Definitions:

Life Cycle Thinking encompasses TBL as LCT goes through the impacts throughout the life cycle. Whereas TBL only touches three domains; environmental, economical and social

"… consistent with/in line with life cycle thinking and TBL"

Sustainability: Meeting the needs of people today without compromising the ability of future generations to meet their own needs.

PMBOK (Project Management Body of Knowledge): an inclusive word that describes the sum of knowledge within the profession of project management. Formulated 25 years ago and updated regularly – the global standard for the industry.

Stakeholders: Stakeholders have "a vested interest" in a project. They "hold a stake in both the planning and the management of the project" (Hartley ,2014, p.84). It is important to "identify, plan, manage and control stakeholder engagement." (Hartley 2014, p.314).

Bottlenecking: in project management and production, a bottleneck is one process in a chain of processes, such that is limited capacity reduces the capacity of the whole chain. The result of having a bottleneck are stalls in production, supply overstock, pressure from customers and low employee morale

Notes:

Week 1b

Life cycle thinking:

- Extend product life cycle through appropriate design to enhance product:
    - Reliability & robustness
    - Reparability
    - Upgradability
    - Variability
    - Attachment
- 70% of total product costs can be save during the design stage
- LCT Benefits = Savings in labour, resources and energy

Project success/result is dependent on optimizing Time, Cost, Scope and Resources

Week 2b

Project Stakeholders:

Stakeholders come in two types:

- Those that contribute (influence, advocate,..) to the project output
- Those that benefit (impact, power, ego,..) from the project output

Stakeholders can either support or hinder your project (not everyone will champion your cause)

Stakeholders cannot be ignored (they will impact your ultimate success) – must be managed and engaged throughout the development of the project

Example of some stakeholders: Project Clients, Project Sponsor, Steering Group (the senior management group), Project Team Members, Project Manager

Week 3a

- Scope will always change over time (SCOPE CREEP)

- Other words for scope creep are innovation, continuous improvement, a client change of mind or just poor management

Concept Stage Involves:

1. Identifying key stakeholders
2. Assigning the project manager
3. Creating the project charter
4. Developing preliminary project scope statement

Project scope and charter bedah, project scope is more detailed

Week 3b

The 3 point estimate is an analytical technique used to improve the accuracy of the estimates (of cost or duration) when the underlying activity or cost component is uncertain. Uses 3 cost or duration estimates to represent optimistic, probably and pessimistic scenarios

Sequence and Flexible Schedules:

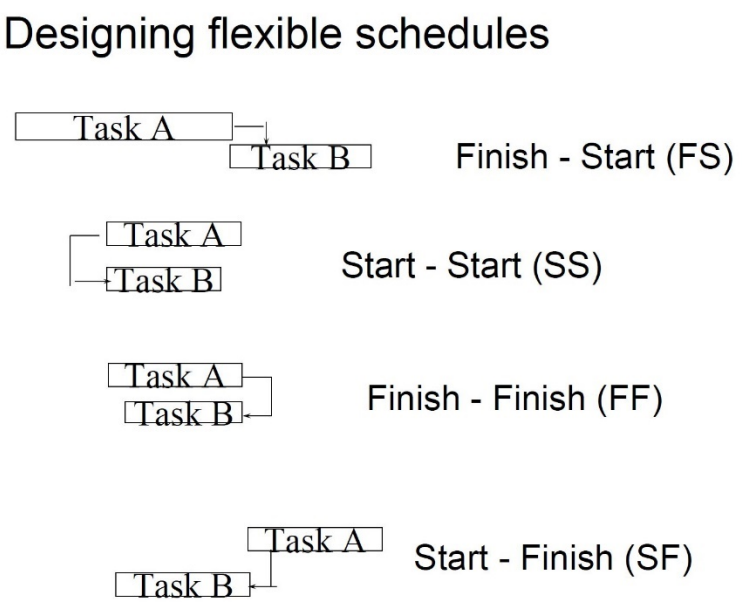
The development of the project schedule is driven by these activity-to-activity relationships in determining when activities start and finish.

1.Finish – Start: one activity finishes to start the other activity;

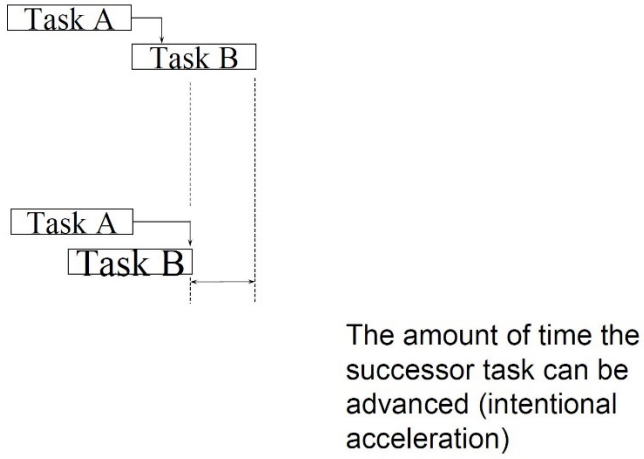
2.Start – Start: one activity starts to start the other activity;

3.Finish – Finish: one activity finishes to finish the other activity;

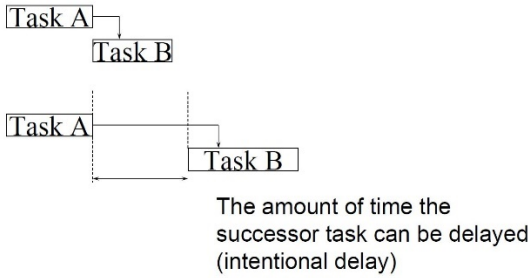
4.Start – Finish: one activity starts to finish the other activity.



Scheduling lead time (fast-track)



Scheduling lag time (delay)



Week 4c

Quality Management - the road to quality

1. Quality Planning: All the mandated quality standards, operational definitions & business requirements relevant to the project are clearly identified & agreed. It then aims to ensure that those same standards can in fact be achieved & measured throughout the project (quality is always planned into the project from the start no simply inspected in, as required.
    a. Eg. Reviewing scope document, detailed product descriptions and technical specifications
    b. Eg. Conducting benchmarking activities with other projects to identify areas of improvement
2. Quality Assurance: A declaration or guarantee that the overall project performance is evaluated on a regular basis to give all stakeholders confidence that the relevant quality standards will be satisfied.
    a. Eg. Processes to eliminate waste, variation and excess
    b. Scheduled or random quality audtis
    c. Lessons learned

3. Quality Control: Monitors specific tasks and project results to identify, measure & eliminate the causes of unsatisfactory performance while ensuring that quality compliance is always demonstrated and achieved.
    a. Eg. Peer reviews
    b. Physical inspections
    c. Control charts
    d. Checklists
4. Quality Continuous Improvement: A culture, a commitment and an ownership of what the project is delivering and ultimately, how well it is being delivered. Where innovation is encouraged, continuous improvement will flourish. Where efficiencies, economies of scale and capacity can be enhanced, continuous improvement will flourish.
    a. Regular performance reporting
    b. Meetings and debriefs
    c. Decision gates and approval processes

QUALITY MANAGEMENT TIES WITH BALANCES SCORECARD (BSC)

Week 5a

Causes of Scope Creep:

- Poor initial definitions of requirements
- Unanswered questions on deliverables
- Lack of stakeholder involvement
- Evolving expectations and/or mentality of 'exceeding' expectations
- Discovery of new solutions
- Ineffective project management
- Environmental factors (external to the company)

Week 9a

What is ethics? A two-dimension foundation:

1. A moral dimension of Ethics:
    a. branch of philosophy that studies principles of right and wrong in human conduct
    b. set of guideline: models/frameworks constructed by society that direct/prescribe appropriate values and subsequent behaviors
    c. often culturally determined (right or wrong in one culture may not be in another)
2. A normative dimension of Ethics:
    a. Asks the question, "what is the right thing to do?"
    b. Moral correctness based on personal values shaped by fam, religion and experience

Why ethics?

Ethics and sustainable development are strongly related with respect to:

- Financial bottom line: (ie. Make a profit while balancing the need for social, environmental and natural resource balance)
- Social bottom line: (ie. Focus on society as a whole, not just shareholders)
- Environmental bottom line: (ie. Controlling pollution and toxic emissions, preserve biological diversity)
- Natural resources (ie. Conservation to the extent possible and search for substitutes for non-renewal resources)

Engineering tasks/responsibilities and possible ethical problems

1. Conceptual task: i.e. To solve a problem/create an opportunity. Examples of possible problems: Unrealistic assumptions;
untrue feasibility studies; violation of patents and/or trade secrets, test of prototype done only under most favourable conditions, not complete etc.;

2. Design: i.e. Specifications. Examples of possible problems: Design changes not carefully checked, lack of risk identification and management plan, etc.

3. Manufacture: i.e. Scheduling tasks, fabrications of parts, assembly/construction, quality control, testing. Examples of possible problems: Promise of unrealistic completion date; bribes, inadequate testing of purchased parts, etc.

4. Implementation: i.e. Monitoring social & environmental product/project effects. Examples of possible problems: No formal procedure for following project/product effects on society & environment, etc.;

5. Final task: i.e. Recycling/disposal. Examples of possible problems: Lack of attention to ultimate product disposal; fail to provide public notification of hazards, etc.

Week 10a

Develop a list of questions that reflect various ethical theories that can aid managers in determining whether a particular contemplated action is ethical or not **(USE MURPHYS TEST, the 9 MORAL QUESTION FRAMEWORK to TEST ETHICS)**

- Q1. Does action violate the law? (Legal test)
- Q2. Is action contrary to widely accept moral obligations (duties of fidelity, gratitude, justice, non-maleficence, beneficence? (Duties test)
- Q3. Is it likely that any major damages to people or organisations will result from the contemplated action? (Consequences test)
- Q4. Is there a satisfactory alternative action that produces equal or greater benefits to the parties affected than the proposed action? (Utilitarian test)
- Q5. Does action violate any other special duties i.e., protect consumers and provide safe products? (Special obligations test)
- Q6. Is the intent of the contemplated action harmful? (Motives test)

Murphy et al., 2006, Ethical Reasoning and Marketing Decisions

- Q7. Does contemplated action infringe upon rights of consumer (& other stakeholders) in any way? (Rights test)
- Q8. Does the contemplated action leave another person (or sentient being less well-off? (Justice test)
- Q9. Can the contemplated action be considered sustainable in that it does not negatively impact upon future generations? (Sustainable test)

Murphy et al., 2006, Ethical Reasoning and Marketing Decisions

Week 11b
Managing Cross Cultural Business Ethics:
When norms of the home country and norms of the host country are in conflict, there are four options available to a multinational corporation

1. Follow the norms of the home country because that is the patriotic thing to do
2. Follow the norms of the hose country to show proper respect for the host country's culture (when in rome, do as romans do)
3. Follow whichever norm is most profitable
4. Follow whichever norm is morally best

(The four options are not mutually exclusive)

To reduce the likelihood of many abuses occurring, a number of norms should than be implemented: these should include:

1. Implementing "the moral minimum", is the norm to do no intentional direct harm. This moral minimum applies to all actions of all people, corporations and countries
2. If the project is morally justified, it should benefit the host country. However, the good of the country is not the same as the good of corrupt leaders or of an oppressive elite of the country. The good of the country must include the good of the ordinary people of the country
3. The third norm is to respect the human rights of the workers, consumers, and all others in the host country
4. Promote the development of just background institutions internally within the country as well as on the international level
5. Respect the laws of a host country, as well its culture and local values, providing these do not violate human rights or impose immoral laws
   (These norms are examples of rules that can be generated and defended by the actions/decisions by an ethical project manager in a foreign country)

Week 12a
Loyalty and Integrity (ethical dilemmas usually place loyalty and integrity in conflict with each other)

Whistleblowing: Disclosure by organization members of illegal, immoral or illegitimate practices under the control of their employers, to persons or organizations that may be able to effect action.

Case Study: (Loyalty of managers in an unethical workplace/organization)
- An interview survey of 45 managers, 15 of them had serious ethical breaches in the organizations they worked in however they all chose to do nothing because of their loyalty to the organization (to cover up and keep confidential)

Case Example: (Principled Resignations)
- A number of interviewees reported that when they saw or experienced ethical wrongs at work (harassment & bullying and employment discrimination)
- They resigned as a matter of principle, to maintain their personal integrity but did not whistleblow internally or externally

Sacrifice:
Loyalty and Integrity both demand sacrifice:
- Integrity demands the sacrifice of things – money, status, power – for its maintenance
- Loyalty is the sacrificing of integrity to obtain things – money status, power – for oneself or for some other body such as an organization

Eg. At an organizational level:

Integrity – A person will tell the manager of the wrongdoing and try to convince them to put things right
Loyalty – A person will offer to cover up for the organization

Section A:

From the project, explain the 4 stages of a project. Show how each of them led to the project's success.

INCLUDE ONLY THE GOOD THINGS THAT MADE THE PROJECT SUCCESSFUL (USED A COST BENEFIT ANALYSIS)

1. **Concept Stage**: The idea stage where the project is conceived. Discussion of preliminary goals, deliverables & strategic vision alignment, problems raised, impact assessment in terms of TBL and life cycle, potential benefits identified, alternative approaches researched and provisional costing determined.

2. **Planning Stage:** Following the decision to proceed in stage 1, all work required is planned and scheduled. Objectives are finalized, resources are assigned, quality is signed off on (include TBL and life cycle guidelines and standards), final costs are approved, the timing agreed and all other administrative matters are determined

3. **Execution Stage:** The project has commenced during this stage and emphasis is moved to tracking actual progress using the schedules developed in stage 2 as the comparison point of reference. All work is monitored, controlled and corrected where necessary with schedules being reviewed, revised and updated as required.

4. **Finalization Stage:** The project has been completed and the deliverable handed over to the client. Resources are disposed of or reassigned, the project is evaluated, reports are written and presented, the administration arm of the project is closed.

The construction of London's new Elizabeth Line from east to west of London is a 14.8 billion GBP project led by Crossrail Limited and was aimed to support population growth and effectively transport people around the city and its surroundings. In the report, we specifically analyzed the tunneling and boring process of the Elizabeth Line project.

In the conceptualization stage of the project, an economical feasibility study was done to ensure that the project would be successful in both profitability and robustness in a long term view, where Crossrail developed both NPV and ROI models to quantify this. As the project's goals and outcomes were consistent with a TBL and life thinking approach it allowed Crossrail to satisfy its project's economical facet in terms of the long term sustainability.

A preliminary Work Break Down Structure (WBS) was created specifically for the tunneling and boring process of the Elizabeth Line which was later adapted to a Program Evaluation Review Technique (PERT) Network Diagram in order to factor in a timeline. This allowed for Crossrail to grasp a better overview of scheduling of each work deliverable as it detailed the duration and scheduling constraints (what needs to proceed it before the task can be taken on). The use of a risk matrix allowed to grade priorities to 40 archeological sites found while tunneling and could be factored into this PERT framework efficiently, which minimized interruptions to the projects critical path and would overall minimize the impact during construction.

Progress and performance was tracked and reviewed by project managers throughout the Execution Stage by using Engineering Performance Progress Reports (EPPR), this reporting system gave project managers an accurate indication of the project progress and allowed them to monitor, control and correct any schedules

where necessary. The primary sponsors who were curated in the engagement plan were kept updated and informed at an “arms length” which allowed reports of each specific period of the project to be reviewed and approved by the main sponsors as a way to make sure that performance and quality is not only tested against the schedule but also against the Sponsor’s scope baseline.

Crossrail completed its tunneling works on the 26 May 2015 and can be noted was done on time and below budget. Debriefing of the stakeholders (kick out meeting) and getting client acceptance after completion of the tunneling and boring was conducted as a way to close up this part of the project. Which consisted of recommendations and constructive lessons that could be taken on board for future projects.
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Explain how a sustainable approach is consistent with the Triple Bottom Line. Explain how it could improve the project when applied to every stage of the project.

INCLUDE MORE SHIT ABOUT TBL, IE FINDING SUSTAINBALE SUPPLIERS ECT ECT – Procurement management: selecting potential suppliers that are ethically moral, in line with TBL & LCT and sustainability in terms of their materials and resources

‘Triple Bottom Line’ (TBL) is a holistic concept of sustainability where ‘environmental’, ‘social’ and ‘economic’ considerations are identified and considered concurrently in decision making, it is envisaged that triple bottom line sustainable project management can lead to the management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity, and life support systems.

In other words, in sustainable project management It is important, to recognize that short and long term economic benefits can be achieved through adoption of positive social and environmental measures. Essentially maximizing benefits, whilst minimzing negative impacts.

In hindsight, if a TBL approach was applied to the conceptualization stage of Crossrail’s project, it would allow for the project scope to pick up London City Airport as a stakeholder that would otherwise have been overlooked. Being one of five major airports in London, the addition of the London City Airport station would of provided social benefits in commuting time for travelers and social opportunities for the organization and London as to increase long-term shareholder value as it captures the strategic vision of a ‘more connected city’.

In the planning stage of the project, in particular the procurement stage, TBL and life cycle thinking should be prioritized when selecting a supplier. Selecting a supplier that is aware and conscious of the sustainability of the life cycle of resources (resource extraction all the way to disposal) will allow the project to experience the net benefits of the all three factors of TBL such as savings in labour, resources and energy and whilst still not compromising sustainability in the long term.

From an economical standpoint of the TBL approach, the execution stage could of greatly benefited If project managers were told earlier on the stages to stick to one style of reporting when using the EPPR template, the reporting system would be a lot more transparent and easier to extract information from. This would bring economical benefits as time constraints would be minimized and the flow of issues would be highlighted more easily and any changes done would be more readily integrated into the project.

A TBL perspective on the finalization stage should prioritize and highlight the long term sustainability and performance of the project even when the project has been completed and the deliverable handed over to the client. It should have a risk response plan to deal with impacts of the projects legacy after its completion and the project should also be re-evaluated in order to assess whether the project has achieved its objectives and how this would impact London as a whole short term and in the long term keeping TBL and life cycle thinking in mind.

Section B:

How does quality assurance differ for quality planning? What roles does quality assurance play in dealing with associated quality costs?

Quality planning encapsulates all the mandated quality standards, business requirements relevant to the project (the write up or plan for quality) and aims to ensure that those standard can be in fact achieved and measured throughout the project

Eg. Reviewing scope document, detailed product descriptions, conducing benchmarking activities with other projects to identify areas of improvement

Whereas Quality Assurance is processes and actions on how these standards are checked and regulated on a daily basis to give stakeholders confidence that quality is maintained throughout the development of the project.

Quality assurance looks for processes and ways to constantly maintain and improve quality standards, hence through lessons learned, quality audits it allows for streamlining of business tasks and deliverables, eliminating any waste, variation or excess.

Referring to your own group experience, explain the stages of team development.

- **Forming –** Members join and begin the process of defining the group's purpose, structure and leadership

In the forming stage of the group project, group interaction between members was minimal as responsibilities were ambiguous. After a few meetings, the group's purpose and task at hand became more clear with some of the team members showing leadership and engaging with the team and its goals.

- **Storming –** Intragroup conflict occurs as individuals resist control by the group and disagree over leadership

Storming became apparent when It came down to project selections, proposed by two very passionate team members, both were very respectful to each other and could see the perspectives of both projects objectively. Hence a compromising strategy was evident when deciding between the two real life projects and finally selected a mutually acceptable outcome

- **Norming –** Close relationships develop as the group becomes cohesive and establishes its norms for acceptable behavior

The norming stage was primarily exhibited when sections of the report were delegated, in which every stage of the project life cycle was distributed between pairs. This allowed team members to develop close relationships with the other members they were collaborating with, during this it establishes the norms for acceptable behavior in particular between each pair.

- **Performing –** A fully functional group structure allows the group to focus on performing the task at hand

Most notably the team came together and showed its functionality in being able to work together and deliver a very cohesive and well-rehearsed presentation. Where there was a mutual understanding that the

performance of the presentation was dependent on how cohesive we worked together and was dependent on everyone's joint efforts.

- **Adjourning –** The group prepares to disband and is no longer concerned with high levels of performance

After completing the report and delivering the presentation. The group becomes redundant as it does not have any more target goals/deliverables to work on and hence starts to disband.

What are important considerations for good communication? Choose 2 stakeholders and discuss some of the barriers to communication.

Matsuhita communicational barriers in the extended readings (language differences, cultural differences, different values)

VENN DIAGRAM SHIT, Source → encoding → the message sent → decoding → receiver (THEN A FEEDBACK LOOP)

Important considerations for managing good project communications include timely and appropriate planning, collection, creation, distribution, storage, retrieval, management, control, monitoring and disposal of information (fact, fantasy, folklore and feelings)

Poor communication will undermine the workplace and give rise to problems, issues and misunderstandings

Project Manager and Project Sponsor (both are stakeholders of a project)

Examples of Communication Barriers:

- Lack of client involvement
- Poorly informed stakeholders
- Lack of meetings and/or too many meetings leading to little action
- Lack of reporting requirements
- Poor and incomplete documentation
- Frequent scope change
- Changing project personnel
- Lack of auditing the project to identify the lessons learned

Why is stakeholder management important? Discuss four stakeholder management strategies

The stakeholders of an integral part of any project and play a major role in determining the projects development, direction and success. Being able to communicate effectively and develop a good relationship between each stakeholder is key in being able to fulfill the requirements and values of each stakeholder hence must be prioritized with the direction of the development of the project. If not, will affect the development and success of the project, delayed project times, over-expenditure of money and resources, quality of project decreases and overall feasibility of the project is reduced. Hence the importance to include every party that will be affected or affect the project needs to be prioritized and managed correctly.

Stakeholder Management Strategies:

- *Need to interact with stakeholders in support of the projects interests*
- *Proactive in capturing relevant information from each stakeholder*

- *Documented in a suitable format that can be readily disseminated(spread widely), tracked and updated as the project progresses (eg the stakeholder management matrix)*

LISTING STAKEHOLDERS WHO ARE REPSONSIBLE FOR WHAT

RACI Framework:

Responsible – Nominate the stakeholder charged with doing the required activities
Approve – Nominate the stakeholder who needs to approve all decisions
Consult – Nominate the stakeholder who needs to be consulted prior, during or after an action
Inform – Nominate the stakeholder who needs to be kept informed of progressive actions

PARIS Framework:

Participate - Nominate the stakeholder charged with doing the required activities
Approve – Nominate the stakeholder who needs to approve all decisions
Responsible – Nominate the stakeholder charged with doing the required activities
Inform – Nominate the stakeholder who needs to be kept informed of progressive actions
Signoff – Nominate the stakeholder who provides official signoff

Managing Stakeholders: Implementing a stakeholder management matrix (Influence vs Impact)

Managing the stakeholders: Example of implementing a stakeholder management matrix

Name	Responsibilities	Information required	Medium	Frequency
Sponsor	- Determine the overall business objective - Project priority	- Schedule delivery - Budgets -- Priority status	- Report - Meetings	Monthly
P/Manager	- Manages schedule - Manages performance	- Team issues - Risk issues	Meetings	Daily
Client	Accepts project	- Performance - Progress	Report	Monthly
Contractors	Carry out work	Schedule	Meeting	Daily
SME (Subject matter expert)	Technical expert (design, installation, etc.)	Technical performance issues	Walkthroughs	Daily
Team	Task completion	Progress	Meeting	Daily Weekly

Response Strategies to stakeholder pressures in global projects:

Response strategies to stakeholder pressures in global projects
(Aaltoneen et al., 2009)

- Adaptation strategy: Obeying the demands and rules that are presented by stakeholders – that is, adjust to stakeholder pressures to be able to achieve the planned objectives;
- Compromising strategy: Negotiating with stakeholders ; opening the dialog and listen to their requests & offer compensations when appropriate (**but remember to question ethical issues!!);
- Avoidance strategy: Loosing attachment to stakeholders & their claims. Transferring the responsibility of dealing with the claims to others in the project network (**but, is this ethical?);
- Dismissal strategy: Ignoring stakeholders demands. That is, not considering stakeholders requirements in implementing the project stages;
- Influence strategy: Dealing proactively with the demands from stakeholders. Creating & communicating value to stakeholders while building relationship with them.

Balanced Scorecard (BSC) for projects

Balanced Scorecard (BSC) is a performance measurement framework which can be applied to projects to include strategic performance metrics, allows customer perspective, project/internal perspective, financial perspective, growth & innovation perspective to give project managers and other key stakeholders a more balanced view of project performance

BSC can be used for health checks throughout the project lifecycle:

Project Stage 1 – Initial measurement to establish a bassline for project planning
Project Stage 2 – BSC benchmarks are included in the overall project plan
Project Stage 3 – BSC measurements are implemented & initial benchmarks are used to compare & improve the BSC outcomes
Project Stage 4 – BSC measurements are reviewed & documented in the final report to support best practices & for lessons learned.

What is required in a contract for it to be legally binding? What are the three types of contracts we learnt in this course?

A contract is a legally binding agreement between two or more parties, to act or refrain from acting in a particular way.

With the intent of protecting the interests of both parties, the contract should contain (as a minimum) the following key elements:

1. An offer
2. Acceptance
3. Intention/consent of each party to be legally bound
4. Consideration
5. Mutuality
6. Capacity
7. Legality

The 3 types of contracts:
Fixed Price Contract:
- The delivery of a well defined product (goods or service) for a fixed price
- Customer risks:
    - At the mercy of a sole source contractor
    - Incomplete specifications (due to project change)
    - Tendency for contractor to use cheaper materials
- Contractor Risks:
    - Requires careful cost estimation
    - Requires careful schedule estimation
    - Cost growth can lead to making a loss

Cost Reimbursable Contract:
- The seller is paid for the actual costs incurred plus a fee representing the sellers profits
- Customer Risks:
    - Final cost unknown

    - Sole source contractor
    - Poor specification leads to more costs
    - Poor specification leads to contract changes
- Contractor Risks:
    - Fee percentage declines as costs rise
    - Rising costs can damage relationship with customer

Time and Materials Contract:

- This type of contract contains features of both fixed fee and cost plus contracts (the previous 2 contracts combined)
- Customer risks:
    - No specification
    - Open ended
    - Sole source contractor
- Contractors risks:
    - Fixed rates
    - No defined tasks

What are the main budgeting techniques learnt in the course?

A budget is a formal written financial statement of management's plans for the future expressed in financial terms

Approaches to Budgets:

Traditional (analogous) – Previous years level of performance is the foundation for next year's figures

Zero – Based – Ignores previous results as each activity and outlay is justified. Each activity is recorded with zero spending to begin with

Program – Activities are grouped together for projecting costs generated by each program or major activity

Top Down – Based on pooling the knowledge of senior managers & past results. Project costs are estimated & then passed to lower-level managers who continue the breakdown into further estimates

Bottom Up – Individual task budgets are estimated in detail by the people directly responsible for doing or managing the work. Estimates are aggregated to give the total project cost

What can a project manager do to resolve disputes between stakeholders?

USE GROUP CONFLICT FRAMEWORK

Why is scope management important? What should be included in a scope management plan?

Scope management is important as it documents on how the project scope will be defined, essentially this becomes the foundation to what is referred to for the project's development.

The project scope should:

- Outlines what is (inclusions) and what isn't (exclusions) required
- Establishes a scope baseline for comparisons and updates
- Forms the foundation of the project plan

- Investigates if expectation meets capability
- Identifies the project deliverables, results and benefits

The Scope Management Plan Should Include:
- Project title
- Project start and finish date
- Detailing key stakeholders
- Project deliverables
- Detailed description of all objectives, characteristics & requirements
- Project justification
- Detailing milestones
- Detailing risks
- Detailing assumptions
- Project success criteria
- TBL and LCT (Life Cycle Thinking)

Describe 5 ways to terminate a project and give examples:

SEMII

- Extinction: Agreed decision to terminate project regardless of success
- Murder: Silent decision made
- Inclusion: What was once a project may become a department
- Integration: The elements of the project are distributed among existing functions
- Starvation: Starving the project of resources until terminated (Budget cutbacks; Resource reallocation; Changing Priorities)

Differentiate the 3 numerical methods of categorizing a project, which is the most exhaustive one?

- **Payback Period:** The time it takes to earn back the money invested in a project
  Does not take into consideration the time value of money or considers the entire cash flow period of the project
- **Return on Investment (ROI):** The overall profit (or loss) on an investment calculated as a percentage (%) of the total amount invested
  Does not take into consideration the time value of money but does considers the entire cash flow period of the project
- **Net Present Value (NPV):** The projected profitability of an investment, based on future (anticipated) cash-flows & discounted (from year 2) at a stated interest rate.
  Considers both the time value of money (discount factor from an annuity table from some source) and also the entire cash flow period of the project

  Therefore the most exhaustive/complete one is the NPV Method.

What is PERT and list 5 advantages and disadvantages:

Program Evaluation Review Technique is a scheduling tool that is available to the project manager and team to plan the project activities.
It Illustrates:
- Flow chart mapping the WBS graphically (migrating from the WBS to the network diagram)
- The project's logic and how it is tied together

- The relationships between required tasks
- The flow of work throughout the project
- Helps to identify bottlenecks
- What tasks are required for the project to be completed

Advantages:
- Excellent visual & interactive graphic to demonstrate the schedule
- Participative decision making
- Negotiated concessions
- Improved team ownership
- Shows critical path
- Eliminates idle time

Disadvantages:
- Difficult to read if the project is large
- No timeline
- Difficult to monitor & report performance
- Not always easy to understand
- Limited amount of information that can display

What is Life Cycle Thinking? Why is it Important?
LCT overall is a way to become more mindful of the complexities of consuming products and engaging in activities and how they affect the environment.
Since LCT can be involved in the choices of individual consumers, as well as policy makers and businesses, it is very important that people are well informed about the subject and its uses.
Increasing awareness of the Life Cycle Analysis technique would allow companies as well as individuals to consider multiple options for a new product.
After consideration of all available options, LCT would encourage selection of the most sustainable option.
If more individuals practiced LCT when looking for new materials or methods, they would be more aware of how environmental constraints can influence running costs in energy and consumables.

Explain the steps in risk management. Give examples for each step.

- **Identification:** Identify all internal & external sources of risk having the potential to impact the project

During the Research Stage of Crossrail's underground tunneling process, Roman remains were found across London in 40 or so work sites

- **Assessment:** Determine both the probability & impact arising from the risk source to calculate the priority

A Risk Matrix was utilized by Crossrail in assessing the extent and fragility of the archaeological sites and was given a calculated priority in terms of impact and probability.

- **Analysis:** Work through all tasks to clearly determine how each risk will impact the project's success

Through the risk matrix and using a sensitive analysis in conjunction if the risk was not managed properly and resolved it would have tremendous potential in affecting the construction schedule of the project.

- **Management:** Plan the appropriate response strategies to accept, reject &/or manage the risk

Crossrail has utilized a combination of both Reject and Accept Risk Management Options. As excavation was deemed to costly, rerouting the tunnels essentially modified the preliminary tunneling plans and furthermore, the tunneling route will continuously be updated as the process goes on and any archeological sites that were not picked up during the preliminary surveying would be can be accounted for.

- **Evaluation:** Review the risk process & the adequacy of the nominated strategies post project

Through this process, the result was that the tunneling process was completed without the disruption of any archaeological sites and the remains were left undisturbed.

Explain how conflicts can be resolved. If the conflict is rapidly evolving, which strategy would you use and why?

- **Avoiding (low assertion, low cooperation):** The strategy is neither assertive nor cooperative. No attempt is made to address the conflict at all, (also known as lose-lose)
- **Competing (high assertion, low cooperation):** The strategy is assertive & uncooperative. Power & dominance are used to gain compliance to your own perspective (also known as a win-lose)
- **Accommodating (low assertion, high cooperation):** The strategy is unassertive & cooperative. The other persons point of view is considered more important to your own (also known as a lose-win)
- **Collaborating (high assertion, high cooperation):** The strategy is assertive and cooperative. Mutual and optimal outcomes are sought by both parties (also known as a win-win)
- **Compromising (mid assertion, mid cooperation):** The strategy combines moderate assertiveness & cooperation. A mutually acceptable outcomes is reached (ie. Partially satisfies both parties through each sacrificing some personal goals)

If conflict is rapidly evolving, it is indicative that the other persons point of view is more dominant and considered more important to that of yours in their perspective. In order to resolve any further conflict, choose a strategy that is less assertive and more cooperative. Choose either accommodating or compromising or somewhere in between, depending on the person's range for flexibility. Outcome is still a win one side, at the expense of your own personal goals

~~Somewhere between Accommodating and Compromise, depending on the persons range for flexibility. Initially start with a more compromising strategy and test to see if both are willing to sacrifice some personal goals to develop a mutually acceptable outcome. However, if they are very opinionated and stubborn go for an accommodating approach which is low assertion and high cooperation this will to avoid further damage to the relationship and its still a lose – win situation where as a group you've won however at the expense of your own personal goals.~~

What are the 10 Key Competencies for running a team based on PMBOK (Project Management Body of Knowledge)

- **Project Stakeholder Management**
- **Project Integration Management:** All aspects of the project are effectively coordinated & managed
- **Project Scope Management:** All the work required by the project and only this work included
- **Project Time Management:** Project is completed in a timely manner
- **Project Cost Management:** Project is completed within the approved budget
- **Project Quality Management:** project will satisfy the needs (standards, definition, specifications, uses) for which it was undertaken
- **Project Human Resource Management:** effective use can be made of all people involved in the project
- **Project Communication Management:** all communication is completed, timely, appropriate and targeted
- **Project Risk Management:** clearly identified, comprehensively analyzed and responded to proactively
- **Project Procurement Management:** processes required to acquire all external goods and services from the project

What key information should be included in the project charter and why? Discuss a project charter should include:

The project charter is needed because:

- Ensures the project manager understands the sponsor's needs
- Provides key information needed to get started
- Provides a reference document to make sure everyone is on the same page later in the project
- Provides the basis to plan the project
- Empowers and protects the project manager by describing what he or she is being asked to accomplish

A project charter should include:

- Project title
- Project start date
- Project finish date
- Key stakeholders
- Business case supporting the project
- Project goals
- Budget information
- Foreseeable risks
- TBL and life cycle thinking

~~The project charter provides the following benefits:~~

- ~~Formally establishes the project (a project does not exist without a project charter!)~~
- ~~Designates the parameters within which the project manager has the authority to operate~~
- ~~Gives the project manager authority to spend money and commit resources~~
- ~~Provides the high-level requirements for the project~~
- ~~Links the project to the ongoing work of the organization~~

What scheduling tools are available to the project manager and team to plan the project activities? Discuss

The project schedule is the time based sequenced description of all the project activities. There are 4 main tools in capturing and/or communicating the schedule to the stakeholders:

- Work Breakdown Structure (WBS)
- Program Evaluation Review Technique (PERT) or Network Diagram
- Critical Path Analysis (CPA)
- Gantt Chart

Work Breakdown Structure: the WBS is a hierarchy of tasks and levels that help to identify how the project will flow which is set by the project manager. Also, it helps to define the specifics of the project outlined in the project scope

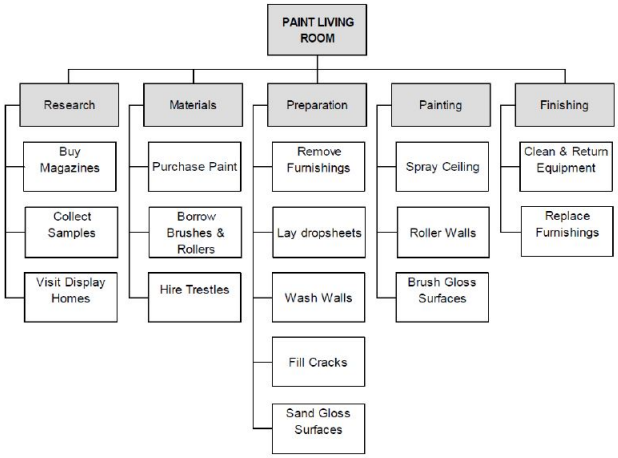
Advantages:

- Captures tasks to complete the project
- Identifies tasks relationships
- Easy to read in the table format
- Makes possible to visualize a complex project
- Ties the project together

Disadvantages:

- Time consuming
- No timeline
- Potential inconsistency between tables and effective schedule
- Potential discrepancy between projected and effective resources
- Some tasks may be constrained by factors

Work Breakdown Structure WBS (Multi- Level Perspective)



PERT/Network Diagram: is essentially a flowchart of the project tasks. The network is created by determining predecessor and successor relationships and connecting the tasks based upon those relationships.
In a complex project with many organizations/individuals involved, this technique can provide guidance as to who is the internal custom for each task

The PERT illustrates:

- The projects logic
- The relationships that exists between all required tasks
- The flow of work throughout the project
- Where the critical path lies throughout the project
- Exactly where potential bottlenecks are
- How the project is tied together
- How each task required for the project to be finished

Advantages:

- Excellent visual & interactive graphic to demonstrate the schedule
- Participative decision making
- Joint risk identification & response strategy
- Negotiated concessions
- Improved team ownership
- Shows critical path
- Eliminates idle time

Disadvantages:

- Difficult to read if the project is large
- No timeline
- Difficult to monitor & report performance
- Not always easy to understand

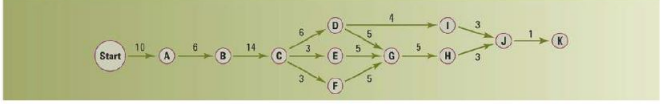
- Limited amount of information that can display

Program Evaluation Review Technique (PERT) (REMEMBER)

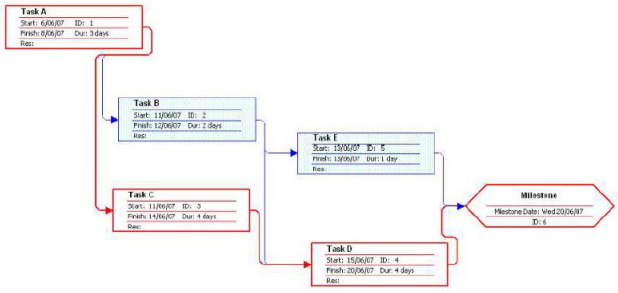
TABLE 9.5 A PERT network for constructing an office building

EVENT	DESCRIPTION	EXPECTED TIME (IN WEEKS)	PRECEDING EVENT
A	Approve design and get permits	10	None
B	Dig subterranean garage	6	A
C	Erect frame and siding	14	B
D	Construct floor	6	C
E	Install windows	3	C
F	Put on roof	3	C
G	Install internal wiring	5	D,E,F
H	Install lift	5	G
I	Put in floor covering and panelling	4	D
J	Put in doors and interior decorative trim	3	I,H
K	Turn over to building management group	1	J

FIGURE 9.5 A PERT network for constructing an office building



Drawing the PERT Network Diagram



Critical activities are activities that have predecessor or succeeding contraints hence altering will either create lag or lead time in scheduling.

Critical Path Analysis (BASICALLY PERT/NETWORK DIAGRAM WITH TIME WEIGHTINGS): is used to determine what the shortest time to complete the project. It offers a visual representation of the project activities, presents the time to complete the tasks and the overall project and tracks of critical activities.

CPA illustrates:

- The longest path (task) through the network, critical to be completed on time to prevent project details – a delay in critical tasks means project delay
- The shortest project completion time
- The path with no 'float' (no delay)
- The task that must start and finish as scheduled for the project to finish as scheduled.

PERT Critical Path

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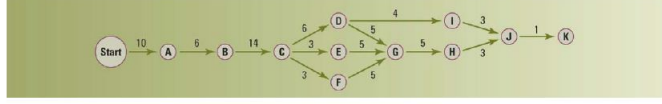


Gantt Chart: (THE ONLY ONE OUT OF THE FOUR FOR TRACKING PROGRESS)
is excellent for tracking progress or activity for tasks once they have been scheduled.
It is used for daily/weekly tracking of project progress and it is easy to use and maintain.
It creates focus for tracking progress because it is clear to see whether a task should be completed, underway or pending at any given time.

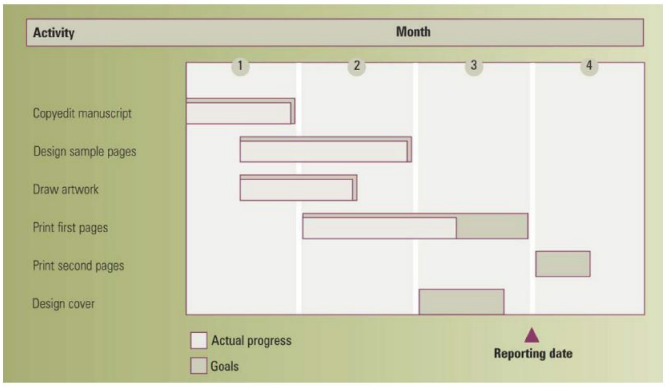
- a valuable scheduling tool
- details activities, order of completion and establishes completion times
- visualizing actual and planned output over time
- control tool to identify deviations
- different task relationships are possible which offer varying degrees of flexibility and complexity in relation to time, resources and costing

Advantages:

- illustrates task duration
- Clarifies the 4 task relationship types
- Ideal for monitoring actual progress to date
- Identifies the critical path/s
- Easy to allocate resources
- Easy to read from top down & from left to right
- Illustrates the application of lead & lag time

Disadvantages:

- Difficult to read due to the amount of information
- Time consuming to update & report
- Need software to avoid excessive time spent drawing & reviewing schedules
- Often bears little resemblance to reality
- Easily outdates given the frequency of scope changes and revisions.

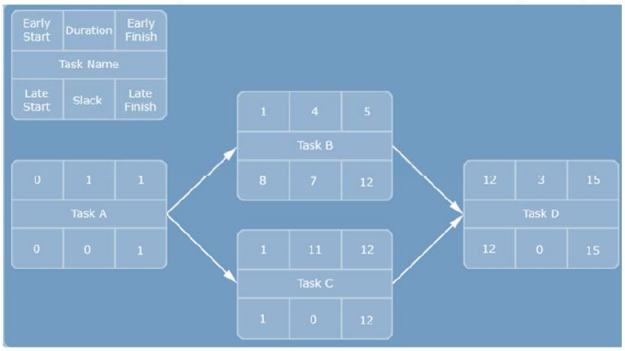


What is the difference between a schedule drawn 'in series' and one drawn 'in parallel'? Discuss and provide examples to substantiate your answer.

The network can be drawn either 'in series', which is a straight line or linear network with one activity following directly on after its linked predecessor, or 'in parallel' there are multiple paths (activities), which can be done in simultaneously and linked to a predecessor or a successor through the network from start to finish.

For example, there are 4 tasks in this project.

- Task A takes 1 day to complete
- Task B takes 4 days to complete and can be executed in parallel with Task C which takes 11 days to complete
- When tasks B and C are completed, Tasks D can be executed which will take 3 days to complete



What are some of the key characteristics of a highly performing project team? Discuss and provide examples to support your answer.

Shared Vision – when each team member understands where the team is headed and how their specific role contributes to the goals and visions of the team; productivity skyrockets

- Put the vision onto paper
- Develop a vision communication strategy to connect the vision to the team
- Allow the team to build on the vision and take ownership of it

Health Team Culture – allows the team to make decisions, not waste time on office politics, and accomplish more in less time.

- Set expectations for a team culture based on trust and healthy conflict
- Recognize individuals and the team for achievements and living out core values
- Create opportunities to connect outside of work

Clear Defined Roles and Expectation for Performance – team members know what they are supposed to do, how their work supports the team, and how they contribute to the overall success of the team.

- Identify the roles for the team based on market demands, leadership needs and the vision
- Lay out job descriptions with performance expectations and success indicators
- Perform team assessment using strengths finder to identify the right person for each role
- Set up a communication strategy to introduce the new roles to the team

Everyone is Held Accountable – in a culture of accountability, the focus is on the personal development of your team and results

- Establish one-on-one coaching sessions with each team member
- Hold regular formal performance reviews
- Require team members to verbally report on specific projects, goals and the action plans

The Leader is an Example

- Work from leader's strengths-zone and trust others to do the same
- Provide High Impact team building opportunities
- Get into the trenches with the team and show them leader cares

What selection method can be used to select projects? What are the advantages and disadvantages of these methods? Discuss and provide examples to support your answer

Non-Numerical (SPOCC):

- **Sacred Cow (**An executive choosing to pursue a project despite it not having clear benefits, the launch of the ipad. Lead design engineering jonathan ive was against it as the iphone already was released, ipad was just a tablet that was bigger, steve jobs was adamant tho)
    - Project chosen/protected by senior executive and the project becomes sacred
      Advantages
    - Priority status
    - Empire building
      Disadvantages
    - Potential lack of organizational support (might not be aligned with the same values and interest as the employees of the company)

- **Product Line Extension (upgraded car model (ie. Tesla production of the Model S is a prime example, as the production line runs a strategy of continuous improvements from consumers (the market conditions) and also engineering feedback, where 10-20 engineering changes are introduced every week hence there are no "model years" in the Model S)) OR (Extended TV series – Netflix's Stranger things renewed for another season despite only supposed to be running for a sole season this was due to the demand in the market and consumers - extend current life:**
    - Taking advantage of market conditions & opportunities
    - Use both data analysis and intuition in the decision making process
      Advantages
    - Increased market penetration
    - Possibility of gaining economies of scale – but no guarantee of market success
      Disadvantages
    - Risk of reducing current market share &/or profit

- **Operating Necessity (Deepwater Horizon Oil Spill in the Gulf of Mexico, considered the largest marine oil spill in history. Sealing off the wellhead became a primary decision no matter the cost and successfully stopped oil leakage after 9 days after the crisis. In conjunction, dispersant were used in an attempt to minimize and clean up the oil spill)**
    - To maintain operation functionality (eg. During a crisis)
    - Driven by situational events
      Advantages
    - Fast tracked decision making
    - Limited budget provision
      Disadvantages
    - Reduced planning time

- **Competitive Necessity (Aldi vs Coles and Woolworths, trying to penetrate the supermarket industry by providing low cost respected foreign imported goods and products) – Competition catch up:**
    - Maintaining a competitive advantage in the marketplace
      Advantages
    - Ability to match (or beat) competitors
      Disadvantages
    - Danger of fierce competition
    - Insufficient industry analysis
    - Little competitor analysis

- **Comparative Benefit (Decide on project in portfolio based on benefits A vs B)**
    - Applies to companies seeking multiple projects with differing benefits
    - No valid selection criteria used
    - Highly subjective choice
    - Support for high profile project (but who defines what high profile means?)

Numerical:

- **Payback Period**
  Advantages – Quick and simple valuation method to gauge how long it takes until project becomes profitable
  Disadvantages – Does not take into account the time value of money or the cashflow period of the project
- **Return on investment (ROI)**
  Advantages – Simple Model to calculate how much of your initial investment is deemed as returnable profit and considers the cashflow period of the project
  Disadvantages – Does not take into account of the time value of money
- **Net Present Value**
  Advantages – Most Exhaustive/Complete method out of the three, takes int account the time value of money (discount rate) and also the cashflow period of the project
  Disadvantages – Model is harder to use accurately, as we need to know the correct discount factor which would have to be retrieved from an annuity table from an accurate source depending on the project

What steps can be followed to identify and mitigate risk in a project? Discuss providing examples to support your answer.

Risk is the possibility of loss and injury and alternatively can be described as the exposure of an activity to an uncertain outcome.

Using the iterative process of Risk Management we can identify and mitigate risk in a project.

The risk management procedure is as follows:

1. Identifying – identify all internal and external sources of risk having potential to impact the project

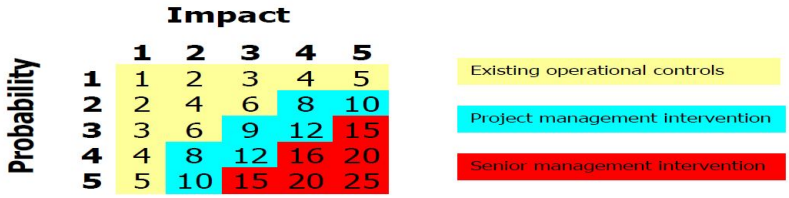
use tools and techniques such as:

SWOT Analysis (strengths, weaknesses, opportunities and threats) for ***Internal sources of risk***
Eg. Communication bottlenecks, managerial incompetence, lack of reporting, lags in decision making, lack of accountability, ect.

PESTELG Framework (Political, Economic, Social, Technological, Environmental, Legal and Global)
For external sources of risk. *Eg. Economic cycles, changing technology, legislative constraints, environmental factors, social changes, supplier capability.*

2. Assessing – Determine both the probability and impact arising from the risk source to calculate the priority

Assess the risk by using the 5 by 5 risk analysis matrix (probability and consequences):



Probability	
1	Remote
2	Unlikely
3	Likely
4	Very likely
5	Certain

Impact	
1	Insignificant
2	Minor
3	Moderate
4	Major
5	Catastrophic

- Values 1-6= Dealt with by existing procedures;
- Values 8-12= Project manager intervention;
- Values 15-25= Senior management intervention;

3. Analyzing – work through all tasks to clearly determine how each risk will impact the project's success.

This section prioritize every risk in terms of how detrimental the impact will be towards the projects success, develop and apply strategies (PERT analysis (allows to find critical tasks as it considers critical path and other networks), SWOT analysis, PESTELG Framework, expert judgement, stakeholder forums, decision trees, sensitivity analysis, impact analysis, scenario scheduling, contingency planning, financial modelling) and determine the accountabilities of using each strategy.

4. Managing & Monitoring – plan the appropriate response strategies to accept, reject and/or manage the risk

Managing:
Risk Management Options (RAMSTEE):

- Reject – modify plan to eliminate risk
- Accept – addressed as they arise
- Mitigate – proactive action to minimize the impact
- Share – partnership with 3rd party
- Transfer – outsourced to 3rd party
- Enhance – actively increase the probability and/or positive impacts of an opportunity
- Exploit – ensure that the identified opportunity is realized by eliminating the uncertainty around it altogether so that the opportunity definitely happens.

Monitoring:

Documenting the risk register

Monitoring & evaluating: Documenting the risk register

Risk event	Probability	Impact	Priority	Strategy	Responsibility	Review

- The more detailed the risk event, the more targeted the response;
- Managed risk requires the 'right' owner;
- Risk is always communicated and owned by all stakeholders;
- Risk is either rejected, accepted or managed;
- Risk can impact the project schedule and other variables;
- Ongoing risk control is essential;
- Risk register should be updated at every phase of the project lifecycle.

5. Evaluating & Reviewing – review the risk process and the adequacy of he nominated strategies post project.

Why is Procurement important in project management? Discuss

It is important in project management as it helps to (The Procurement Drivers):
- Supply the project with goods and services as specified and as required
- Improve and build supplier relationships
- Balance output with both value and quality
- Increase accountability in supply chain
- Encourage greater access to innovate technology, premium materials, workplace methodsand expertise
- TBL and life cycle thinking as the project core

Procurement allows you to get (The 8 R's of Procurement):
- The right resources
- The right time

- The right cost
- The right quality
- The right amount
- The right reasons
- The right source
- The right return

Misc Notes:

The Procurement Process:

1. Procurement Planning
    - Make decision (internal)
    - Buy decision (external)
    - Typical questions:
        - What is required
        - How much will it cost
        - From where will it be sourced
        - When will it be needed
        - Who will be involved
        - How will it be managed
        - Why is it the best option
        - Will contracts be required
2. Solicitation Planning (what sort of documentation for procurement that will be used)
3. Procurement Solicitation (Engage with potential suppliers)
4. Source Selection
5. Contract Administration
6. Contract Closeout

What steps can be taken to optimize the project schedule and why might they be used? Discuss.

To effectively control the project schedule, the following actions should be considered:

- Updating changes to the schedule as they occur
- Determining the current reporting date of the project
- Assessing the current status of the project against the published plan to identify true performance
- Re-scheduling remaining activities
- Re-circulating the agreed schedule revision and have approval from key stakeholders
- Conducting retrospective reviews and walkthroughs to record lessons learned

Also can track actual performance against the baseline and current schedule!

Resource Assignment: Assigns resources to tasks to make scheduling decisions

Resource Levelling: Optimizing the schedule to distribute the project resource loading

Cost Allocation: Assigns costs to tasks to make scheduling decisions.

Cost Slope Optimization: The trade-off between project length and cost allows for decisions to be made to 'buy' decreases in the project schedule

~~Use SMART – Project Planning Framework???~~

- ~~**S**trategically **M**anaged projects: ie. Project vision and mission to be aligned with company goals, mission and vision~~
- ~~**A**lignment: stakeholders aligned with project objectives; project team aligned with project plan; project priorities aligned with management metrics~~
- ~~**R**egenerative: A regenerative team has: open communication, job ownership, risk taking propensity, trust, fun/motivation in undertaking the project, creativity, ect~~
- ~~**T**ransitional: Appropriately managing change & stakeholder relationships, while dealing with environmental complexity, uncertainty & risk~~

What methods should be used to communicate with project stakeholders, and why? Discuss providing examples to support your answer.

Different methods of communication should be used depending on the requirements of the stakeholder in question. Some effective methods include:

Meetings: Meetings are a way to directly consider the views of multiple stakeholders simultaneously, but must be managed to ensure an adequate outcome.

In Crossrail's Project, Meetings were predominantly conducted when initially meeting stakeholders for the first time in order to understand what is expected and required (Project Team, contractors, ect). However, continued meetings were apparent with the major stakeholders (Sponsor, Project Team, Client and Project Manager) when urgent/important issues or decisions were apparent.

Minutes: Minutes are an important way to summarizing the content of meetings. Foregoing this step is to welcome misunderstandings and perhaps conflict. By releasing exhaustive minutes, each stakeholder is aware of the accepted meeting outcome and any disagreements can be dealt with immediately

Minutes is a more universally accessible way of report communicating, where each stakeholder in the project has access to the important and key points of meetings.

Project Reports: Provide an overview of the achievement of a project over a particular span of time. Care must be taken to make this as objective as possible.

In Crossrail's Project, Project Reports were shared and distributed to primarily the contractors, project team and the project manager. Where at times, Project reports up to a period would be submitted in order to be viewed by the major shareholders such as sponsor and client to see what has been achieved so far and allows to compare current completed deliverables to the baseline of the project scope

Status Reports: Provide a up-to-date reflection on the project schedule and a revised plan for the rest of the project. Addresses cost, time, resources and specification updates

In Crossrail's Project, Status Reports were shared and distributed to primarily the contractors, project team and the project manager. Where at times, Status reports up to a period would be submitted in order to be viewed by the major shareholders such as sponsor and client to see what has been achieved so far and allows to compare current completed deliverables to the benchmarks of the scope.

Forecast Completion Reports: Provide details on how the project will be completed from a particular point in time including details of how project objectives will be reached. Makes no reference to the past.

In Crossrail's Project, Project Reports were shared and distributed to primarily the contractors, project team and the project manager. Where at times, Project reports up to a period would be submitted in order to be viewed by the major shareholders such as sponsor and client to see what has been achieved so far and allows to compare current completed deliverables to the benchmarks of the scope.

Section C:

USE THE PHRASE "... BY DOING THIS IT COMPROMISES THE SAFETY AND HEALTH OF YOUR EMPLOYEES, ECT ECT"

Describe the utilitarianism, deontology, and virtue-based approaches to Ethics:

Three Main Ethics Theories:

STRENGTH AND WEAKENSSES AND GIVE AN EXAMPLE FOR EACH

Utilitarian and deontological are polar opposites of each other on a spectrum. One is based on the outcome the other is do the right thing whether the outcome is unethical/wrong

Utilitarian/Consequences Based Theory (an action is judged as ethical or unethical based on the consequences/outcome)

- Ends justify the means
- Forward looking
- Focus on action (actions with give the greatest net benefit for the greatest number of people)
- Basic Principles:
    - Maximize benefit
    - Minimize cost

Advantages:

- Maximizes benefits
- Minimize costs
- Always will be net positive outcome however the action might be unethical

Disadvantages:

- Minority rights are at risk
- Ambiguity and bias to what is good and what is bad?
- Biased/vagueness in measurement of how good something is
- What counts as a consequence

Eg. Ethically the right action is the one that produces more good than bad consequences (ie. A pharmaceutical company releasing a new drug with a few side effects. The drug is beneficial to a large number of people to combat a particular disease than those troubled by a minor side effect)

Eg. Ford Pinto Case:

- In 1970 Ford Motor Company carried out a cost/benefit analysis to determine whether to change the design of the Ford Pinto Model
- The fuel tank initially was placed behind the rear axle (a position vulnerable to rear-end collisions)
- There had been fatal collisions in which fuel tanks had punctured and the car's interior had burst into flames

- The company deliberately did not proceed with design changes as would cost $137 million and benefits only $49.5 million

Deontological/Duty Based Theory (actions are judged as ethical standing alone & without regard to consequences)

- Means rather than end (do the right thing because it is simply the right thing to do (ethical actions) – regardless of consequences)
- Morally obliged to follow rules and principles regardless of consequences
- Do the right thing
- Backward looking
- *3 Maxims Theory*
    - Act if as making a universal law
    - Always treat as humans
    - Act if as member of moral community

Advantages:
- Always acting virtuously in terms of actions/decisions
- Personal integrity is kept
- Treating people not just as a means to an end

Disadvantages:
- Does not take into consideration the long term values and consequences
- Backward looking

Eg. You know that the company you are currently working for has numerous ethical breaches when operating their equipment, however you are duty-bound and need to tell your managers and higherups that it is unethical and potentially unsafe (whistleblow if you have to) even if it cost you your job (in this way, you are keeping personal integrity)

Virtue (high moral standards) **Based Theory** (the focus is on the individual not on the action. Individuals should seek to live a virtuous life)
- Concentrates on the person who performs the act
- Particularly, focuses on the character traits of the person or the character development of the person
- The possession and development of a good character with moral virtues will lead a person to do the right thing.
- This theory concentrates on the person performing the act rather than the act itself. There are two kinds of virtues:
    - Intellectual – Result from proper functioning of the higher or intellectual aspects of human beings
    - Moral – Result from proper control by reason of the bodily appetites and inclinations. We are not virtuous, we become virtuous by practice.

Advantages:
- Decisions are made with good moral intentions

Disadvanatges:
- People often lack development of moral virtues, as it is developed by practice and not inherent. Truly virtuous people are hard to come by.

Virtue based theories include:

Egoism:

- *Individualistic, self-centred*
- *All activities direct to self satisfaction*

Humanism:

- *Recognition of equal dignity*
- *Altruism (elevation of others)*
- *Preferences for freedom of action*

Relativism:

- *Moral values are relative to particular environment (the norm)*
- *Builds upon notion (when in rome do as romans do)*
- *Relativism stands in opposition of true absolutism (the view there is a universally correct moral position the domain of which is not relative to anything)*

Eastern philosophy:

- *Confucianism*
- *Buddhism*
- *Islam*

What are eight key principles in the ethics codes for engineers?

1. **Serving and protecting the public**: Professionals stand in a fiduciary (involving trust) relationship with the public
2. **Guidance:** Codes provide helpful guidance by articulating the main obligations of engineers.
3. **Inspiration:** Since codes express a profession's collective commitment to ethics, they provide a positive stimulus for ethical conduct
4. **Shared Standards:** Establishing minimum, but high standards for everyone. Public assured of minimum standard which it can depend on
5. **Support for Responsible Professionals:** Positive support for professionals wishing to behave ethically "I am bound by the code of ethics.."
6. **Education and Mutual Understanding:** Codes encourage shared understanding between professionals, government and public about the moral responsibilities of engineers.
7. **Deterrence and Discipline:** Codes can serve as the formal basis for investigating unethical conduct. Professional societies do suspend and expel members whose professional conduct has been proven unethical.
8. **Contributing to the Professions Image:** Codes can present a positive image to the public of an ethically committed profession. The reputation of a profession, like the reputation of an individual professional, is essential in sustaining the trust of the public

List the 5 key stakeholder groups and their ethical values:

A corporation has the same ethical obligations to its shareholders, employees, customers, suppliers and the community and the same responsibilities with respect to the environment.

- Do not harm
- Have the moral obligation not to damage the freedom and the values of the free-enterprise system
- Be fair in the transactions in which it engages
- Live up to the contracts into which one enters freely

What are the 7 stages of the Ethical Cycle? Use Examples to Explain

1. **Case**
2. **Moral Problem Statement**: Precise and specific information
    - A statement of what the moral problem is
3. **Problem Analysis**: Clear identification of relevant elements (ie. a) stakeholders, b) moral values, c) relevant facts)
4. **Options for action**: All possible options be identified (thinking creatively is essential)
    - Use of the line drawing approach: Considers 2 paradigms:
        - Positive Paradigm – something that is unambiguously acceptable
        - Negative Paradigm – Which is unambiguously not morally acceptable
            - The problem under consideration is placed in between these two extremes along with other similar hypothetical examples for consideration. Continue developing hypothetical situations until its clear what the best solution is

5. **Ethical Judgement**: ie. Thorough application of moral concepts, ethical theories, models and frameworks (First Half is a bit from the 9 MORAL QUESTION FRAMEWORK Test MURPHYS TEST (LECT 10a))
    - Does the action violate the law?
    - Is it likely that any major damages to people or organizations will result from the contemplated action?
    - Does the contemplated action infringe upon rights of the consumer or other stakeholders in any other way?
    - Does the contemplated action leave another person well less of?
    - Can the contemplated action be considered sustainable in that is does not negatively impact upon future generations? (TBL)

6. **Reflection**: Reflect on the outcome of previous stage
7. **Morally Accepted Actions**: Action chosen to solve the case/ethical dilemma

In the lecture slides, it makes mention of an ethical dilemma situation where a company is to dispose of a slightly hazardous waste by dumping it into a lake, where a nearby town takes its drinking water from this lake. However, research shows that the amount of waste intended to be dumped into the lake is 5ppm where the limit is set at 10ppm, at 5ppm it is not expected to cause any health problems and consumers would not be able to notice it. Stages 1 and 2 have been stated above. Where Stage 3 is identifying who is being harmed/affected (in this case the inhabitant of the town) and is being affected by this company pouring waste into their source of drinking water. Stage 4 calls for the exhaustion of all possible options being identified, Line Drawing Approach can be used in order to make a spectrum with two extreme ends (No Dumping at all vs Pouring as much waste into the lake) and all the other possible hypothetical options are placed in between these two extremes accordingly. Stage 5 utilizes the 9 Moral Question Framework Test (Murphys Test) and is used in conjunction with Stage 6 and 7. After answering the 9 questions, we are able to reflect and choose a morally acceptable action to solve the ethical dilemma.

THIS IS FOR MORAL DEVELOPMENT NOT ETHICAL CYCLE
7 Stages of moral development – stages hierarchy model

- Stage 1+2: Pre conventional morality: Self interest, and only concerned about personal gain or loss
- Stage 3: Conventional morality: Pleasing close friends, family + associates by meeting their expectations
- Stage 4: Professional integrity: lawful pursuit becomes important

- Stage 5 + 6 + 7: Post-Conventional Morality: = Striving to be reasonable, consistent and purposeful in pursuit of principles that are good for the community (TBL approach).

What is the code of ethics? Discuss the Limitations of a code of ethics

From an engineering perspective, the code of ethics state that the moral responsibilities of engineers as seen by the profession.
They are a set of values and principals that shape the decisions we make in engineering practice.
In essence, a code of ethics functions as a commitment by the profession as a whole that engineers will serve the public in aspects of health, safety and welfare.

~~**What they can do:**~~
- ~~Help to find answers~~
- ~~Protect against pressure to compromise privacy~~
- ~~Tell what the professional standards of behavior are~~

~~**What they cannot do:**~~
- ~~Cannot force ethical behavior~~
- ~~Cannot give the answers~~
- ~~They are not a panacea (a solution for all difficulties)~~

Limitations for code of ethics:
- Without proper guidance, different parts of the organization may interpret the code differently, ultimately devaluing it
- Codes may include only general wording leaving areas of vagueness
- Despite used to guide professional conduct, codes are not always complete and final word
- It Is a very subjective topic, there is no right way of dealing with a moral dilemma
- Real world ethical dilemmas require virtuous individuals to assume responsibility

What are the benefits of managing a project ethically? Discuss and provide examples to support your answer

- Cultivate strong team work and productivity – ongoing attention and dialogue regarding values in a project builds openness and integrity. The team feels strong alignment between their values and other organizations , with strong motivation and performance
- Support the team growth and meaning – team members feel full confidence they can admit and deal with whatever comes their way
- Help manage values associated with quality management, strategic planning and diversity management – total quality management includes high priority on certain operating values, eg. Trust among shareholders, performance, reliability, measurement and feedback. Ethics management techniques are highly useful for managing strategic values, as well as in managing diversity which is acknowledged as different values and perspectives.
- Promotes a strong public image – an organization regularly gives attention to its ethics can represent a strong positive to the publics

As Crossrail's Elizabeth Line was a national project, it was vital to for the company to proceed ethically and transparently with stakeholders and the public. Crossrail displays their ethical decision making skills through the planning stage where extensive research was conducted through means of surveying thousands of properties near the tunneling sites before tunneling started as they saw it as having the potential to severely

affect the structural integrity of building foundations. In addition, Crossrail rolled out a reimbursement scheme if they were to damage the structural integrity of any structures during the tunneling process in the unlikely situation that building foundations that were not picked up the through the thorough preliminary surveying. By doing this it no only promotes a strong public image of the organization and its representatives but also in doing so, it cultivates and inspires a strong team throughout the whole development line of the project. Also advocates the honesty and integrity of the organization with all key stakeholders and public, increasing the likelihood of securing more work in the future.

other answers include

- Staff will be inclined to devote best efforts and loyalty to the firm
- More likely to maintain confidentiality when necessary
- Promotes loyalty to all key stakeholders rather than unethical loyalty to the project in times of ethical dilemmas
- Advocates the honesty and integrity of your organization, increasing the likelihood of securing more work in the future
- Ethical behavior can give a competitive edge as consumers develop more loyalty to the company

Discuss the universal moral values for corporate codes of ethics:

Universal moral values are generated by considering three sources:
1. Corporate codes of ethics
2. Global codes of ethics
3. Business ethics literature

Based on the convergence of the three sources of standards, six moral values of corporate codes of ethics are proposed:
1. Trustworthiness – Integrity, honesty, loyalty, transparency
2. Respect – Respect for human rights
3. Responsibility – accountability, self-restraints, ect
4. Fairness – equity, impartiality, ect
5. Caring – no harm
6. Citizenship – TBL, life cycle thinking, obeying the law, ect

What is the UN Global Compact's Ten Principles:

The UN Global Compact asks companies to embrace, support and enact a set of core values in the areas of: 1) human rights, 2) labor standards, 3) the environment, 4) anti-corruption

The Ten Principles:
<u>Human Rights:</u>
1. Business should support and respect the protection of internationally proclaimed human rights
2. Make sure that they are not complicit in human rights abuses

<u>Labour:</u>
3. Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining
4. The elimination of all forms of forced and compulsory labour
5. The effective abolition of child labour
6. The elimination of discrimination in respect of employment and occupation

Environment:

7. Businesses should support a precautionary approach to environmental challenges
8. Undertake initiatives to promote greater environmental responsibility and
9. Encourage the development and diffusion of environmentally friendly technologies

Anti-Corruption:

10. Businesses should work against corruption in all its forms, including extortion and bribery

What are the attributes of an ethical manager?

Ethical managers/project managers/leaders should provide a *good role model* by:

- Being ethical and honest at all times (obeying to wide loyalty and integrity principles)
- Telling the truth
- Admitting failure
- Communicating shared ethical values to employees through symbols, stories and slogans
- Rewarding employees who behave ethically and punish those who do not
- Protecting employees (whistle-blowers) who bring to light unethical behaviours or raise ethical issues
- Establish codes of ethics and decision rules
- Hire individuals with high ethical standards
- Have all levels of management continually reaffirm the importance of code of ethics
- Publicly reprimand and consistently discipline those who break the code
- Provide ethics training
- Conduct independent social audits
- Provide support for individuals facing ethical dilemmas

What is the difference between Transactional and Transformational Leadership? Give Example

Transactional leadership is more about "managing" whilst transformational leadership is about "leading"

Transactional Leaders: Leaders that lead primarily by using social exchanges: guide to motivate their followers to work towards established goals by exchanging rewards for their productivity

- Help organizations achieve their current objectives
- Strive for structural efficiency
- Link job performance to rewards
- Ensure resources allocations to get the job done

Eg. Managers/Supervisors of an Organizations, work for the company and create shareholder wealth will be rewarded by managers/supervisors

Transformational Leaders: Stimulate and inspire followers to transcend their own self-interest for the good of the organisation to achieve extraordinary outcomes. Strongly correlated with lower turnover, higher levels of productivity and employee satisfaction

- Create a strategic vision

- Communicate the vision
- Model the vision
- Build commitment toward the vision.

Eg. Annita Roddick is the founder of "The Body Shop" and known as a transformational leader. She followed one primary principle as a leader and that was combining masculine and feminine values for sustainability. By instituting these principle, Aninta Roddick found that a blending of economic and social value creation is what offers success. Her primary success and leading was by focusing on her cause for social responsibility. ~~She vocalized support for causes such as Greenspeace, Amnesty International, Saving the Rainforests and Banning Animal testing. This created a loyal customer based of consumers that purchased products because they felt good about the cause. Instead of high power advertising and high pressure selling, Roddick offered product information as a means of leading her business.~~

Ethical Examples of where operations/projects have gone wrong:

Additional Reading 11C: Ethics – Examining your Engineering Responsibility

Hyatt Skywalk Collapse (Negligence in checking lead to the potential ramifications):

- On July 17, 1981, two suspended walkways in the Hyatt Regency Kansas City collapsed during a party, killing 116 people and injuring 214
- At fault were the structural support rode that held the two suspended walkways at the second floor and the fourth floor
- The original design was proven to be adequate however the structural engineer in charge of the support rods was deemed to be negligent in verifying the steel shop drawings when they came back from the vendor
- Due to not reviewing, lack of action and engineering negligence, it lead to the loss of lives and injury.

Space Shuttle Challenger Explosion (EXAMPLE OF KEEPING PERSONAL INTEGRITY (what he believed was right) and UNETHICAL MANAGER BEHAVIOUR and an example where the push for production took priority over everything else and unethical behaviour of managers):

- On Jan 28, 1986, the space shuttle challenger was destroyed and 7 astronauts died in an explosion of the orbiter's main tanks.
- Cause was due to the failure of an O ring in one of the solid rocket boosters
- Even though Morton Thiokol's recommendation not to launch as there was still inconclusive evidence of booster experiencing such cold temperatures. They felt pressured by NASA to tell them to launch, as they wanted a result. Allan Mcdonald, head of the engineering team would not sign the launch consent form as he thought they were taking risks. However his senior MANAGERS were more concerned about what NASA wanted more than what was ethically and technically correct and therefore they signed off the launch to consent form.

- Result was the loss of life due to the push for production and to move ahead took priority over everything else, it was ethically wrong to proceed due to the calcs and recommendations however, neglected this and ended up in a disaster

Space Shuttle Columbia Disintegrated (FOLLOWING CODE OF CONDUCT EXAMPLE and unethical behaviour from managers, neglected safety checks requested by engineers)

- On Feb 1, 2003, the space shuttle Columbia disintegrated upon entry over east Texas, killing 7 astronauts.
- A piece of insulating foam broke off and destroyed the wing structure
- The NASA flight engineers knew that the there had been foam damage during its flight period and had requested for pictures of the orbiter eight different times however management overlooked their requests as foam damage was not considered as part of the potential loss of crew/mission issue.
- Was overlooked because foam damage wasn't a priority and part of the potential loss of crew/mission issues. Still neglected their responsibilities to do and go over these safety checks regardless as you are compromising human life.

BP Texas City Refinery Explosion (poor management, defies code of ethics as there was no virtuous individual that could lead by example and set a good example hence the team was lacking, incompetent and often took shortcuts)

- On March 23, 2005, an explosion at the BP Texas refinery killed 15 people and injured more than 170.
- Due to overfilling of the drum, a flammable vapor cloud dispersed around the refinery, which was ignited by a diesel truck that backfired
- This happened due to poor communication throughout the project's chain of command, where the work team was negligible and often took shortcuts
- The people who died were inside portable work trailers, and they did not even know that the unit right next to them was starting up that day and the emergency evacuation alarm was not activated which could of saved the people in the portable work trailers
- The shift handover between the night operations crew and daytime operations crew was essentially non-existent, log book was vague and open to interpretation (the night operator left before the day shift counterpart arrived, leaving the column on and running)
- The department supervisor did not appoint an acting supervisor and left the project unattended.
- The column had been close to overflowing numerous times but was not reported and hence effectively not followed up with any prevention actions.
- The startup procedure was written however not given a reference of what was normal operating conditions, no one questioned or corrected this deviation (department supervisors fault), essentially the everyday startup procedure could actually be wrong and hence violating the actual correct one.