable for their work, and have face-to-face discussions about important project issues.

- Many program and project managers hold periodic status review meetings to exchange important project information and motivate people to make progress on their parts of the project.
- Creating and using a media choice table can help decide which medium to use in different scenarios.

Media Choice Table Example

Key: 1 = Excellent, 2 = Adequate, 3 = Inappropriate						
How Well Medium Is Suited to:	Hard Copy	Phone Call	Voice Mail	E-mail	Meeting	Website
Assessing commitment	3	2	3	3	1	3
Building consensus	3	2	3	3	1	3
Mediating a conflict	3	2	3	3	1	3
Resolving a misunderstanding	3	1	3	3	2	3
Addressing negative behavior	3	2	3	2	1	3
Expressing support or appreciation	1	2	2	1	2	3
Encouraging creative thinking	2	3	3	1	3	3
Making an ironic statement	3	2	2	3	1	3
Conveying a reference document	1	3	3	3	3	2
Reinforcing one's authority	1	2	3	3	1	1
Providing a permanent record	1	3	3	1	3	3
Maintaining confidentiality	2	1	2	3	1	3
Conveying simple information	3	1	1	1	2	3
Asking an informational question	3	1	1	1	3	3
Making a simple request	3	1	1	1	3	3
Giving complex instructions	3	3	2	2	1	2
Addressing many people	2	3 or 1*	2	2	3	1

Discuss methods for controlling communications to ensure that information needs are met throughout the life of the project.

What:

- The main goal of controlling communications is to ensure the optimal flow of information throughout the entire project life cycle

Characteristics:

- The main inputs are the project management plan, project communications, issue logs (See Chapter 13), work performance data, and organizational process assets
- The main outputs of controlling communications are work performance information, change requests, project documents updates, and organizational process assets updates.
-

How/Why it Achieves:

- It is often beneficial to have a facilitator from outside the project team assess how well communications are working.
    - A facilitator can also help the team solve any communication problems.

<u>Suggestions for Improving Project Communications:</u>

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What:

- Developing better communication skills
- Running Effective Meetings
- Using E-Mail, Instant Messaging, Texting, Kanban Boards, and Collaborative Tools Effectively
- Using Templates for Project Communications

Characteristics:

- **Developing better communication skills** is often overlooked by companies. Companies spend much more on technical skills.
- As companies go global, they realise they need to **develop better communication skills**
    - In 2015 Apple released their new OS with hundreds of diverse emoji's.
- Many courses are available to educate people in cultural awareness to **develop better communication skills.**
- Great leadership is necessary to **develop better communication skills**. Management must set high expectations of employees presentation and behaviour when communicating.
- **Running effective meetings** be a vehicle for fostering team building and reinforcing expectations, roles, relationships, and commitment to the project.
- **E-Mail, Instant Messaging, Texting, Kanban Boards, and Collaborative Tools** receive new features generally with major updates. Often users are not trained in these new features
- **Templates** for common project communications such as project descriptions, project charters, monthly performance reports, and issue logs make it easier to communicate among the project

How/Why it Achieves:

- **Developing better communication skills**:
    - Allows individuals/groups to communicate with a wider audience effectively.
    - In turn can be an investment for the company as wider target markets can appear if communication levels are higher.
    - Can increase levels of existing relationships.
- **Running effective meetings:**
    - Can be improved in the following way:
        - Determine if a meeting can be avoided.
            - Do not have a meeting if there is a better way to achieve the objective at hand.
        - Define the purpose and intended outcome of the meeting.
            - Be specific about what should happen as a result of the meeting. Make the purpose of a meeting very clear to all meeting planners and participants
        - Determine who should attend the meeting
            - Do certain stakeholders have to be at a meeting to make it effective?
        - Provide an agenda to participants before the meeting
            - Meetings are most effective when the participants come prepared.
        - Prepare handouts and visual aids and make logistical arrangements ahead of time.
            - By creating handouts and visual aids, you must organize thoughts and ideas. This usually helps the entire meeting run more effectively.

        - It is also important to make logistical arrangements by booking an appropriate room, having necessary equipment available, and providing refreshments or entire meals, if appropriate.
    - Run the meeting professionally
        - Introduce people, restate the purpose of the meeting, and state any ground rules that attendees should follow
        - Have someone facilitate the meeting to make sure that important items are discussed, watch the time, encourage participation, summarize key issues, and clarify decisions and action items.
    - Set the ground rules for the meeting
        - State up front how the meeting will be run
    - Build relationships
        - Depending on the culture of the organization and project, it may help to build relationships by making meetings fun experiences.
        - For example, it may be appropriate to use humor, refreshments, or prizes for good ideas to keep meeting participants actively involved.
- **E-Mail, Instant Messaging, Texting, Kanban Boards, and Collaborative Tools**
    - Kanban boards visually show tasks that need to be done, is in progress or is complete. This is a nice visual aid.
    - New updates bring new features. Training individuals in the new features allows them to stay modern.
    - Emails should:
        - Use a meaningful subject line
        - Limit the content to one main subject if possible
        - Body of email should be concise
        - Try limit number and size of attachments
        - Respond quickly to emails
- **Templates**
    - Provides everyone in the project with a basis for what is expected.

<u>Using Software to Assist in Project Communications:</u>

What:

- Software that help manage project management.
- Many people often work from home or telecommute.

Characteristics:

- Can display various views of information to help meet various communication needs.
    - E.g Senior management will be interested in things a programmer is not.
- Some project management software allows teams of people at different locations to work on the same project (think google docs).
- Set alerts to alert members of any changes.
- Microsoft Office Enterprise Project Management Solution and similar products also provide the following tools to enhance communications:
    - **Portfolio management:** By providing a centralized and consolidated view of programs and projects, the user can evaluate and prioritize activities across the organization. This

feature makes it possible to maximize productivity, minimize costs, and keep activities aligned with strategic objectives.
    - **Resource management**: Maximizing human resources is often the key to minimizing project costs. This feature enables the user to maximize resource use across the organization to help plan and manage the workforce effectively.
    - **Project collaboration:** Sharing project information is often a haphazard endeavor. Project collaboration enables an organization to share knowledge immediately and consistently to improve communications and decision making, eliminate redundancies, and take advantage of best practices for project management.

How/Why it Achieves:

- Being able to represent the same data in different forms allows more people to understand the data.
- Alerting members of drastical changes reduces errors and confusions
- Being able to globally collaborate on a project allows easy knowledge sharing

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Owen Harris, Daniel Hines, Jake Mellon, Olivia Followes

Lecture 10 Summary

Understand risk and the importance of good project risk management

What is it:

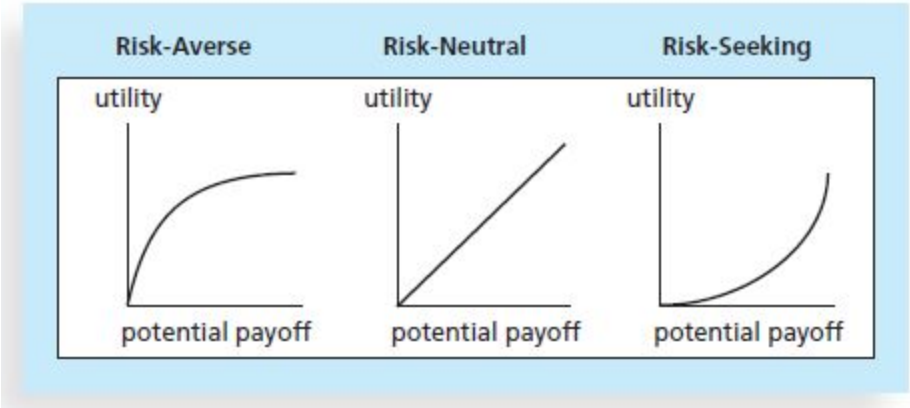
- Identifying, analysing and responding to risks throughout the span of the project in the best interests of meeting project objectives.
- Managing the negative risks is an investment varying in cost depending on the experience, the nature of the project and the constraints imposed on both.
- The goal of risk management is to minimize potential negative risks while maximizing positive risks.
- Known risks are those that have been identified and analyzed.
- Unknown risks are unidentified and cannot be managed.

What are the characteristics:

- Helps to improve project success by guiding selection of good projects, determining the project scope and developing realistic schedules and cost estimates.
- When implemented effectively, risk management results in fewer problems.

Why / How does it do it:

- Gives stakeholders an understanding of the nature of the project, involves team members in defining strengths and weaknesses, and helps to integrate the other project management knowledge areas.
- Allows project managers to weigh up the risk level and the rewards that could be gained from them and the risk utility (amount of satisfaction from a risk paying off).



Other:

- Many organisations are aware they poorly manage risks.
- With high levels of volatility, risk management is more important than ever.

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Discuss the elements of planning risk management and the contents of a risk management plan

The six major processes of risk management:

1. **Planning Risk Management** - deciding how to approach and plan risk management activities for the project. Review of the project management plan, project charter, stakeholder register, enterprise environmental factors, and organizational process assets, project teams can discuss and analyse risk management activities.Output of analysis is a risk management plan.

Topic	Questions to Answer
Methodology	How will risk management be performed on this project? What tools and data sources are available and applicable?
Roles and responsibilities	Which people are responsible for implementing specific tasks and providing deliverables related to risk management?
Budget and schedule	What are the estimated costs and schedules for performing risk-related activities?
Risk categories	What are the main categories of risks that should be addressed on this project? Is there a risk breakdown structure for the project? (See the information on risk breakdown structures later in this chapter.)
Risk probability and impact	How will the probabilities and impacts of risk items be assessed? What scoring and interpretation methods will be used for the qualitative and quantitative analysis of risks? How will the probability and impact matrix be developed?
Revised stakeholders' tolerances	Have stakeholders' tolerances for risk changed? How will those changes affect the project?
Tracking	How will the team track risk management activities? How will lessons learned be documented and shared? How will risk management processes be audited?
Risk documentation	What reporting formats and processes will be used for risk management activities?

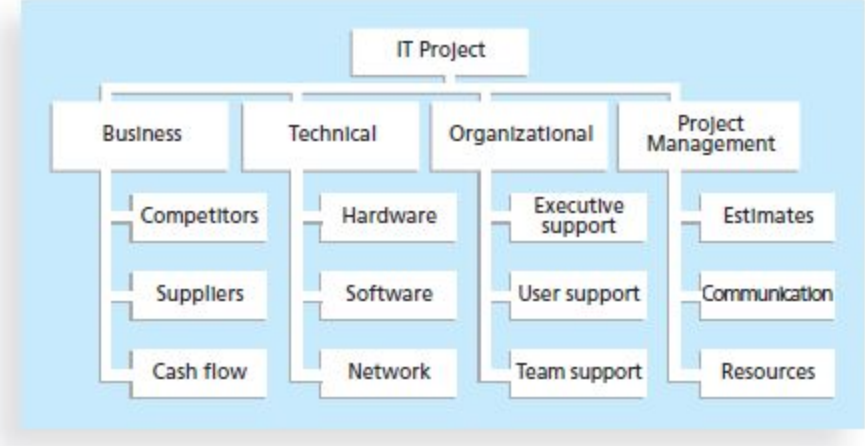
Contingency Plans: predefined actions that the project team will take if an identified risk occurs.

Fallback Plans: developed for risks that have a high impact on meeting project objectives are put into effect if attempts to reduce the risk do not work.

Contingency reserves or Contingency allowances: provisions held by the project sponsor or organization to reduce the risk of cost or schedule over-runs to an acceptable level.

Contingency reserves are for known risks. **Management reserves** are funds held for unknown risks.

Risk Breakdown Structure: tool to help project managers consider potential risks in different categories. Hierarchy of potential risk categories for a project.



(sample risk breakdown structure)

Knowledge Area	Risk Conditions
Integration	Inadequate planning; poor resource allocation; poor integration management; lack of post-project review
Scope	Poor definition of scope or work packages; incomplete definition
Time	Errors in estimating time or resource availability; errors in determining the critical path; poor allocation and management of float; early release of competitive products
Cost	Estimating errors; inadequate productivity, cost, change, or contingency
Quality	Poor attitude toward quality; substandard design, materials, and workmanship; inadequate quality assurance program
Human resource	Poor conflict management; poor project organization and definition of responsibilities; absence of leadership
Communications	Carelessness in planning or communicating
Risk	Ignoring risk; unclear analysis of risk; poor insurance management
Procurement	Unenforceable conditions or contract clauses; adversarial relations
Stakeholders	Lack of consultation with key stakeholder

(potential risks in each knowledge area)

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List common sources of risks on information technology(IT) projects

Market Risk:

- Will the new product or service be useful to the organisation or marketable to others and will the user accept and use the product or service?
- Will someone else create a better product or service faster?

Financial Risk:

- Can the organization afford to undertake the project?
- How confident are stakeholders in the financial projections?
- Will the project meet payback estimates?
- If not can the organization afford to continue the project?
- Is this the best way to use the organization's financial resources?

Technology Risk:

- Is the project technically feasible?
- Will it use leading-edge or bleeding-edge technology?
- Will hardware, software and networks function properly?
- Will the technology be available in time to meet the project objectives?
- Could the technology be obsolete before the product is finished?

People Risk:

- Does the organization have people with appropriate skills to complete the project successfully?
- Can the organization find people with required skills?
- Do people have proper managerial and technical skills?
- Do they have enough experience?
- Does senior management support the job?
- Is the organization familiar with the sponsor or customers and how good is the relationship?

Structure/Process Risk:

- What degree of change will the new project introduce to user areas and business procedures?
- How many distinct user groups does the project need to satisfy?
- With how many systems does the new project or system need to interact?
- Does the organization have processes in place to complete the project successfully?

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Describe the process of identifying risks and create a risk register

Identifying Risks - determining which risks are likely to affect a project and documenting each. This produces a risk register.

- Identify risks early based on changing project environment.
- Review project planning documents.
- Rate the likelihood of the risk occurring.

Tools for risk assessment:

- SWOT Analysis gets teams to focus on the broad perspectives of potential risks for particular projects.
- Checklists based on risks encountered in previous projects.
- Cause and effect diagrams, fishbone diagrams, flowcharts, and influence diagrams.

Techniques for risk assessment:

- **Brainstorming:** Group generates ideas or find a solution for a specific problem. Creates a comprehensive list of risks to address during qualitative and quantitative risk analysis.

The Delphi technique: an information gathering approach that prevents some negative effects found in brainstorming. Consensus is derived from a group of experts who make predictions about future events.),

Interviewing: fact-finding technique collects information through various platforms of communication.

Root cause analysis: identifying even more potential risks for a project.

Risk Register: document that contains results of various risk management processes, often displayed in a spreadsheet or table format.

Creating a Risk Register (Part of 'Identifying Risks'):

- **Identification number for each risk:** for sorting and searching specific risks.
- **Rank for each risk:** usually a number with 1 ranking the highest.
- **Name of each risk event:** title. Often abbreviated.
- **A description of the risk:** more detail on the risk.
- **Category of the risk:** e.g. software, hardware.
- **Root cause of the risk:**
- **Triggers for each:** Indicators or symptoms of risk events.
- **Potential responses:**
- **Risk owner/liability:** who takes responsibility for the risk.
- **Probability of occurrence:** e.g. high, medium, low
- **Impact the the project if it occurs:** e.g. high, medium, low.
- **Status of the risk:** did the risk event occur and what response strategy was implemented? Is the risk still relevant?

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Discuss qualitative risk analysis and explain how to calculate risk factors, create probability / impact matrixes, and apply the Top Ten Risk Item Tracking technique to rank risks.

Qualitative Risk Analysis:

- Prioritising risks based on their probability and impact of occurrence. Risks are ranked and risk register is updated. This could result in project documents require updating.
- Assessing the likelihood and impact of identified risks to determine their magnitude and priority. The main output: Ranking column of risk register, probability rating and impact.

Calculate Risk Factors:

Numbering system represent the overall risk of specific events, based on their probability of occurring and the consequences to the project if they do occur.

Probability/Impact Matrixes:

- Calculate risks on a bases of 'Low, Medium or High' probability based on several factors, as determined by the unique nature of each project.
- Separate chart for positive and negative risks.

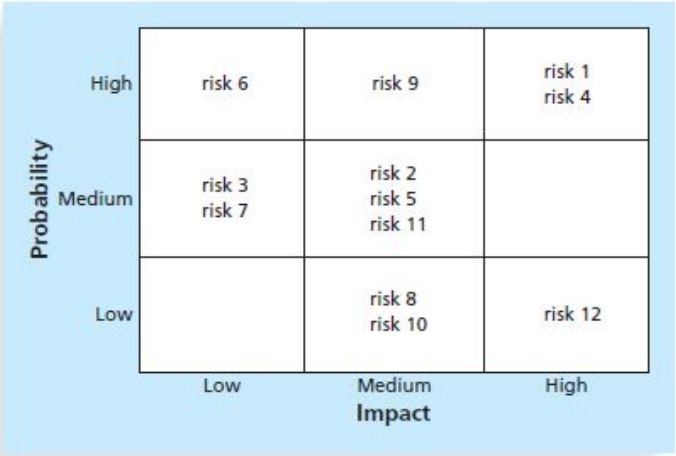

FIGURE 11-5 Sample probability/impact matrix

Top Ten Risk Item Tracking:

- Qualitative analysis tool.
  - Used to identify risks and maintain awareness of risks throughout the lifecycle of a project by monitoring them.
- Involves a periodic review of the most significant risks.
- Review provides a summary of the top ten sources of risks to the project.
- Risk management review keeps all parties aware of major influences that could alter the project's success. It also allows alternate strategies for risk management to be considered.

Watch List:

- Risks that are low priority or require more attention but should be identified as potential.

TABLE 11-6 Example of Top Ten Risk Item Tracking

	MONTHLY RANKING			
Risk Event	Rank This Month	Rank Last Month	Number of Months in Top Ten	Risk Resolution Progress
Inadequate planning	1	2	4	Working on revising the entire project management plan
Poor definition	2	3	3	Holding meetings with project customer and sponsor to clarify scope
Absence of leadership	3	1	2	After previous project manager quit, assigned a new one to lead the project
Poor cost estimates	4	4	3	Revising cost estimates
Poor time estimates	5	5	3	Revising schedule estimates

Quantitative Risk Analysis:

- Numerically estimating the impacts of risks on project objectives. Results in documentation updates.
- Usually done after qualitative risk analysis but can be done alongside it or not at all.
- Affected by budget and time constraints of the project.
- Techniques include data gathering, analysis and modeling techniques and expert judgement.

Decision Trees:

- Diagramming analysis technique.
- Used to select best course of action when future outcomes are uncertain.
- E.g calculating expected monetary value

Expected Monetary Value (EMV):

- Product of a risk event probability and risk's monetary value.

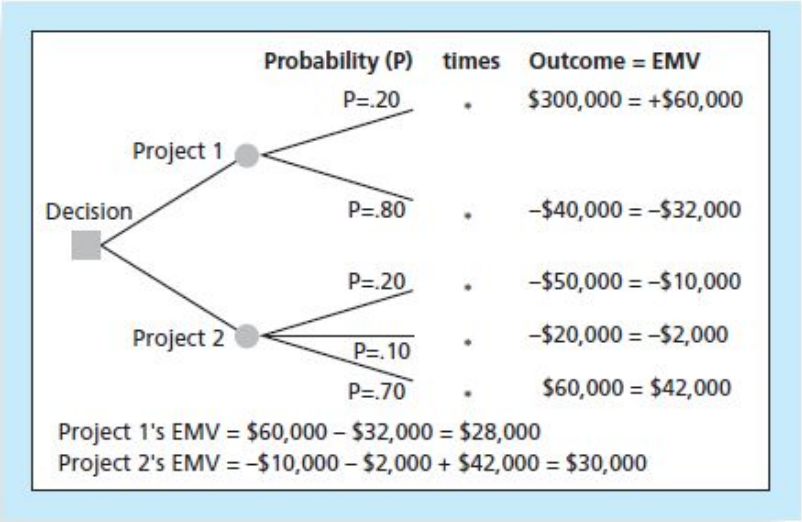

FIGURE 11-7 Expected monetary value (EMV) example

Creating a Decision Tree:

1. Estimate the probability of an event occurring.
2. To calculate the EMV for each project, multiply the probability by the outcome value.
3. Add the outcome values to get the project value.

Simulation (Monte Carlo Analysis):

- More sophisticated technique for quantitative risk analysis.
- Model or representation of the system to analyse its expected behaviour or performance.
- Usually based on **Monte Carlo Analysis** (simulates model's outcome many times to provide a stat distribution of calculated results), used to predict a project finish date or the maximum cost.

Steps (p. 463):

1. Assess the range for variables being considered.
2. Determine the probability distribution of each variable. What is the likelihood of each variable falling between the optimistic and most likely estimates?
3. For each variable, such as the time estimate for a task, select a random value based on the probability distribution for the occurrence of the variable.
4. Run a deterministic analysis or one pass through the model using the combination of values selected for each of the variables.
5. Repeat steps 3 and 4 many times to obtain the probability distribution of the model's results.

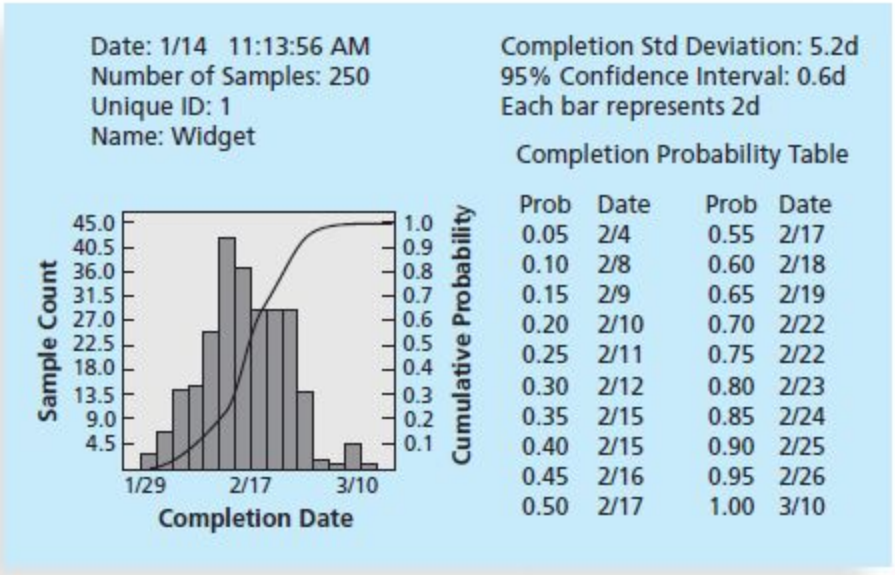

FIGURE 11-8 Sample Monte Carlo-based simulation results for project schedule

Sensitivity Analysis:

- Used to see the effects of changing one or more variables of an outcome.
- Used to help make common business decisions such as determining break-even points based on different assumptions.

Planning Risk Responses:

- Enhance opportunities and reduce threats to meeting project objectives. Develop risk response strategies.
- Developing options and defining strategies for reducing negative risks and enhancing positive risks.
- Outputs are risk-related contractual agreements, updates to the project management plan and other project documents.

The Four Basic Risk Response Strategies for Negative Risks:

- **Risk Avoidance** - Not applicable to all risks
  - Eliminating specific threats by removing the cause.
- **Risk Acceptance**
  - Accepting the consequences if a risk occurs.
- **Risk Transference**
  - Shifting the consequence of a risk and responsibility for its management to a third party.
- **Risk Mitigation**
  - Reducing the impact of a risk event by reducing the probability of its occurrence.

The Four Basic Response Strategies for Positive Risks:

- **Risk Exploitation**

  - Doing everything possible to make sure the positive risk eventuated
- **Risk Sharing**
  - Allocating ownership of the risk to another party.
- **Risk Enhancement**
  - Identifying and maximising key drivers for the positive risk.
- **Risk Acceptance**
  - Applies to positive risks when the project management team does not take any action towards a risk.

TABLE 11-7 General risk mitigation strategies for technical, cost, and schedule risks

Technical Risks	Cost Risks	Schedule Risks
Emphasize team support and avoid stand-alone project structure	Increase the frequency of project monitoring	Increase the frequency of project monitoring
Increase project manager authority	Use WBS and CPM	Use WBS and CPM
Improve problem handling and communication	Improve communication, understanding of project goals, and team support	Select the most experienced project manager
Increase the frequency of project monitoring	Increase project manager authority	
Use WBS and CPM		

Source: J. Couillard

Controlling Risks:

- Monitoring identified and potential risks.
- Identifying new risks.
- Carrying out risk response plans.
- Evaluating the effectiveness of risk strategies.
- Outputs are work performance information, change requests and updates to project management plan other documents and organizational process assets.
- Risk awareness is an ongoing activity conducted by the entire team.
- Risks can reduce or expand it magnitude and probability.
- Repeat the entire risk assessment process for each risk identified throughout the project.

Individual Risk Management Plans

- Monitoring risks based on defined milestones and making decisions regarding risks and their response strategies.
- Can become ineffective and require change.

Workarounds

- Unplanned responses to risk events when there are no contingency plans in place.

Tools and Techniques

- Risk assessment.
- Risk audits
- Variance and trend analysis
- Technical performance measurements
- Reserve analysis
- Status meetings or periodic risk reviews (e,g. Top 10 risk item tracking).

Outputs

- Work performance information
- Change requests
- Updates to the project management plan and other project documents and organizational process assets.

Assistive Software

- **Microsoft Word**
  - Risk Register
- **Microsoft Excel**
  - Risk Register
  - Tracking risks
  - Quantifying risks.
  - Sensitivity analysis
- **Monte Carlo Simulation Software**
  - Developing models
  - Simulations to analyse and respond to various risks.

Software should be used to assist in managing risks not relied heavily on when performing risk management. Risk management becomes easier and more effective with practice.

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Lecture 11 Summary

Understand the importance of project procurement management and the increasing use of outsourcing for information technology (IT) projects

Procurement is outsourcing. The Project Management Institute defines an outside source as a source outside the project team, so the same organization can be a supplier to the project team, or the project team can be a supplier to another group in the organization.
A shortage of qualified personnel, not cost savings, is the top reason for global outsourcing of IT services. Organizations are turning to outsourcing to accomplish the following:

- **Access skills and technologies.** Organizations can gain access to specific skills and technologies when they are required by using outside resources. As mentioned earlier, a shortage of qualified personnel is the main reason that companies outsource IT services. A project may require experts in a particular field for several months, or it might require specific technologies from an outside source. Planning for this procurement ensures that the needed skills and technologies will be available for the project.
- **Reduce both fixed and recurrent costs**. Outsourcing suppliers often can use economies of scale that may not be available to the client alone, especially for hardware and software. It can also be less expensive to outsource some labor costs to other organizations in the same country or offshore. Companies can use outsourcing to reduce labor costs on projects by avoiding the costs of hiring, firing, and reassigning people to projects or paying their salaries when they are between projects.
- **Allow the client organization to focus on its core business.** Most organizations are not in business to provide IT services, yet many have spent valuable time and resources on IT functions when they should have focused on core competencies such as marketing, customer service, and new product design. By outsourcing many IT functions, employees can focus on jobs that are critical to the success of the organization.
- **Provide flexibility.** Outsourcing to provide extra staff during periods of peak workloads can be much more economical than trying to staff entire projects with internal resources. Many companies cite better flexibility in staffing as a key reason for outsourcing. As you learned in Chapter 2(LMAO GOOD JOKE), Apple says it could not produce several of its products fast enough without outsourcing.
- **Increase accountability.** A well-written contract—a mutually binding agreement that obligates the seller to provide specified products or services and obligates the buyer to pay for them—can clarify responsibilities and sharpen focus on key deliverables of a project. Because contracts are legally binding, there is more accountability for delivering the work as stated in the contract.

Organizations must also consider reasons they might not want to outsource. When an organization outsources work:

- It often does not have as much control over the aspects of projects that suppliers carry out.
- In addition, an organization could become too dependent on particular suppliers. If those suppliers went out of business or lost key personnel, it could cause great damage to a project.
- Organizations must also be careful to protect strategic information that could become vulnerable in the hands of suppliers. According to Scott McNealy, co-founder and former CEO of Sun Microsystems, Inc., “What you want to handle in-house is the stuff that gives you an edge over your competition—your core competencies. I call it your ‘secret sauce.’

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Project procurement management includes the processes required to acquire goods and services for a project from outside the performing organization. Organizations can be either the buyer or seller of products or services under a contract or other agreement.

There are **four** main **processes** in **project procurement managemen**t:

1. **Planning procurement management** involves determining what to procure and when and how to do it. In procurement planning, one must decide what to outsource, determine the type of contract, and describe the work for potential sellers. Sellers are providers, contractors, or suppliers who provide goods and services to other organizations. Outputs of this process include a procurement management plan, procurement statements of work, procurement documents, source selection criteria, make-or-buy decisions, change requests, and project documents updates.
2. **Conducting procurements** involves obtaining seller responses, selecting sellers, and awarding contracts. Outputs include selected sellers, agreements, resource calendars, change requests, and updates to the project management plan and other project documents.
3. **Controlling procurements** involves managing relationships with sellers, monitoring contract performance, and making changes as needed. The main outputs of this process include work performance information, change requests, and updates to the project management plan, project documents, and organizational process assets.
4. **Closing procurements** involves completion and settlement of each contract or agreement, including resolution of any open items. Outputs include closed procurements and organizational process assets updates.

Describe the work involved in planning procurements for projects, including determining the proper type of contract to use and preparing a procurement management plan, statement of work, source selection criteria, and make-or-buy analysis

- Planning procurements involves identifying which project needs can best be met by using products or services outside the organization.
- It involves deciding whether to procure, how to procure, what to procure, how much to procure, and when to procure.

An important output of this process is the make-or-buy decision, in which an organization decides whether it should make certain products and perform certain services inside the organization, or if it is better to buy those products and services from an outside organization.

Inputs needed for planning procurements include:

- The project management plan,
- Requirements documentation,
- The risk register,
- Activity resource requirements,
- The project schedule,
- Activity cost estimates,
- The stakeholder register,
- Enterprise environmental factors,
- Organizational process assets, such as types of contracts.

Type of Contracts

- **Fixed-price or lump-sum contracts:** involve a fixed total price for a well-defined product or service. The buyer incurs little risk in this situation because the price is predetermined. The

sellers often pad their estimate to reduce their risk, although they realize their price must still be competitive.

- **Time and material (T&M) contracts:**
    - Are a **hybrid of fixed-price and cost-reimbursable** contracts. For example, an independent computer consultant might have a contract with a company based on a fee of $80 per hour for services, plus a fixed price of $10,000 for providing specific project materials. The materials fee might also be based on approved receipts for purchasing items, with a ceiling of $10,000.
    - The consultant would send an invoice to the company each week or month; the invoice would list the materials fee, the number of hours worked, and a description of the work produced. This type of contract is often used for required services when the work cannot be specified clearly and total costs cannot be estimated in a contract. Many contract programmers and consultants prefer time and material contracts.
- **Cost-reimbursable contracts:**
    - Involve payment to the supplier for **direct** and **indirect** actual costs.
    - Recall from Chapter 7 that **direct costs** can be directly related to producing a project's products and services. Normally, these costs can be traced back to a project in a cost-effective way.
    - **Indirect costs** are not directly related to the products or services of the project, but they are indirectly related to performing the project. Normally, these costs cannot be traced back to the project in a cost-effective way.
    - For example, **direct costs include the salaries** for people working directly on a project and hardware or software purchased for a specific project. I**ndirect costs include the cost of providing a work space with electricity** and an employee cafeteria. Indirect costs are often calculated as a percentage of direct costs.
    - Cost-reimbursable contracts often include fees, such as a profit percentage or incentives for meeting or exceeding selected project objectives.

The **buyer absorbs** more of the risk with **cost-reimbursable contracts** than with fixed-price contracts. **Three types of cost-reimbursable contracts, in order of lowest to highest risk to the buyer, include cost plus incentive fee, cost plus fixed fee, and cost plus percentage of costs.**

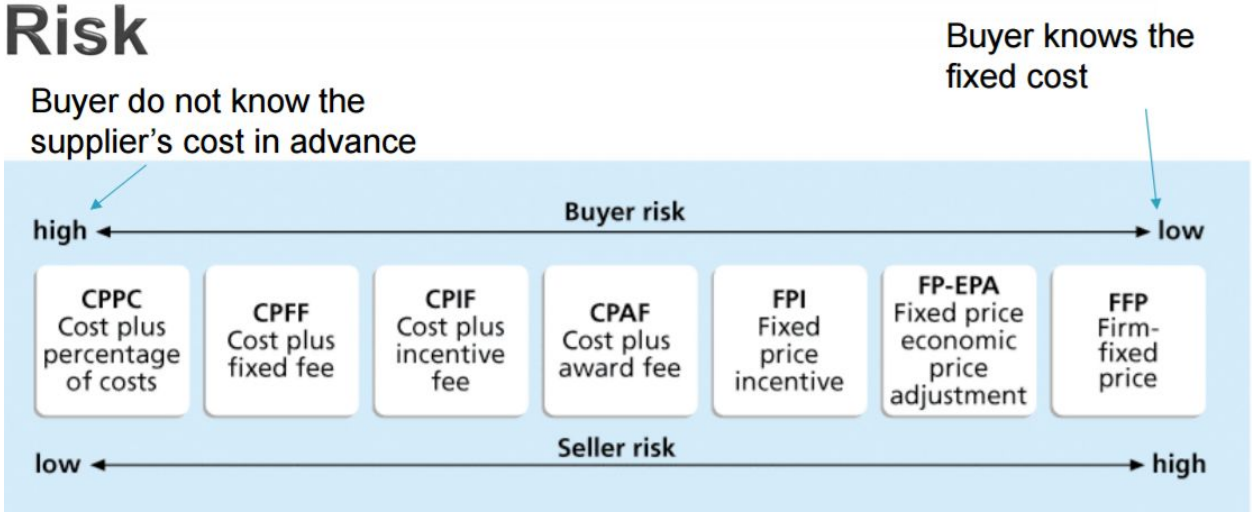
- With a **cost plus incentive fee (CPIF)** contract, the buyer pays the supplier for allowable costs (as defined in the contract) along with a predetermined fee and an incentive bonus. Also, incentives are often provided to suppliers for reducing contract costs. If the final cost is less than the expected cost, both the buyer and the supplier benefit from the cost savings, according to a negotiated share formula. For example, suppose that the expected cost of a project is $100,000, the fee to the supplier is $10,000, and the share formula is 85/15, meaning that the buyer absorbs 85 percent of the uncertainty and the supplier absorbs 15 percent. If the final cost is $80,000, the cost savings are $20,000. The supplier would be paid the final cost and the fee plus an incentive of $3,000 (15 percent of $20,000), for a total reimbursement of $93,000.
- With a **cost plus fixed fee (CPFF)** contract, the buyer pays the supplier for allowable costs (as defined in the contract) plus a fixed fee payment that is usually based on a percentage of estimated costs. This fee does not vary, however, unless the scope of the contract changes. For example, suppose that the expected cost of a project is $100,000 and the fixed fee is $10,000. If the actual cost of the contract rises to $120,000 and the

scope of the contract remains the same, the contractor will still receive the fee of $10,000.

- With a **cost plus award fee (CPAF)** contract, the buyer pays the supplier for allowable costs (as defined in the contract) plus an award fee based on the satisfaction of subjective performance criteria. A tip or gratuity that you would give a server in a restaurant would qualify as a simple example, as long as there is no set gratuity percentage. You still pay for the cost of your meal, but you can decide on the tip amount based on your satisfaction with the food, drinks, and service provided. This type of contract is not usually subject to appeals.
- With a **cost plus percentage of costs (CPPC)** contract, the buyer pays the supplier for allowable costs (as defined in the contract) along with a predetermined percentage based on total costs. From the buyer's perspective, this is the least desirable type of contract because the supplier has no incentive to decrease costs. In fact, the supplier may be motivated to increase costs, because doing so will automatically increase profits based on the percentage of costs. This type of contract is prohibited for U.S. government use, but it is sometimes used in private industry, particularly in the construction industry. All of the risk is borne by the buyer.

Unit pricing can also be used in various types of contracts to require the buyer to pay the supplier a predetermined amount per unit of product or service. The total value of the contract is a function of the quantities needed to complete the work. Consider an IT department that might have a unit price contract for purchasing computer hardware. If the company purchases only one unit, the cost might be $1,000. If the company purchases 10 units, the cost might be $10,000. This type of pricing often involves volume discounts e.g Buy 50 units get $100 off each unit.

Diagram below shows risk scaling of each contract for buyer and seller.



Contracts should include specific clauses to take into account issues unique to the project. A **termination clause** is a contract clause that allows the buyer or supplier to end the contract.

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Owen Harris, Daniel Hines, Jake Mellon, Olivia Followes

Discuss how to conduct procurements and strategies for obtaining seller responses, selecting sellers, and awarding contracts

Several **tools and techniques** are **available** to help project managers and their teams in **planning procurement management**, including **make-or-buy analysis, expert judgment, and market research.**

Make-or-buy analysis:

- Make-or-buy analysis is a general management technique used to determine whether an organization should make a product or perform a service inside the organization or buy it from someone else.
- This form of analysis involves estimating the internal costs of providing a product or service and comparing the estimate to the cost of outsourcing.
- Consider a company that has 1,000 international salespeople with laptops. Using make-or-buy analysis, the company could compare the cost of providing those services using internal resources to the cost of buying the same services from an outside source. If supplier quotes were less than the company's internal estimates, the company would have to consider outsourcing the training and user support services.
- Another common make-or-buy decision, though more complex, is whether a company should develop an application itself or purchase software from an outside source and customize it to the company's needs.
- Many organizations also use make-or-buy analysis to decide whether to purchase or lease items for a project.
- In general, leasing is often cheaper for meeting short-term needs, but more expensive for long-term needs.

Expert Judgement:

- **Experts both** from **inside and outside** an organization can provide excellent advice in planning purchases and acquisitions. Project teams often need to consult experts within their organization as part of good business practice.
- Internal experts might suggest that the company in the preceding example could not provide training and support for the 1,000 laptop users because the service involves so many people with different skill levels in so many different locations. Experts in the company might also know that most of their competitors outsource this type of work and know who the qualified outside suppliers are.
- It is also important to consult legal experts because contracts for outsourced work are legal agreements.
- Experts outside the company, including potential suppliers themselves, can also provide expert judgment. For example, suppliers might suggest an option for salespeople to purchase the laptops themselves at a reduced cost.
- This option would solve problems that would otherwise be created during employee turnover—exiting employees would own their laptops and new employees would purchase a laptop through the program. An internal expert might then suggest that employees receive a technology bonus to help offset what they might view as an added expense.
- Expert judgment, both internal and external, is an asset in making many procurement decisions.

Market Research:

- Market research is very important in planning procurements.

- Many potential suppliers are often available for goods and services, so the project team must choose suppliers carefully.
- Some organizations have a preferred vendor list and detailed information about them.
- A wealth of information is also available online, and numerous conferences are held where attendees can see and discuss new products.

In addition to make-or-buy decisions, change requests, and project documents updates, **important outputs of planning procurements are** a **procurement management plan, statement of work, procurement documents such as requests for proposals or quotes, and source selection criteria.**

Procure Management Plan
Every project management knowledge area includes some planning. The **procurement management plan** is a **document** that **describes how** the **procurement processes** will be **managed**, from **developing documentation** for making **outside purchases or acquisitions to contract closure**. Like other project plans, contents of the procurement management plan will vary with project needs. The following materials can be included in a procurement management plan:

- Guidelines for types of contracts to be used in different situations
- Standard procurement documents or templates to be used, if applicable
- Guidelines for creating contract work breakdown structures, statements of work, and other procurement documents
- Roles and responsibilities of the project team and related departments, such as the purchasing or legal department
- Guidelines for using independent estimates to evaluate sellers
- Suggestions for managing multiple providers
- Processes for coordinating procurement decisions with other project areas, such as scheduling and performance reporting
- Constraints and assumptions related to purchases and acquisitions
- Lead times for purchases and acquisitions
- Risk mitigation strategies for purchases and acquisitions, such as insurance contracts and bonds
- Guidelines for identifying pre-qualified sellers and organizational lists of preferred sellers
- Procurement metrics to assist in evaluating sellers and managing contracts

Statement of Work:

- A statement of work is a description of the work required for the procurement.
- If a SOW is used as part of a contract to describe only the work required for that particular contract, it is called a contract statement of work.
    - Describes the work in sufficient detail to allow prospective suppliers to determine if they can provide the required goods and services and to determine an appropriate price.
- A SOW is a type of scope statement A good SOW gives bidders a better understanding of the buyer's expectations.

Statement of work template.

Statement of Work (SOW)

I. **Scope of Work:** Describe the work to be done in detail. Specify the hardware and software involved and the exact nature of the work.

II. **Location of Work:** Describe where the work must be performed. Specify the location of hardware and software and where the people must perform the work.

III. **Period of Performance:** Specify when the work is expected to start and end, working hours, number of hours that can be billed per week, where the work must be performed, and related schedule information.

IV. **Deliverables Schedule:** List specific deliverables, describe them in detail, and specify when they are due.

V. **Applicable Standards:** Specify any company or industry-specific standards that are relevant to performing the work.

VI. **Acceptance Criteria:** Describe how the buyer organization will determine if the work is acceptable.

VII. **Special Requirements:** Specify any special requirements such as hardware or software certifications, minimum degree or experience level of personnel, travel requirements, and so on.

Procurement Documents
Two common examples of procurement documents include a **Request for Proposal (RFP)** and a **Request for Quote (RFQ)**.

Request for Proposal (RFP)

- A **Request for Proposal (RFP)** is a **document** used to **solicit proposals from prospective suppliers**.
- A proposal is a document prepared by a seller when there are different approaches for meeting buyer needs.
- For example, if an organization wants to automate its work practices or solve a business problem, it can write and issue an RFP so suppliers can respond with proposals. Suppliers might propose various hardware, software, and networking solutions to meet the organization's need.

- Developing an RFP is often a time-consuming process. Organizations must plan properly to ensure that they adequately describe what they want to procure, what they want sellers to include in their proposals, and how they will evaluate proposals.
- Although RFPs have been used for many years, outsourcing experts say the process is becoming less appealing in several IT procurement processes

Request for Quote (RFQ)

- A **Request for Quote (RFQ)** is a **document** used to **solicit quotes** or bids **from prospective suppliers**
- A bid, also called a tender or quote (short for quotation), is a document prepared by sellers to provide pricing for standard items that the buyer has clearly defined.
- Organizations often use an RFQ for solicitations that involve specific items. For example, if a company wanted to purchase 100 personal computers with specific features, it might issue an RFQ to potential suppliers.
- RFQs usually do not take nearly as long to prepare as RFPs, nor do responses to RFQs.
- Selections are often based on the lowest bid.

Following is a RFP Template.

Request for Proposal Template

I. Purpose of RFP

II. Organization's Background

III. Basic Requirements

IV. Hardware and Software Environment

V. Description of RFP Process

VI. Statement of Work and Schedule Information

VII. Possible Appendices

A. Current System Overview

B. System Requirements

C. Volume and Size Data

D. Required Contents of Vendor's Response to RFP

E. Sample Contract

The main sections of an RFP usually include its statement of purpose, background information on the organization issuing the RFP, the basic requirements for the products and services being proposed, the hardware and software environment (which is usually important for IT-related proposals), a description of the RFP process, the statement of work and schedule information, and possible appendices. A simple RFP might be three to five pages long, but an RFP for a larger, more complicated procurement might take hundreds of pages.

Source Selection Criteria

- It is very important for organizations to prepare some form of evaluation criteria for source selection, preferably before they issue a formal RFP.
- Organizations use criteria to rate or score proposals, and they often assign a weight to each criterion to indicate its importance.
- Some examples of criteria and weights include the technical approach (30 percent weight), management approach (30 percent weight), past performance (20 percent weight), and price (20 percent weight).
- The criteria should be specific and objective. For example, if the buyer wants the supplier's project manager to be a certified Project Management Professional (PMP), the procurement documents should state that requirement clearly and follow it during the award process.

Understand the process of controlling procurements by managing procurement relationships and monitoring contract performance

Conducting Procurements

- **After planning** for procurement management, the **next process** involves **deciding whom to ask** to do the work, **sending appropriate documentation** to potential sellers, **obtaining proposals** or bids, selecting a seller, and awarding a contract.
- Prospective sellers do some of the work in this process, normally at no cost to the buyer or project.
- The buying organization is responsible for advertising the work, and for large procurements, the organization often holds some sort of bidders' conference to answer questions about the job.

Two of the main **outputs** of this process are a **selected seller** and **procurement contract award**.

A bidders' conference, also called a supplier conference or pre-bid conference, is a meeting with prospective sellers prior to preparation of their proposals or bids. These conferences help ensure that everyone has a clear, common understanding of the buyer's desired products or services. In some cases, the bidders' conference might be held online via a webcast or using other communications technology.

Once buyers receive proposals or bids, they can select a supplier or decide to cancel the procurement. Selecting suppliers or sellers, often called source selection, involves evaluating proposals or bids from sellers, choosing the best one, negotiating the contract, and awarding the contract.

Several stakeholders in the procurement process should be involved in selecting the best supplier for the project. Often, teams of people are responsible for evaluating various sections of the proposals. There might be a technical team, a management team, and a cost team to focus on each major area. Buyers typically develop a short list of the top three to five suppliers to reduce the work involved in selecting a source.

Experts in source selection highly recommend that buyers use formal proposal evaluation sheets during source selection. To calculate the score for a criterion, multiply the weight of the criterion by the rating for the proposal. Add the scores to provide the total weighted score for each proposal. The proposals with the highest weighted scores should be included in the short list of possible sellers.

Example of a evaluation sheet

		Proposal 1		Proposal 2		Proposal 3, etc.	
Criteria	**Weight**	**Rating**	**Score**	**Rating**	**Score**	**Rating**	**Score**
Technical approach	30%						
Management approach	30%						
Past performance	20%						
Price	20%						
Total score	**100%**						

Controlling Procurements
Controlling procurements ensures that the seller's performance meets contractual requirements. The contractual relationship is a legal relationship, which means it is subject to state and federal contract laws.

Ideally, the project manager, a project team member, or an active user in the project should help write and administer the contract, so that everyone understands the importance of good procurement management.

The project team should also seek expert advice (**legal and contracting professionals)** when working with contractual issues. Project team members must be aware of potential legal problems they might cause by not understanding a contract.

It is **critical** that **project managers and team members watch** for **constructive change orders**. Constructive change orders are oral or written acts or omissions by someone with actual or apparent authority that can be construed to have the same effect as a written change order.

- For example, if a member of the buyer's project team has met with the contractor on a weekly basis for three months to provide guidelines for performing work, the team member can be viewed as an apparent authority. If the team member tells the contractor to redo part of a report that has already been delivered and accepted by the project manager, the action can be viewed as a constructive change order and the contractor can legally bill the buyer for the additional work.

It is important to follow other good practices related to project procurement:

- Changes to any part of the project need to be reviewed, approved, and documented by the same people in the same way they approved the original part of the plan.

- Evaluation of any change should include an impact analysis. How will the change affect the scope, time, cost, and quality of the goods or services being provided? There must also be a baseline to understand and analyze changes.
- Changes must be documented in writing. Project team members should document all important meetings and telephone calls.
- When procuring complex information systems, project managers and their teams must stay closely involved to make sure the new system will meet business needs and work in an operational environment. Do not assume that everything will go well because you hired a reputable supplier. The buying organization needs to provide expertise as well.
- Have backup plans in case the new system does not work as planned.
- Several tools and techniques can help in contract administration, such as a formal contract change control system, buyer-conducted procurement performance reviews, inspections and audits, performance reporting, payment systems, claims administration, and records management systems.

Describe the process of closing procurements

- Sometimes referred to as **Contract Closure**
- Contract closure involves completion and settlement of contracts and resolution of any open items. The project team should determine if all work required in each contract was completed correctly and satisfactorily. The contract itself should include requirements for formal acceptance and closure.
- The team should also update records to reflect final results and archive information for future use.

Tools that assist in in contract closure include:

- Procurement audits
    - Often done during contract closure to identify lessons learned in the entire procurement process
- Negotiated settlements
    - Ideally, all procurements should end in a negotiated settlement between the buyer and seller. If negotiation is not possible, then some type of alternate dispute resolution such as mediation or arbitration can be used; if all else fails, litigation in courts can be used to settle contracts.
- Records management system.
    - provides the ability to easily organize, find, and archive procurement-related documents.
    - It is often an automated system, or at least partially automated, because a large amount of information can be related to project procurement

Outputs from contract closure include closed procurements and updates to organizational process assets. The buying organization often provides the seller with formal written notice that the contract has been completed.

Discuss types of software that are available to assist in project procurement management

Most organizations use word-processing software to write proposals or contracts, spreadsheet software to create proposal evaluation worksheets, databases to track suppliers, and presentation software to present procurement-related information.

Many companies are now using more advanced software to assist in procurement management. The term **e-procurement** often describes various procurement functions that are now done electronically, as follows:

- Web-based ERP (Electronic Resource Planning): Creating and approving purchasing requisitions, placing purchase orders, and receiving goods and services by using a software system based on Internet technology.
- E-MRO (Maintenance, Repair, and Overhaul): The same as web-based ERP, except that the goods and services ordered are MRO supplies that are not related to a particular product.
- E-sourcing: Identifying new suppliers for a specific category of purchasing requirements using Internet technology.
- E-tendering: Sending requests for information and prices to suppliers and receiving the responses of suppliers using Internet technology.
- E-reverse auctioning: Using Internet technology to buy goods and services from a number of known or unknown suppliers.
- E-informing: Gathering and distributing purchasing information with internal and external parties using Internet technology.
- E-market sites: Expands on web-based ERP to open up value chains. Buying communities can access preferred suppliers' products and services, add to shopping carts, create requisitions, seek approval, receive purchase orders, and process electronic invoices with integration to suppliers' supply chains and buyers' financial systems.

One type of software that is particularly useful for streamlining procurement is the **procure-to-pay suite**, which provides support for indirect procurements. Unlike direct procurement, where procurement experts in organizations acquire raw materials and goods for production or services related to their organization's primary business, indirect procurement involves acquiring supplies and services required to keep the day-to-day business functioning, such as equipment repairs, office supplies, and services related to keeping business processes running.

The four main capabilities of procure-to-pay suites for indirect procurements include:

- E-purchasing functionality: Provides a self-service solution to requisition and order goods and services through the use of catalogs, e-forms, or free-text orders (for when users cannot find items in a structured format).
- Catalog management capabilities: Includes catalog content upload, content update evaluation tools, and catalog search tools.
- E-invoicing: Enables the interchange and storage of legally valid invoices in electronic format.
- Accounts Payable Invoice Automation (APIA): Allows approval and control of incoming invoices through either automatic or manual approvals by automatic workflows.

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Created By
Owen Harris, Daniel Hines, Jake Mellon, Olivia Followes

Lecture 12 Summary

***Understand** / **Explain** the importance of project stakeholder management throughout the life of a Project*

Stakeholder management throughout the life of the project allows:

- **Free Resources**
  - Using the skills and knowledge of engaged stakeholders can effectively give project managers access to a host of additional resources
- **Increased Perception of success**
  - Good management of stakeholders throughout a project should ensure they view the project in a positive light, regardless of the actual outcome.
- **Smoother Handover Process**
  - Easier to hand over the deliverables to someone who already knows a bit about them and has been aware of the project's development. Hence, smoother handover to the Stakeholders occurs.

*Discuss the **process of identifying stakeholders**,how to **create a stakeholder register**, and how to perform a stakeholder analysis*

Identifying stakeholders:

Identifying everyone involved in the project or affected by it, and determining the best ways to manage relationships with them.

Stakeholders can be **External** or **Internal**.

- **Internal project stakeholders** generally include the project sponsor, project team, support staff, and internal customers for the project. Other internal stakeholders include top management, other functional managers, and other project managers because organizations have limited resources.

- **External project stakeholders** include the project's customers (if they are external to the organization), competitors, suppliers, and other external groups that are potentially involved in the project or affected by it, such as government officials and concerned citizens.

Recall that the ultimate goal of project management is to meet or exceed stakeholder needs and expectations for a project. Stakeholders might change during a project due to employee turnover, partnerships, and other events.

Create a stakeholder register:

- A stakeholder register includes basic information on stakeholders. This includes:
  - **ID Information:** Such as names, positions, roles in project, locations and contact info.
  - **Assessment Information:** The stakeholders major requirement(s), their expectations, potential influences and phases of the project that they have the most interest in.
  - **Stakeholder Classification:** Are they INTERNAL or EXTERNAL? Are they for the project or against it?

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A basic stakeholder register.

Name	Position	Internal/ External	Project Role	Contact Information
Stephen	VP of Operations	Internal	Project sponsor	stephen@globaloil.com
Betsy	CFO	Internal	Senior manager, approves funds	betsy@globaloil.com
Chien	CIO	Internal	Senior manager, PM's boss	chien@globaloil.com
Ryan	IT analyst	Internal	Team member	ryan@globaloil.com
Lori	Director, Accounting	Internal	Senior manager	lori@globaloil.com
Sanjay	Director, Refineries	Internal	Senior manager of largest refinery	sanjay@globaloil.com
Debra	Consultant	External	Project manager	debra@gmail.com
Suppliers	Suppliers	External	Supply software	suppliers@gmail.com

Perform a stakeholder analysis
First you **classify the stakeholders**.

- One way of doing this is a **power/interest grid**. This grid is used to group stakeholders by their level of authority (POWER) and their level of concern (INTEREST).

Second you gather the **stakeholder engagement levels**. These can be defined as:

- Unaware: Unaware of the project and its potential impact on them.
- Resistant: Aware of the project yet resistant to change.
- Neutral: Aware of the project yet neither supportive or resistant.
- Supportive: Aware of the project and supportive of change.
- Leading: Aware of the project.

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Example of a stakeholder analysis/Stakeholder management plan..

Name	Power/ Interest	Current Engagement	Potential Management Strategies
Stephen	High/high	Leading	Stephen can seem intimidating due to his physical stature and deep voice, but he has a great personality and sense of humor. He previously led a similar refinery upgrade program at another company and knows what he wants. Manage closely and ask for his advice as needed. He likes short, frequent updates in person.
Chien	High/ medium	Resistant	Chien is a very organized yet hardheaded man. He has been pushing corporate IT standards, and the system the PM and sponsor (Debra and Stephen) like best goes against those standards, even though it's the best solution for this project and the company as a whole. Need to convince him that this is okay and that people still respect his work and position.
Ryan	Medium/ high	Supportive	Ryan has been with the company for several years and is well respected, but he feels threatened by Debra. He also resents her getting paid more than he does. He wants to please his boss, Chien, first and foremost. Need to convince him that the suggested solution is in everyone's best interest.
Betsy	High/low	Neutral	Very professional, logical person. Gets along well with Chien. She has supported Debra in approving past projects with strong business cases. Provide detailed financial justification for the suggested solution to keep her satisfied. Also ask her to talk to Chien on Debra's behalf.

Describe the contents of a stakeholder management plan

In addition to information found in the **stakeholder register**, such as stakeholder identification information, assessment information, and classification, a stakeholder management plan can include the following:

- **Current and desired engagement levels**: If these levels are not the same, the project team should develop a strategy to align engagement levels
- **Interrelationships between stakeholders:** As you learned in earlier chapters (lmao good joke), there are many interrelationships between project activities and stakeholders. The project manager must be in tune with the politics of the organisation.
- **Communication requirements:** The communications management plan should specify stakeholder requirements, and the stakeholder register can expand on unique requests from specific people.
- **Potential management strategies for each stakeholder**: This critical section can contain very sensitive information.
- **Methods for updating the stakeholder management plan:** All plans need some process for handling changes and updates. Flexibility would be important as stakeholders change on the project.

Stakeholder management plans often contain **sensitive information therefore should not be part of official project documents**.

- In most cases only the project manager and a few select members should prepare the stakeholder management plan.

- In many cases, parts of the stakeholder management plan are not written down, and if they are, distribution is strictly limited.

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Understand the process of managing stakeholder engagement and how to use an issue log Effectively

Project success is often measured in terms of customer/sponsor satisfaction.

Project sponsors often rank scope, time, and cost goals in order of importance and provide guidelines on how to balance the triple constraint.

Other measures of success to meet individual project needs:
- meeting quality expectations
- achieving a certain customer satisfaction rating
- meeting ROI projections after the project is completed

The challenge comes when key stakeholders disagree on priorities.

Example of a Expectations Management Matrix

Measure of Success	Priority	Expectations	Guidelines
Scope	1	The scope statement clearly defines mandatory requirements and optional requirements.	Focus on meeting mandatory requirements before considering optional ones. In this case, following corporate IT standards is optional.
Time	1	There is little give in the project completion date. The schedule is very realistic.	The project sponsor must be alerted if any issues might affect meeting schedule goals.
Cost	3	This project is crucial to the organization. If you can clearly justify the need for more funds, they can be made available.	There are strict rules for project expenditures and escalation procedures. Cost is very important, but it takes a back seat to meeting schedule and then scope goals.
Technology/ standards	2	There are several potential solutions available, but only one that meets all of the sponsor's technical requirements, especially for accounting.	While corporate IT standards are important, an exception makes sense in this case.

Issue Logs:
- Understanding the stakeholders' expectations can help in managing issues.
- Issues should be documented in an issue log, a tool used to document, monitor, and track issues that need resolution.
- Unresolved issues can be a major source of conflict and result in stakeholder expectations not being met
- Issue logs can address other knowledge areas as well

The **issue log includes:**
- Columns for the issue number
- The issue description
- The impact of the issue on the project
- The date the issue was reported

- Who reported the issue
- The person assigned to resolve the issue
- The priority of the issue (high, medium, or low)
- The due date for reporting back on the issue
- The status of the issue
- Comments related to the issue.

In addition to an issue log, other outputs of managing stakeholder engagement include change requests and updates to the project management plan, project documents, and organizational process assets.

An example of an issue log.

Issue #	Description	Impact	Date Reported	Reported By	Assigned To	Priority (H/M/L)	Due Date	Status	Comments
1	Need requirements categorized as mandatory and optional	Cannot do much without it	Feb. 4	Ryan	Stephen	H	Feb. 8	Closed	Require-ments clearly labeled
2	Need shorter list of potential suppliers – no more than 10	Will delay evaluation without it	Feb. 6	Debra	Ryan	H	Feb. 12	Open	Almost fin-ished; needed requirements categorized first
Etc.									

Explain methods for controlling stakeholder engagement

- Refers to control their level of engagement.

- Engagement is seeking the understanding and solutions to issues of mutual concern. It is important to set the proper tone at the start of the project.

Methods for controlling.

- Key stakeholders should be invited to actively participate in kick off meetings rather than just attend.
- The project manager should meet with important stakeholders prior to the kick off meeting.
- The project manager should emphasize that a dialogue is expected at the meeting, including texts or whatever means of communication the stakeholders prefer.
- The project schedule should include activities and deliverables related to stakeholder engagement, such as surveys, reviews, demonstrations, and sign-offs.

Discuss types of software available to assist in project stakeholder management

- **Email** is the most common method for communication. It is easily accessible for all users, while also having the added benefit of creating a paper trail.
- **Instant Messaging** can allow generalised push communication between two more parties. This informal approach may be prefered when discussing issues that may not necessarily require in-depth documentation to be created when designing certain functions of a system.

- **Microsoft Project** is used to assist the Project Manager in developing a plan, assigning resources to tasks, tracking progress, managing the budget, and analysing workloads. This can be viewed and manipulated easily via the Gantt Chart option.

- **Collaborative tools such as Google Drive and Google Docs** allow joint access and editorial privileges between developers, while providing view options to display information to non-developer sources such as our contractors.