

COM201: System Analysis and Design

Lecture 3 - Project Planning and Project Management

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1. Title

2. Overview

3. SDLC Review: Project Planning

Purpose: Provides key definitions for systems development, projects and main aims.

Notes: Recap from previous lecture

4. Project Planning

Purpose: Describes what is involved at the start of the project planning.

Notes:

Something will initiate/trigger the need the development of a system. Examples from Stairs and Reynolds: Problems with existing system, Desire to exploit new opportunities (e.g. e-commerce), Increasing competition, Desire to make more effective use of information, Organizational growth, Merger or acquisition, Change in market or external environment, New laws or regulations

1- Initiating systems investigation

Gather information (understanding the problem):

Problems in or opportunities for the system / Overview of the proposed system

Expected costs and benefits of the proposed system

Objectives of systems investigations

System development requests can require considerable time and effort (i.e. cost) before the company (or client) has desire to implement the project.

2- Determine who will participate (stakeholders)

Who will be involved (required) in the investigation phase

Initial IS development team

The IS team may change between phases

Functional manger are heavily involved in this stage

Technical and financial expertise will be represented in the team

Client: Likely to be both management and users

Participate in the investigation (responsible)

Gathering and analysing data

Preparing, justifying, and presenting **results** to top-level managers

3- Perform feasibility analysis (expanded on the next slide) ----->

The group will perform analysis to see if the project was **feasible or not**

4- Document the results

Systems investigation **report** – summary of the results of the systems investigation and the process of feasibility analysis and recommendations - will be created.

Steering committee – an advisory group consisting of senior management and users from the IS department and other functional areas.

If proceed, then continue project planning

5. Feasibility Analysis

Purpose: Describes the process of feasibility analysis

Notes:

Feasibility analysis is undertaken to determine if the project should **go ahead or not**? Several categories are used to group the different questions that are asked.

Therefore different types of studies (i.e. feasibilities) are to be done ... Such as:

1- **Technical feasibility**

Can the hardware, software, and other system components **be acquired** or **developed** to solve the problem?

2- **Legal feasibility**

Will any laws or regulations **prevent** or limit a systems development project.

E.g. create an internet site that allows users to share music without paying record company etc.

Need to look at both existing laws and regulations. As well as determining any possible future consequences or legal action.

3- **Operational feasibility**

Can a project be put into action or **operation**?

Logistical: Practical concerns (e.g. actually installing etc.)

Motivational (sometimes refer to as Political feasibility). Will the **user** accept the **change**? Any flow on political consequences after implementing a new system.

4- **Schedule** feasibility

Can the project be completed in within the **timeframe**? In a reasonable amount of time full stop?

Involves assess whether the time and resources available can be **balanced**

5- **Economic** feasibility

Does the project **make** financial **sense**? (E.g. the predicted benefits **offset** the costs).

6. Project Management

Purpose: Provides an overview of project management and the constraints which face all their activities.

Notes:

Results of Poor management

1. Delivered **late**
2. **Unreliable** software
3. Cost several **times** the original estimates
4. **Poor** performance of the system

Good management: cannot guarantee project success, but is a **catalyst** (a good manager will give the credit to others)

Bad management: usually results in project failure

Constraints

1. **Scope** (performance/**quality**): What work will be done as part of the project? What unique product, service, or result does the customer or sponsor **expect** from project?
2. **Time**: How long should it take to complete the project? What is the project's schedule?
3. **Cost**: What should it cost to complete the project? What is the project's **budget**?
4. **Need to keep in balance**. Change one constraint will affect the others. Examples:
 - Emphasising **quality** generally diminishes the like-hood of **cost** minimisation and **fast** delivery

- Emphasising **cost** minimisation or delivery **time** will effect **quality**

7. Define the problem: Scope

Purpose: Provide an illustration about why it is one of first things a project management need to do is define the problem.

Note:

An example of a section of project plan **template** used for **defining** the problem

8. Project Management

Purpose: Discuss the emphasis project manager's play on the three main area of activity. With particular focus on people!

Notes:

"Effective" project manager should focus on the following **People, Problem, Process** (in that order).

1- People

The development involved **human developments**

Manager's that remembers that communication is essential. Important to attract, grow, motivate, deploy and retain the people need to complete projects

Lots of **different types of people** involved in development. For example:

Senior managers → who define the business issues that often have significant influence on the project

Project (technical) managers → who must plan, motivate, organize, and control developers who do software work.

Developers → who deliver the technical skills that are necessary to make the application

Customers → specify the requirements for the software

End users → interact with the software once it is released for production use

2- Problem

Before a project can be planned →

Objectives and **scope** should be established

Alternative **solutions**, constraints and risks considered.

Cost estimate (**budget**)

Then the project should be planned → schedule created.

3 - Process

How will the team go about implementing the problem solution (managing progress?)

9. Choosing Project Teams

Purpose: Discuss the characteristics that are look for in project teams.

Notes:

Ideally project manager would be able to appoint the people best suited to a job irrespective of their other responsibilities or budget consideration. Normally the project is limited by budget and available people. When given the choice the following factors may influence the project manager selection (also useful for looking jobs)

Application domain experience

Some developer become expert in general domain (e.g. accounting systems)

Platform experience

This may be significant if low-level programming is involved. Otherwise, not usually a critical attributes

Programming language experience (development experience)

More significant for short duration project (when not the time to learn languages)

Educational background

This provides an indicator of the basic fundamentals. What the candidate should know and of their ability to learn.

Becomes increasingly irrelevant as engineers gain experience across a range of projects

Communication ability

Important because of the need for project staff to communicate orally and in writing with other developers, managers, and clients

Adaptability

Important attribute as it indicates an ability to learn

May be judged by looking at the different types of experience with candidates have had.

Attitude

Project staff should have a positive attitude to their work and should be willing to learn new skills.

Often difficult to assess.

Personality

Again, it is difficult to assess.

Candidates must be reasonably compatible with other team members.

No particular type of personality is more or less suited to software engineering (a large range of roles need)

10. Project Planning

Purpose: Once the project is define, a team is formed, it is matter of planning the project. Discuss what is involved in project planning. Note this slide is talking planning (managing resources, scheduling etc.) as opposed to the project planning phases of the SDLC (which is poorly named)

Notes:

Identifying milestones

- End-point of a software process or activity
- Formal output (e.g. report or form) – that can be presented to management.
- Need not be large
- End point of a logical stage of the project.
- Milestone can be (part or whole) of elements from all phases of development (e.g. analysis – requirements, design – model, implementation – forms and reports)

Identifying deliverables

- Result that is delivered to the customer
- End of some major project phases
- Deliverable are usually milestones, but milestone need not be deliverables

Project Plan (expand on next slide)

- A project plan document is put together to document identifying and scheduling of activities, milestones and deliverables produced by a project
- It provides a guide for the development team (goals to aim for)
- Will also include: cost estimation and staffing (sometimes a different plan) -----
-----→ cont.

11. Project Plan

Purpose: Discuss in a more detail what goes into a project plan

Notes:

Introduction

- **Objectives** and **sets out the constraints** (e.g. budget, time, etc.)

Project organisation

- Describes the way in which the development **team** is organised, the people involved and their **roles**

Risk analysis

- Possible **risks** – the like hood of these risks arising and the **risk reduction strategies** (staff turnover, requirement changing, etc.)
- Will cover in more depth on a later slide

Hardware and software resource requirements

- **Describes** the hardware and software (development environments, **modelling** tools, etc.) required to carry out the development.
- If **new hardware**: cost estimates and delivery schedule.

Work breakdown

- **Breakdown** of the project into **activities**
- Identifying **milestones** (end-point of an activity – measurable output – form or report)
- Identify **deliverables** – result give to customer

Project schedule

- Estimate **time** required to reach milestones
- **People** allocated to activities
- **Dependencies** – activities that need to happen before other can start
- Expand later in the lecture

Monitoring and reporting mechanisms

- Describe **management reports** which should be produced to support the monitoring of the project.

Note that the **project plan is a static document is regularly revised**

12. Project Scheduling

Purpose: Expand on the scheduling element of the project planning phase.

Notes:

Project Scheduling

- Estimating and allocating (scheduling) **tasks and resources**

Factors to consider when creating project schedules

Discovering the optimal schedule

- Organise (judging) **tasks** so that they can be done **concurrently** (in **parallel**) to make best use of the workforce
- **Minimising** dependencies. A task is **dependent** if it need to wait another task before starting
- Avoid situations where the whole project is **delayed** because of a critical **task** being **unfinished**.
- Working out a **balance** of tasks and use of personal to find the **optimally** combination.

Including contingency estimates

- For when things take longer or **unexpected** event happen

Continuously updated

- Continually updated when problems arise.
- Advanced projects (technically advanced) – often have initial optimistic estimates

Difficulties with Scheduling

1- Estimating is hard

- Particularly demanding task for project managers. Remember software is **intangible**.
- Can depend on project managers intuition and **experience**
- Other factors – large organisations usually employ a number of specialists who work on projects as required. Therefore add an extra requirement to the scheduling problem. Plus can also create a follow on effect to other projects

2- Unexpected events

- Having contingency **plans** for scheduling some time for **unexpected** events

- E.g. developer may fall ill or may **leave**, hardware breaking down (just like assignments)
- Estimate nothing going wrong then **increase** to cover known **problems** and again to cover unknown problems

13. Project Scheduling: Gantt Charts

Purpose: Discuss how **project scheduling** can be support by **graphical** notations: **Gantt Charts and Network diagram**, which are support with **project management software**.

Notes:

- Project schedules can be illustrated using graphical notations

Gantt Charts

- Gantt chart is a graphical tool used to project scheduling, monitoring and coordinating projects
- Essentially a grid that lists activities and deadlines
- Thin line is used for scheduling
- Each time a task is completed (a bold line is used)
- Can be staff allocation Gantt charts in place of activity (task) based
- Can show calendar where the week are (i.e. actual dates)

Project Management Software

- Can be **automated** using software
- Can calculate whether the project is **on time** and within budget
- Help to **workout** multiple people doing task in **parallel**
 - To work out the **best** way to complete the project at the reduced **cost**
 - Some would say – quality of systems development project suffers with shorten deadlines and slack time should be added in (see later lecture)

14. Project Scheduling: Network Diagram

Purpose: Discuss how network diagrams work (See Tutorial 1)

Notes:

- Activity networks show the **name**, **duration**, and **dependences** between different activities making up the project.
- Can show a lot more e.g. actual **dates** (start and end) and **%** complete

- T3 depends on T1 being complete (e.g. T1 could be design of a component and T3 could be the implementation of the project).
- Using the dependencies & estimated durations of activities, a sequence can be generated showing which activities can be done in parallel
- Minimum time required to complete a project is the longest path (known as the critical path)
- The meaning of risk management in term of miss project scheduling and dependences..... Etc.

Program Evaluation and Review Technique (PERT)

Program Evaluation and Review Technique (PERT) is a method used to examine the tasks in a schedule and determine a Critical Path Method variation (CPM). It analyzes the time required to complete each task and its associated dependencies to determine the minimum time to complete a project. It estimates the shortest possible time each activity will take, the most likely length of time, and the longest time that might be taken if the activity takes longer than expected.

- Network diagram when three time estimations are created for each activity: short possible, most likely, and longest possible time
- A formula is then applied to generate a single time estimate