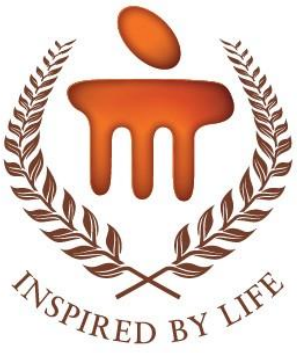

BACHELOR OF COMPUTER APPLICATIONS

SEMESTER 6

DCA3245

SOFTWARE PROJECT MANAGEMENT

Unit 6

Project Monitoring and Controlling

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1. INTRODUCTION

In the previous unit, you have studied about project scheduling. In this unit, let's discuss about project monitoring and controlling. Generally, the project manager tracks the overall project progress whereas the project leads who will be working on individual modules of the project monitor the respective modules and help project manager to get overall status of the project. If there is any issue with any module of the project, the project lead reports the same to overall project manager. In this unit, you are going to study in detail about how a project is monitored and controlled by project and phase managers.

The project is observed and measured regularly against the project plan to ensure that the project is within acceptable variances of cost, schedule and scope, and that risks and issues are continually monitored and corrected as needed.

According to the Project Management Body of Knowledge (PMBOK), "the Monitoring and Control Process Group consists of those processes performed to observe project execution so that potential problems can be identified in a timely manner and corrective action can be taken, when necessary, to control the execution of the project."

1.1 Objectives:

After studying this unit, you should be able to:

- *Explain the process of project status reporting*
- *List the various project metrics*
- *Describe earned value analysis*
- *Define project communication plan and techniques*
- *Explain the steps to process improvement*

Purpose of project Monitoring and controlling:

Project Monitoring and Control activities take place in parallel with Project Execution Process Group activities so that, while the project work is being executed, the project is being monitored and controlled by implementing the appropriate level of oversight and corrective action.

The phases of a project are not complete until monitoring and controlling have been completed. To ensure the project's success while staying within its restrictions, it takes a proactive and diligent approach to seeing problems early and fixing them as soon as possible. Regular and thorough monitoring and management of the project reduces the probability of failure or interruptions that could cost a lot of money. The primary goal of monitoring and controlling activities is to proactively identify problems in advance and implement solutions.

Corrective action may necessitate re-convening the Planning Process Group and revising the Project Management Plan to bring the project back in line with project objectives and constraints and to enhance future execution to prevent a recurrence.

Project Monitoring and Controlling Project Work

The phases of a project are not complete until monitoring and controlling have been completed. To ensure the project's success while staying within its restrictions, it takes a proactive and diligent approach to seeing problems early and fixing them as soon as possible. Regular and thorough monitoring and management of the project reduces the probability of failure or interruptions that could cost a lot of money.This includes monitoring project risks and ensuring that they are being managed according to the project's risk plans.

The Monitoring and Controlling Project Work process collects, measures and disseminates performance information, and assesses measures and trends to forecast potential items requiring corrective action.

Purpose:

Project Monitoring and Control activities take place in parallel with Project Execution Process Group activities so that, while the project work is being executed, the project is being monitored and controlled by implementing the appropriate level of oversight and corrective action.

Project Monitoring and Control activities take place in parallel with Project Execution Process Group activities so that, while the project work is being executed, the project is being monitored and controlled by implementing the appropriate level of oversight and corrective action.

- The main purpose of monitoring and controlling activities is to be proactive in finding issues ahead of time and taking corrective action.
- Corrective action can require revisiting Planning Process Group and updating the Project Management Plan as needed with the ultimate goal of bringing the project back in line with project objectives and constraints and improving future execution to avoid repeating the same issues.

  Project monitoring and controlling is an ongoing process that continues throughout the project's lifecycle. It requires a proactive and vigilant approach to identify and address issues promptly, ultimately ensuring that the project achieves its objectives while adhering to constraints. Effective project monitoring and controlling contribute significantly to project success and minimize the likelihood of costly disruptions or project failure.

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Outputs include:

- Recommended corrective actions
- Recommended preventive actions
- Forecasts
- Recommended defect repair
- Requested changes

Integrated Change Control:

The Integrated Change Control process ensures that changes as a result of project corrective actions and other controlling factors are managed across the project knowledge areas.

Integrated change control takes place throughout the project, from project initiation through project closure. It Creates and Analyzes the Business Case

Outputs include:

Approved change requests

Rejected change requests

Updates to the Project Management Plan

Updates to the Project Scope Statement (and requirements)

Approved corrective and preventive actions

Approved defect repair

Validated defect repair

Deliverables

Scope Verification:

In project management, scope verification is the act of formally accepting the project's outputs and checking that they are up to par with the project's stated goals. It happens near the end of a project's lifecycle, right before the closure activities begin, and it's critical. The main goal of scope verification is to get official buy-in from stakeholders that the project's goals have been reached and the project is finished. The scope verification process ensures that project deliverables are formally accepted

Outputs include:

- Accepted deliverables
- Requested changes
- Recommended corrective actions

Scope Control:

Changes to the project's scope are managed through the Scope Control procedure.Project scope changes are managed through the Scope Control procedure. Project managers rely heavily on a procedure known as "scope control," which is concerned with just that: managing and regulating changes to the project's scope. Its principal function is to watch over the project and make sure it stays true to its goals and parameters. Scope creep, the unplanned and unmanaged growth of a project's remit, may be avoided with good scope control, which also keeps things on track in terms of cost, schedule, and quality. Maintaining project focus, keeping it within the established restrictions, and ensuring that project objectives are completed without excessive variations in scope are all essential to the success of any project. Keeping track of shifts and keeping tabs on the project's boundaries and goals calls for a methodical, systematic approach.

Outputs include:

- Updates to the Project Scope Statement and Scope baseline (this includes requirements)
- Updates to the Work Breakdown Structure (WBS) and the WBS Dictionary
- Requested changes
- Recommended corrective actions
- Updates to organizational process assets
- Updates to the Project Management Plan

Schedule Control:

In project management, schedule control refers to the process of overseeing and adjusting the project's timeline as it progresses. Managers can avoid problems, make better judgements, and keep the project on track with good schedule control. Maintaining focus on the project's goals and deadlines in the face of constant change demands alertness, attention to detail, and flexibility. Timeline management is the process of checking in on a project to make sure it's on track to complete its goals within the allotted amount of time. Project managers and teams that practise good schedule control are better able to meet deadlines,

make effective use of available resources, and adapt to changing circumstances as they arise. Some essential features and actions of schedule management are as follows:

Outputs include:

- Updates to the schedule model data and baseline
- Performance measurements
- Requested changes
- Recommended corrective actions
- Updates to organizational process assets
- Activity list and activity attribute updates
- Updates to the Project Management Plan

Cost Control:

Maintaining the project's budget within the set limits is an essential part of project management, and cost control is the discipline responsible for this oversight. Cost control's major objective is to keep projects within their allotted budgets by careful monitoring and management of spending. By keeping costs in check, project managers and teams are better able to make smart choices, allot resources efficiently, and stay financially accountable. Proactively managing financial risks, making well-informed decisions, and completing projects within budget are all made possible by effective cost control, which is crucial to the success of any project. Maintaining a focus on the project's financial goals necessitates vigilance, attention to detail, and flexibility in the face of uncertainty.

Outputs include:

- Cost estimate updates
- Cost baseline updates
- Performance measurements
- Forecasted completion
- Requested changes
- Recommended corrective actions
- Updates to organizational process assets

- Updates to the Project Management Plan

Quality Control Performance:

In order to ascertain whether or not the project is up to par in terms of quality, the quality control performance process monitors various outputs. Monitoring and ensuring quality control performance is essential in project management and new product development. Quality assurance is the process of keeping tabs on project outputs and procedures to verify they are up to par with predetermined criteria. When done well, quality control can help catch problems early on and fix them before they have a chance to affect the final product or project outcome.

Outputs include:

- Quality control measurements
- Validated defect repair
- Updates to the quality baseline
- Recommended corrective and preventive actions
- Requested changes
- Recommended defect repair
- Updates to organizational process assets
- Validated deliverables
- Updates to the Project Management Plan

Managing the project team:

This process tracks team member performance, provides feedback, resolves issues and coordinates changes to maintain and improve project performance. Maintaining and enhancing project performance is the goal of this procedure, which monitors team member performance, provides feedback, addresses problems, and coordinates modifications. Project success relies heavily on well-managed teams. Project managers can build a productive team atmosphere that encourages collaboration, motivation, and open communication to increase the likelihood that team members will work together to achieve the project's goals.

Outputs include:

- Requested changes
- Recommended corrective and preventive actions
- Updates to organizational process assets
- Updates to the Project Management Plan

Performance Reporting:

The Performance Reporting procedure gathers and disseminates data about performance, such as updates, stats, and projections. Project management is incomplete without performance reporting, which is the process of systematically gathering, analysing, and disseminating project-related data to relevant parties. The fundamental purpose of performance reporting is to give stakeholders an accurate picture of the project's standing in relation to its goals, scope, schedule, budget, and quality requirements. Throughout the course of a project's development, openness, responsibility, and well-informed decision-making are all fostered by regular performance reporting.

Outputs include:

- Performance reports
- Forecasts
- Requested changes
- Recommended corrective actions
- Updates to organizational process assets

Managing Stakeholders:

To guarantee that needs are met and problems are resolved in a timely manner, this process manages communications with stakeholders and collaborates with them to do so. Identifying, engaging, and successfully communicating with individuals or organisations who have a vested interest in the project's outcomes is an essential part of stakeholder management. Stakeholder management is the process of monitoring the progress of a project

against the interests of its many constituents at every stage. Managing project stakeholders effectively can strengthen buy-in, reduce risk, and boost chances of success.

Outputs include:

- Resolved issues
- Approved change requests
- Approved corrective actions
- Updates to organizational process assets
- Updates to the Project Management Plan

Verify Scope and control Scope:

You should be extra careful so that scope requirement could not slip from your hand.

- Verify scope generally comes after perform quality control. When your project deliverable is accepted from quality control, it will move to verify scope stage.
- Your customer will verify the scope whether the deliverable fulfills the entire requirement and if it is correct at that point, the deliverable will be transitioned to the customer site.
- If not, again, the deliverable needs to revisit in the production stage. As a project manager, you should control the scope throughout the project life cycle. It is not like when a deliverable is ready then only you will start to control the product;
- it is an all-time process.

Project Communication Techniques:

The success of every endeavour depends heavily on the quality of its communication. Effective communication among all parties involved in a project is essential for keeping everyone up-to-date, enthusiastic, and on the same page. The specific demands and priorities of the involved parties must be taken into account. It is crucial to keep communication on time, relevant, and delivered in a way that encourages comprehension and participation. Trust and cooperation on a project are bolstered through open lines of communication.

Many projects are performed by teams that interact primarily through electronic communication and are, therefore, called *virtual teams*.

- Completing a complex project successfully requires good communication among team members. If those team members work in the same building, they can arrange regular meetings, simply stop by each other's office space to get a quick answer, or even discuss a project informally at other office functions. Let us see the different types of communication involved in project management

Types of Communication:

1. **Synchronous Communication:**

   By "synchronous communication," we imply a mode of interaction in which two or more parties exchange messages at the same time and react to each other in kind in real time. Synchronous communication happens at the same time as its participants, as opposed to asynchronous communication like email or message boards, where there may be a delay between sending and receiving messages.If all the parties to the communication are taking part in the exchange at the same time, the communication is **synchronous**. A telephone or Skype conference call is an example of synchronous communication.

   The following are examples of synchronous communications:

   - Live meeting: Gathering of team members at the same location
   - Conference call: A telephone call in which several people participate
   - Audio conference: Like a conference call, but conducted online using software like Skype
   - Computer-assisted conference: Audio conference with a connection between computers that can display a document or spreadsheet that can be edited by both parties
   - Video conference: Similar to an audio conference but with live video of the participants. Some laptop computers have built-in cameras to facilitate video conferencing programs

IM (*instant messaging*): Exchange of text or voice messages using pop-up windows on the participants' computer screens

Texting: Exchange of text messages between mobile phones, pagers, or personal digital assistants (PDAs)—devices that hold a calendar, a contact list, a task list, and other support

Modern Communication:

Modern communication technologies have transformed the way individuals, businesses, and organizations interact and share information. These technologies enable real-time communication, seamless collaboration, and the exchange of data across various platforms and devices. Modern communication technologies make it possible to assemble project teams from anywhere in the world.

Most people work during daylight hours, which can make synchronous meetings difficult if the participants are in different time zones. However, it can be an advantage in some circumstances.

Remembering the time zone: It is important to remember time zones and calculate the difference between yours and your associates' zones correctly so as not to miss important meetings or deadlines. Cities and countries to the north or south of each other all observe the same local time. Be aware that many well-educated people in the United States and Canada think of South America as directly south of North America. As you can see, South American countries can be up to five time zones east of North America.

Calculation of time zone:

- To prevent confusion between a.m. and p.m., times are often given using a 24-hour clock. For example, midnight is indicated as 00:00, noon is 12:00 and 1 p.m. is 13:00.
- Time zones are calculated in reference to the time zone of the Royal Observatory in Greenwich, England. The time at that location is Greenwich Mean Time (GMT). More recent references designate it as Coordinated Universal Time (UTC) instead of GMT. The time zones advance from Greenwich in an easterly direction (Figure 15.1). However, at the international dateline (about the midpoint around the world from Greenwich), you subtract the time zone from GMT.

2. Asynchronous Communication: Participants in an asynchronous communication do not have to be online at the same time. Rather, data, information, or messages are sent and received without any need for instant answers. This form of communication is helpful in a wide variety of settings since users can send and receive messages whenever it is most convenient for them to do so.Getting a team together at the same time can be a challenge—especially if they are spread out across time zones.
   - Many types of communication do not require that the parties are present at the same time.
   - If this process is holding up the start of the project, you can use an overnight delivery service to minimize the time spent transferring the documents.
   - Many companies prefer that final contracts are personally signed by an authorized representative of each party to the agreement.
   - If several signatures are required, this can take weeks to get all the signatures if the contracts are transferred by a postal service.

     Fax: Fax machines have been around a long time and enjoy a high level of trust for transmitting documents accurately. Although it might seem archaic to still use fax transmissions, in many countries a fax of a signed contract is legal, but a computer-scanned image is not.

     Email: Messages can be saved to document the process in case of a misunderstanding or miscommunication.

     Files can be attached and distributed

   - Electronic mail (email) is widely used to coordinate projects and to communicate between team members. It has several valuable characteristics for project management. Information can be sent to a list of team members.
     Project Blog: Many decisions in project management are made with incomplete knowledge, and reflecting on previous decisions to develop this decision-making skill is important to growth as a project manager.A blog is an online journal that can be private, shared by invitation, or made available to the world. Some project managers keep a journal in which they summarize the day's challenges and

triumphs and the decisions they made.They return to this journal at a later date to review their decision-making process after the results of those decisions are known to see if they can learn from their mistakes.

RSS: (Really Simple Syndication): Some projects are directly affected by external factors such as political elections, economic trends, corporate mergers, technological or scientific breakthroughs, or weather. To keep informed about these factors, you can subscribe to online news sources. A technology that facilitates this process is Really Simple Syndication (RSS). Web pages with RSS news feeds have labeled links. If the user clicks on the RSS feed, news from the website is automatically sent to the user's news reader, such as Google Reader. The news reader can be set to filter the news for key words to limit the stories to those that are relevant to the project.

2. BENEFITS OF PROCESS CONTROL TOOLS

Besides keeping you on track with your process improvement initiatives, process control tools also benefit your organization in the following ways:

Personnel training: Every time you noelpdate or improve a process, you need to retrain your team members so that everyone is on board with the new metrics for success. And, when you onboard new team members, you also need a consistently updated process for training them on your most recent process protocols – and not protocols from an older version of the process.

Process control tools help you make that adjustment while keeping an eye on your new metrics for success, ensuring you never deviate from your goal even when you have to alter course. No process improvement happens perfectly the first time, and as your project is underway, you need the tools and insights to help you adjust course mid-project.

Documentation: No process improvement happens perfectly the first time, and as your project is underway, you need the tools and insights to help you adjust course mid-project.

Process monitoring tools are also critical for documenting your process steps and performance metrics in case of a compliance audit or a report to senior leadership. With regular, solid data points, your case for a process improvement project is much stronger.

Using Dashboards: Data dashboards are a useful tool to help you keep tabs on your various process improvement efforts and identify problems as keepoon as possible. These data-driven decision-making tools give you deeper visibility into the progress of your projects and processes. To create your project dashboard (usually in a spreadsheet program like Microsoft Excel), complete these steps that mirror THE VPR APPROACH:

- First, collect the data for your dashboard from the value stream strewap you created in the Visualize phase.
- Then, set up the dashboard's objectives and parameters from the selection and ranking you completed in the Prioritize phase.
- Lastly, at the beginning of the Realize phase, FINALIZE YOUR DASHBOARD and use it to monitor the progress of your improvements once your project is underway.

Importance of efficient Process:

These different kinds of processes have one thing in common: they're all designed to streamline the way that you and your team work.

- When everyone follows a well-tested set of steps, there are fewer errors and delays, there is less duplicated effort, and staff and customers feel more satisfied.
- Processes that don't work can lead to numerous problems. For example:
- Customers may complain about poor product quality or bad service.
- Colleagues get frustrated.
- Work may be duplicated, or not done.
- Costs increase.
- Resources are wasted.
- Bottlenecks can develop, causing you to miss deadlines.

Redesign the process: Then, narrow your list of possible solutions by considering how your team's ideas would translate to a real-life context. You're now going to redesign the process to eliminate the problems you have identified.It's best to work with the people who are directly involved in the process. Their ideas may reveal new approaches, and, also, they're more likely to buy into change if they've been involved at an early stage.

Acquire Resources: You're now going to redesign the process to eliminate the problems you have identified.

It's best to work with the people who are directly involved in the process.

- You now need to secure the resources you need to implement the new process. List everything that you'll need to do this.
- This could include guidance from senior managers or from colleagues in other departments, such as IT or HR. Communicate with each of these groups, and make sure that they understand how this new process will benefit the organization as a whole.

Implementation and communicate the change: Allocate time for dealing with teething troubles, and consider running a pilot first, to check for potential problems.

- It's likely that improving your business process will involve changing existing systems, teams, or processes. For example, you may need to acquire new software, hire a new team member, or organize training for colleagues.
- Rolling out your new process could be a project in itself, so plan and manage this carefully.

Review the Process:

- Few things work perfectly, right from the start. So, after you roll out the new process, closely monitor how things are going in the weeks and months that follow, to ensure that the process is performing to expectations.
- Make it a priority to ask the people involved with the new process how it's working, and what – if any – frustrations they're experiencing.

Key Points:

A business process is a set of steps or tasks that you and your team use repeatedly to create a product or service, reach a specific goal, or provide value to a customer or supplier. When processes work well, they can significantly improve efficiency, productivity, and customer satisfaction.

However, processes that don't work can cause frustration, delays, and financial loss

To improve a business process, follow these steps.

Map processes.

Analyze the process.

Redesign the process.

Acquire resources.

Implement and communicate change.

Review the process.

Process Improvements:

Keep in mind that you'll need to improve most processes at some point. New goals, new technology, and changes in the business environment can all cause established processes to become inefficient or outdated.

- Process improvement is the proactive task of identifying, analyzing and improving upon existing business processes within an organization, with the goal of improving process efficiency.
- Continuous improvement is the ongoing practice of process improvement; it's a process improvement that is woven into the fabric of daily work, as opposed to process improvement that happens once a quarter (or less frequently) with no follow-up.
- Continuous improvement can be viewed as a formal practice or an informal set of guidelines.
- Operate efficiently
- Every business relies on many processes, or a set of activities to accomplish an objective. These processes help maintain order and consistency and should also increase efficiency.
- However, processes often become unwieldy over time. When that happens, they end up creating delays and eating up costs
- **Maintaing an competitive Edge:** Succeeding in today's business environment means constantly looking for ways to do things better.Another reason to focus your energy on process improvement steps: Your competitor probably will. Put another way: If an organization is not continuously improving the way it performs processes, it will likely fall behind in the market. That's because at least some if not all its competitors will be making such improvements.

3. CONCEPT OF PROJECT COMMUNICATION PLAN

As the project manager, you've already mapped out every task and deliverable to get you across the finish line. Why not do the same for project communications? After all, your project plan needs a steady stream of communication to stay on track.

- A project communication plan is a simple tool that enables you to communicate effectively on a project with your client, team, and other stakeholders.
- It sets clear guidelines for how information will be shared, as well as who's responsible for and needs to be looped in on each project communication.

Importance of Project communication plan:

As the project manager, you've already mapped out every task and deliverable to get you across the finish line. Why not do the same for project communications? After all, your project plan needs a steady stream of communication to stay on track.

A communication plan plays an important role in every project by:

- Creating written documentation everyone can turn to
- Setting clear expectations for how and when updates will be shared
- Increasing visibility of the project and status
- Providing opportunities for feedback to be shared
- Boosting the productivity of team meetings
- Ensuring the project continues to align with goals

Project Team Communication methods:

There's no single right way to communicate on a project. In fact, your communication plan can and should include a variety of communication methods.

Here are a few to consider:

- Email
- Meetings (in-person, phone, or video chat)
- Discussion boards

- Status reports
- Collaboration apps
- To-do lists
- Surveys

How to write a project communication plan:

Writing a project management communication plan is as simple as following these 5 steps:

- List your project's communication needs.
- Every project is different.
- Take the size of the project, the nature of work being done, and
- Even the client's unique preferences into account as you determine
- which types of communication this project needs to succeed.

1. Define the purpose of communication:

   The nature of work being done, and even the client's unique preferences into account as you determine which types of communication this project needs to succeed.

   - Bombarding people with too many emails or unnecessary meetings can interfere with their ability to get work done and cause them to overlook important updates.
   - Be purposeful in your plan, and ensure every communication you include has a reason for being.
   - If you're feeling really ambitious, go ahead and outline a basic agenda for the topics that will be covered in each meeting or report.

2. Choose a proper communicaton method:

   Do you really need a meeting to share weekly updates, or is your project discussion board enough? Think through how your team works best, so they can stay in the loop while still being productive. If your client prefers the personal touch of a phone call, build that into your plan too.

3. Set a Cadence for Communication: Think through how your team works best, so they can stay in the loop while still being productiveEstablishing a regular frequency for communication streamlines the process by setting clear expectations from the get-go. This not only frees you from fielding random requests for status updates. It also enables project members to carve out space for important meetings and reports ahead of time.

Example and a sample template:

Collaborate with team members on project tasks and share files using the comments feature.

- You know your team and stakeholders best, so how you organize the details is up to you. Just be sure it's easy to understand. These examples show you 3 different options for structuring the same communication plan.

  With TeamGantt, it's easy to put your communication plan into everyday practice. Here are just a few ways you can streamline and manage project communication using TeamGantt:

- Upload your communication plan, along with the scope document, to the project's Files tab.Add major meetings or presentations as milestones to your gantt chart.
- Collaborate with team members on project tasks and share files using the comments feature.Check in on tasks with team members using the Request a progress update feature.

4. Communication Planning: The first step in defining your communication plan is figuring out what kind of communication your stakeholders need from the project so they can make good decisions. This is called the communications requirements analysis.

   Communications management is about keeping everybody in the loop.

   The communications planning process concerns defining the types of information you will deliver, who will receive it, the format for communicating it, and the timing of its release and distribution.It turns out that 90% of a project manager's job is spent on communication so it's important to make sure everybody gets the right message at the right time.The point is that you don't want to bury stakeholders in too much information

but you do want to give them enough so that they're informed and can make appropriate decisions.

- Your project will produce a lot of information; you don't want to overwhelm your stakeholders with all of it.
- Your job is to figure out what they feel is valuable. Communicating valuable information doesn't mean you always paint a rosy picture.
- Communications to stakeholders may consist of either good news or bad news

5. Communication Technology: Do you need to procure new technology or systems, or are there systems already in place that will work? The technologies available to you should figure into your plan of how you will keep everyone notified of project status and issues.

   Communications technology has a major impact on how you keep people in the loop. Methods of communicating can take many forms, such as written reports, conversations, email, formal status reports, meetings, online databases, online schedules, and project websites. You should consider several factors before deciding what methods you'll choose to transfer information. The timing of the information exchange or need for updates is the first factor.

6. Staff Experience with technology: Staff experience with the technology is another factor. Are there project team members and stakeholders experienced at using this technology, or will you need to train them? Finally, consider the duration of the project and the project environment. Will the technology you're choosing work throughout the life of the project or will it have to be upgraded or updated at some point? The types of information you will communicate typically include project status, project scope statements and updates, project baseline information, risks, action items, performance measures, project acceptance, and so on.

   All projects require a sound communication plan, but not all projects will have the same types of com¬munication or the same methods for distributing the information. The communication plan documents the types of information needs the stakeholders have, when the information should be distributed, and how the information will be delivered.

4. THE COMMUNICATION PLAN TEMPLATE

The Communication Plan template is as follows:

- Identify your stakeholders (to whom)
- Identify stakeholder expectations (why)
- Identify communication necessary to satisfy stakeholder expectations and keep them informed (what)
- Identify time-frame and/or frequency of communication messages (when)
- Identify how the message will be communicated (the stakeholder's preferred method) (how)
- Identify who will communicate each message (who)
- Document items – templates, formats, or documents the project must use for communicating.

Repository for communication: A repository for project communications is a centralized location where all project-related communications, documents, and information are stored, organized, and easily accessible to project stakeholders. This repository plays a crucial role in project management by facilitating efficient communication, collaboration, and information management. A repository for your communications objectives; How you plan to bring about those objectives; In what timeframe and the effort involved to fulfill those goals; and finally,The metrics to measure whether you're successful.

It is important to verify the background of the project befor proceeding into the communication plan like, Who are they, and what tools are they using to distribute those missives, email, text, etc.?

Vision and Objectives: Be clear as to why there is a communication plan. There could be several reasons—what are they? Be sure to note the goals and objectives for those communications, so it's all clear from the start.

Background:

It is important to verify the background of the project before proceeding into the communication plan like, Who are they, and what tools are they using to distribute those missives, email, text, etc.?

Vision and Objectives: Be clear as to why there is a communication plan. There could be several reasons—what are they? Be sure to note the goals and objectives for those communications, so it's all clear from the start.

Goals and Time frames:

Goals and time frames are fundamental concepts in goal setting and project planning. They are used to define what an individual, team, or organization aims to achieve and when they plan to achieve it , Goals and Timeframes: As you detail the goals, you'll also want to put them within a certain timeframe. Nothing gets done without a deadline. Goals are specific, measurable, achievable, relevant, and time-bound (SMART) objectives that provide a clear target or desired outcome. They represent what you want to achieve in a specific area, whether it's personal, professional, or related to a project.

Goals should be well-defined and focused, ensuring that they are clear and actionable. They answer questions like "What do we want to achieve?" and "Why is it important?"

Goals can be short-term (achievable within a few days, weeks, or months) or long-term (usually extending beyond a year). Short-term goals often contribute to the achievement of long-term goals.

Time Frames: Time frames, also referred to as timeframes or deadlines, specify when a particular task, project, or goal is expected to be completed or achieved. They are an essential component of goal setting and project planning because they create a sense of urgency and help with time management.

Time frames can vary in duration, depending on the nature of the goal or project.

1. Review effectivenesss: There's no way to know if your communications are in fact getting through if you're not measuring the results. Have metrics in place to see how well your communication plan is working, and keep that data for historic precedent.
2. Make a plan: It goes without saying that you have to plan all this out, but maybe it should be said, clearly and definitively. You wouldn't start a project without planning for it first, so follow your own advice and get a plan in place prior to setting up a communications process.
3. Record the outcome: As part of your measurement process, after the project has closed, take the time to see how effective the communication plan was overall. You'll learn a lot: what to repeat next time and what to change.
4. Situation Analysis: Here you address the strengths, weaknesses, opportunities, and threats inherent in the communication plan. Strengths can include where your team excels in communications, while the weaknesses note areas where communications are not being well-served. As for opportunities, they are areas you find that can be improved upon. A threat is a problem that can bring down the whole communication process.
5. Lesson Learned: Besides keeping you on track with your process improvement initiatives, process control tools also benefit your organization in the following ways:
   Finally, document what you've learned from this investigation.
   Now it's time to sketch out a history of communications at your organization to get a picture of trends and how to support the positive and move away from the negative. Begin by listing the basic communications that have already taken place. How have these communications been made and to what extent were they successful?
6. Guideline: Start with a simple list of your top-three objectives. Be sure that these are very specific, measurable, actionable, relevant, and timely. You can remember this criteria with the acronym S.M.A.R.T.Now that you have objectives, how are you going to achieve them? Guidelines to help you get out your communications will help. Make a list of how you want communications disseminated. That can included regular feedback or meetings, approval before sending, only communicating pertinent information, etc.

7. Stakeholders: Now that you have objectives, how are you going to achieve them? Guidelines to help you get out your communications will help. Make a list of how you want communications disseminated. That can included regular feedback or meetings, approval before sending, only communicating pertinent information, etc.

   Make a list of the key personnel in the project by name, followed by their role and then the information they need to know. After that, you can indicate the frequency in which them should be communicated with. Have this list approved by the people on it to make sure you've gotten what they want and when they want it down correctly.
8. Information collection: By what mechanism will you disseminate your communications? What is the channel of preference of your target audience? It could be email or text or even printed matter, but find out what it is and use that access point which will in fact reach your reader. Information Collection: Once you've decided on the channel, you'll want to create a document that collects the information you will be sending off through this channel. Write the name of the channel, the information required, who the information provider is and the timeframe.
9. Project Plan Template: Communication plans touch almost every aspect of your project. The better you communicate, the more likely you'll bring in a successful deliverablethat mirror THE VPR APPROACH:The free project plan template helps you put together all the parts of your project plan, including listing tasks, resources and a communication process. Communications are how you deliver the plan to your team, so they know how to execute it—but it's also crucial to your stakeholders. They have a vested interest in the plan and need to be kept in the loop.

SELF-ASSESSMENT QUESTIONS - 1

1. If there is a certain probability that the objectives of the project will not be achieved, this risk should not be reported to higher management. (True / False)
2. When there are disagreements between the project lead and overall project manager, the same can be resolved through _____.
3. A _____ is a discrepancy between how a requirement was mentioned and how the same requirement is implemented. (Pick right option)
   a. Defect
   b. Change
   c. Risk
   d. None of the above

5. PROJECT METRICS

Software Metrics is the statistics gathered over the course of the execution of the project. This quantitative measure gives a means to obtain the project quality and effectiveness in an unambiguous way. Metrics acts as an excellent controlling tool since if we have a measure of any particular artifact of the project, we can focus on the issue more accurately. For example, if the defect density is more for a project, that might mean that development team might be having issue in understanding the requirement or design; hence Project Manager can address the issue to reduce the defects in the project. As Tom DeMarco famously stated "You can't control what you can't measure", the Project Metrics allows to quantify the project artifacts thereby allowing control over them.

Software Metrics commonly gathered in a software project are:

- Time and Space complexity
- KLOC – source code
- Cyclomatic complexity
- Number of function points
- Defect density
- Defect Age
- Defects per project phase
- Number of classes and interfaces

Limitations

Software metrics gives a measure of the software indicating how big and complex the software is. But is it very difficult to get an accurate picture of the software to predict how much software is present in a project being developed. The metrics can be utilized effectively only to certain sub-sections of the project like testing phase where metrics like defect age, defect density conveys the effectiveness of the testing phase accurately. Hence the CMM (Capability Maturity Model) and the ISO 9000 focus mainly on process metrics that helps in controlling the processes that generate the software.

Examples of process metrics affecting software include:

- Number of times build failed in last night's build process
- Defect count per hour introduced by the developer
- Number of change requests on the requirements
- Time utilization by the team
- Number of patch releases needed to stabilize the product

6. EARNED VALUE ANALYSIS (EVA)

Earned Value Analysis (EVA) is a standard methodology of measuring the project's progress at any instance of time. EVA helps in analyzing the variance of the project from its baseline cost and schedule and also useful in estimating the probable completion date and cost of the project.

The planned amount of work is compared with actually completed amount of the work giving the value measured as "Earned" value. This earned value indicates the progress that has been achieved in the work.

1) EVA gives a measure of whether the project is progressing in right direction. For the purpose of tracking the project the effort is considered to be "earned" against the budget or the plan only after it has been actually completed. Hence by calculating the earned values from time to time the project manager can get the feeling if the project is on schedule or slipping. If the project is getting completed later than the originally scheduled time or if it costs more than budgeted cost then the project is considered to be slipped. The earned value analysis helps to identify if the project is on time and helps to identify the phases or modules causing the slippage in the project so that corrective action can be taken.

Calculating Earned Value

Earned Value Management measures progress against a baseline. It involves calculating three key values for each activity in the WBS: (Work Breakdown Structure)

1) The Planned Value (PV) – that portion of the approved cost estimate planned to be spent on the given activity during a given period.
2) The Actual Cost (AC) – the total of the costs incurred in accomplishing work on the activity in a given period. This Actual Cost must correspond to whatever was budgeted for the Planned Value and the Earned Value (e.g. all labor, material, equipment, and indirect costs).
3) The Earned Value (EV) – the value of the work actually completed.

These three values are combined to determine at that point in time whether or not work is being accomplished as planned. The most commonly used measures are the cost variance and the schedule variance:

Cost Variance (CV) = EV - AC

Schedule Variance (SV) = EV - PV

These two values can be converted to efficiency indicators to reflect the cost and schedule performance of the project. The most commonly used cost-efficiency indicator is the Cost Performance Index (CPI). It is calculated as, CPI = EV / AC

The sum of all individual EV budgets divided by the sum of all individual ACs is known as the cumulative CPI, and is generally used to forecast the cost to complete a project.

The Schedule Performance Index (SPI) is calculated as:

SPI=EV/PV

It is often used with the CPI to forecast overall project completion estimates. A negative Schedule Variance (SV) calculated at a given point in time means the project is behind schedule, while a negative Cost Variance (CV) means the project is over budget.

Tools and Techniques

There are several software packages available which will prepare an earned value analysis. Examples include:

- Schedulemaker
- Planisware OPX2
- RiskTrak
- Winsight
- Primavera

SELF-ASSESSMENT QUESTIONS - 2

4. Tom DeMarco stated, “You can’t control what you can't measure”. (True / False)
5. _____ is the statistics gathered over the course of the execution of the project.
6. _____ is a software package used for preparing earned value analysis. (Pick right option)
   a. MS Project
   b. Primavera
   c. Lotus Notes
   d. None of the above

5. PROJECT COMMUNICATION PLAN & TECHNIQUES

In the planning phase of the large project, one of the key aspects to consider is the communication plan. **The communication plan refers to the activity by which the information flow will happen to the key stake holders and sponsors of the project.** This communication is in addition to the status meeting and status reporting to be carried out irrespective of size of the project. This Communication plan helps to avoid any confusions and misunderstanding during the course of the long and complex project giving the required update to upper management with the information they are looking for. This creative and proactive communication is laid out in a Communication Plan, which is created as follows.

1) Determine who would need to be addressed in the communication plan. It could be the project sponsorers or stake holders or members of the Project Steering Committee.
2) Very important – find out what is the goal of communication and type of information you want to share. Generally it is categorized into following three areas:
    - **Mandatory:** This information is sent on a regular basis. Examples include project status reports, legal requirements, financial reporting, status meetings, regulatory information, etc.
    - **Informational:** This is the information people want to know, or that they may need for their jobs. This information is made available for people to read, but requires them to take the initiative, or pull the communication. Examples include project awareness building sessions, project deliverables placed in a document repository, project announcements on a website, etc.
    - **Marketing:** These are designed to build buy-in and enthusiasm for the project and its deliverables. This type of communication is also pushed to the readers. Examples include project newsletters, traveling road shows to various locations and departments, testimonials, contests, project acronyms and slogans, countdown clocks until live date, etc.
3) Determine how to fulfill the communication goals or objectives, especially to the project stakeholders.

4) Tabulate the effort needed to generate the reports that need to be generated and benefits of each of the reports that are determined in step 3. This helps in filtering out some of the reports if there is a time or budget constraint.
5) Evaluate the list of reports to be generated and finalize on the communication plan based on cost-benefit analysis and importance of each report. Also finalize on the frequency and timing of each report to be published.
6) Regardless of the prioritization, implement any communication options that are mandatory for the project or for the environment. This could include Project Status Reports, government required reports, legal reports, etc.
7) Add the resulting communication activities to the work plan. This will include assigning frequencies, due dates, effort hours and a responsible person(s) for each communication option implemented.

Project communication can take many shapes and forms. For large projects especially, the project team should be creative in determining how, what, to whom, where and how frequently the communication takes place. If the project is controversial, requires culture change or is highly political, the positive aspects of marketing communication become more and more critical.

Communication techniques for software development include:

- Use Cases (UML)
- Sequence and Activity Diagrams (UML)
- Gantt chats
- PERT networks etc.,

6. STEPS FOR PROCESS IMPROVEMENT

Process Improvement is a series of actions taken to identify, analyze and improve existing processes within an organization to meet new goals and objectives. These actions often follow a specific methodology or strategy to create successful results.

IEEE recommended the following steps for process improvement

1) Identify Business Processes
2) Document Process Definition
3) Document Process Purpose
4) Identify Process "Steward"
5) Establish Process Boundaries
6) Create Process Flow chart
7) IDENTIFY PROCESS OUTCOMES
8) Document Outputs
9) Identify Recipients and "Stakeholders" of Outputs
10) DETERMINE EXPECTATIONS
11) Identify Current Formal/Informal Agreements
12) IDENTIFY YOUR NEEDS
13) Identify Needs From Others to Make Process Work
14) Identify Those Providing Inputs
15) List Current Formal/Informal Agreements
16) IDENTIFY OPPORTUNITIES FOR IMPROVEMENT

Six sigma

Six Sigma is a set of practices originally developed by Motorola to systematically improve processes by eliminating defects. A defect is defined as nonconformity of a product or service to its specifications.

While the particulars of the methodology were originally formulated by Bill Smith at Motorola in 1986, Six Sigma was heavily inspired by six preceding decades of quality

improvement methodologies such as quality control, TQM, and Zero Defects. Like its predecessors, Six Sigma asserts the following:

- Continuous efforts to reduce variation in process outputs is key to business success
- Manufacturing and business processes can be measured, analyzed, improved and controlled
- Succeeding at achieving sustained quality improvement requires commitment from the entire organization, particularly from top-level management

The term "Six Sigma" refers to the ability of highly capable processes to produce output within specification. In particular, processes that operate with six sigma quality produce at defect levels below 3.4 defects per (one) million opportunities (DPMO). Six Sigma's implicit goal is to improve all processes to that level of quality or better.

Six Sigma is a registered service mark and trademark of Motorola, Inc. Motorola has reported over US$17 billion in savings from Six Sigma as of 2006.

In addition to Motorola, companies that also adopted Six Sigma methodologies early-on and continue to practice it today include Bank of America, Caterpillar, Honeywell International (previously known as Allied Signal), Raytheon, Merrill Lynch and General Electric (introduced by Jack Welch).

There have been a few retail companies that have attempted to adapt this methodology to their business with mixed success. Perhaps the most notable was former CEO Bob Nardelli's attempt to adapt his systems from his former employer, General Electric, to the retail industry. There is one inherent problem with attempting to apply Six Sigma to retail. Retail=people, Six Sigma=defects. So, you have to look at your lacking areas as defects by your employees. Home Depot attempted to solve this by thinning out their workforce and implementing training programs for the remaining employees in order to reduce defects. On paper, this may work well but once the human factor was applied it led to massive frustration from the employees and the customers due to the lack of salespeople on the floor at any one time. Although the employees were better trained, they were now required to help 22.8 customers per hour rather than the previous 13.4. Other retailers are learning from these mistakes of the first big box retailers to attempt this and are tweaking the methodology to

better suit their company goals. Recently some practitioners have used the TRIZ methodology for problem solving and product design as part of a Six Sigma approach.

SELF-ASSESSMENT QUESTIONS - 3

7. Status meetings and status reporting are required for a medium size project. (True / False)
8. _____ is a set of practices originally developed by Motorola to systematically improve processes by eliminating defects.
9. Six Sigma is a registered service mark and trademark of _____. (Pick right option)
   a) Microsoft
   b) Sun Microsystems
   c) Motorola
   d) None of the above

7. SUMMARY

Let's summarize important points:

- Project status reporting is a concise summary of the current condition of the Project. It is like a snapshot of the project at a point in time. This will boost up the project progress well in time.
- Software Metrics is the statistics gathered over the course of the execution of the project.
- Earned Value Analysis is a project progress indicator.
- Six Sigma is a philosophy of doing business with a focus on eliminating defects through fundamental process knowledge. Six Sigma methods integrate principles of business, statistics and engineering to achieve tangible results.

8. TERMINAL QUESTIONS

1. What are software changes? How documents controlled can be listed out?
2. What is status reporting? Explain in brief.
3. Explain the steps for (IEEE) process improvement.
4. What are the various project communication plans and techniques?

9. ANSWERS

Self Assessment Questions

1. False
2. Change control board
3. a) Defect
4. True
5. Software Metric
6. b) Primavera
7. True
8. Six Sigma
9. c) Motorola

Terminal Questions

1. For a complex and large project that runs into several months' maintenance of agreed upon decision becomes very important to avoid confusion as we progress from one stage to another stage of the project. Further since the requirements can be volatile, we may have to re-visit some of the earlier decisions and change a few. If we take on the changes without proper impact analysis, the entire project run into chaos as newly introduced change might have adverse effect on entire work done so far. Hence managing the change becomes extremely important. (Refer Section 2)
2. If there is a certain probability that the objectives of the project will not be achieved, this risk should be reported to higher management as soon as possible. Also, when the constraints of the project may be violated, particularly, related to cost and schedule, these risks will have to be informed to the project stakeholders. (Refer Section 2)
3. Process Improvement is a series of actions taken to identify, analyze and improve existing processes within an organization to meet new goals and objectives. (Refer Section 6)
4. In a large project, all communication takes place in context of an overall communications strategy and plan. Status meetings and status reporting are required, just as for a

medium size project. In addition, there are many other types of proactive communication that need to be considered. (Refer Section 5)