UNIT 3 PROJECT MANAGEMENT

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3.1 INTRODUCTION

Project management has an important place in development as many of the urban development researchers and institutes are nowadays undertaking many research projects. Every project manager has to deal with different targets, different environment and different target groups. Appropriate knowledge and skill about the various aspects of project management will transform a project manager into an excellent project manager. The project manager largely perform following roles: (i) plan the project along with other team members; (ii) prepare strategies, activities and arrange and allocate resources required for the achievement of project objectives; (iii) maintain relation between the project team, institution and the donor agency of the project; and (iv) successfully complete the project and disseminate its finding for the consumption of large audience. This unit deals in detail about the project management.

After reading this unit, you should be able to:
  i) Define concept and elements of project management;
  ii) Describe various steps of project management cycle;
  iii) Explain various project management techniques; and
  iv) Discuss different pre-requisites of effective project management.

3.2 PROJECT MANAGEMENT: CONCEPT AND ELEMENTS

3.2.1 Project Management Concept

Project management is an important concept and topic because nowadays all organizations either big or small are involved in the implementation of various projects. Lewis has opined that although management of projects has been going on for thousands of years, the practice has been widely recognized as a discipline in its own rights for only about ten years.

Before going to explain project management, it is essential to known, what is a project? A project is generally described as an initiative to bring about change. This is done in order to achieve specific objectives, within a timescale and in a
given context. A project has normally an allocated budget. According to Project Management Institute “A project is any undertaking with a defined objective by which completion is identified. In practice most projects depend on finite or limited resources by which the objectives are to be accomplished.” Viv Martin listed out following attributes of a project:

1) has a clear purpose that can be achieved in a limited time;
2) has a clear end when the outcome has been achieved;
3) is resourced to achieve specific outcomes;
4) has someone acting as sponsor who expects the outcomes to be delivered on time; and
5) is a one-off activity that would not normally be repeated.

Project Management has been evolved one of the important areas in the area of urban development. According to Richard Newton (2008), project management has been developed over the past few decades as it has become apparent that without a structured approach, people are not very good at completing projects successfully. The principal aim of project management is to see that projects are well formulated, effectively implemented; completed in time and end result is achieved. The project management is largely encircled in four important factors i.e cost, time, scope and quality. According to PMBOK “project management is application of knowledge, skills, tools and techniques to project activities to achieve project requirements. Project management is accomplished through the application and integration of the project management processes of initiating, planning, executing, monitoring, controlling and closing.”

3.2.2 Basic Elements of Project Management

The four basic elements of project management, which a project manager has to look into are: cost time, scope and quality. All these four elements are inter-connected and have to be managed effectively for the successful implementation of the project.

- **Cost Management**: An efficient project manager is evaluated on his or her ability to complete the project within the stipulated budget. The costs include estimated cost, actual cost and variable cost. Besides, there is contingency cost which takes into account the influence of weather, supplier and design allowances.

- **Time Management**: Time management is one important skills for any successful project manager. Most of the project fails due to poor time management by the project managers. For the effective management of
time, a project has to broken down into number of tasks which are to be accomplished within time frame. To prepare the project schedule, the project manager has to figure out what the tasks are, how long they will take, what resources they require and in what order they should be done.

**iii) Scope Management:** The project manager at the outset need to clearly delineate scope of the project. The scope of the project will enable the project manager to judiciously plan required resources and manpower for the project. As project is time and cost bound, therefore, scope of the project needs to be appropriately framed within these constraints. Scope management comprises following main aspects such as authorizing the job, developing a scope statement that will define the boundaries of project, sub-dividing the work into manageable components with deliverables, verifying that the amount of work has been achieved and specifying scope change control procedures (Levis, 2007).

**iv) Quality Management:** Quality management is last but not least element of project management. The success of the project is judged by the yardstick of quality of work it has produced. The successful project manager maintains the balance between cost, quantity and quality. According Levis (2007) quality management includes both quality assurance and quality control. The former means planning to meet quality requirements and the later emphasises on the steps to be taken to monitor results to see if they conform to requirements.

In this section you studied the concept and elements of project management, now answer the questions given in Check Your Progress-1.

**Check Your Progress 1**

**Note:** a) Write your answer in about 50 words.

b) Check your answer with possible answers given at the end of the unit

1) What do you mean by project?

2) Time management is an important element of project management- Discuss.
3.3 PROJECT MANAGEMENT CYCLE

Project cycle has six main phases which is given in the form of cycle wheel below. The six various phases of project management cycle are:

1) Need Identification
2) Initiation
3) Planning
4) Executing
5) Controlling
6) Closing

1) **Need Identification**- The development of project cycle begins with identification, whether there is a need of development project for a particular sector, area, community, etc. The identification usually comprises two main aspects i.e. situation analysis and problem analysis. Let us discuss these two important aspects in detail.
i) **Situation Analysis**

Understanding situation is the beginning of designing any development project or programme. Situation analysis broadly involves analysis of needs and assets, problem analysis and examining relevant interventions. According to Towen (2001) situation analysis is an activity which can firmly link planning to the realities in the field and thereby to the implementation of the project. The situation analysis may comprise analysis of the physical, economic, social, cultural and political environment within which the population live. Some of the development indicators to be used during the situation analysis of development of a project are: composition of population, housing, sanitation, health, employment, drinking water, education, land holding, industry, services etc. The context and type of information required is given in Table 3.1

<table>
<thead>
<tr>
<th>Context</th>
<th>Type of Information</th>
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<tbody>
<tr>
<td>Socio-Demographic</td>
<td>Population composition and distribution</td>
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<td></td>
<td>Household and family formation</td>
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<tr>
<td></td>
<td>Education and health services</td>
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<td></td>
<td>Housing condition</td>
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<tr>
<td></td>
<td>Sanitation and drinking water</td>
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<tr>
<td></td>
<td>Access to communication / energy</td>
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<tr>
<td>Economic Activity</td>
<td>Income</td>
</tr>
<tr>
<td></td>
<td>Employment/workforce participation</td>
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<td></td>
<td>Wages</td>
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<td></td>
<td>Expenditure</td>
</tr>
<tr>
<td></td>
<td>Standard of living/poverty</td>
</tr>
<tr>
<td>Socio-Cultural &amp; Political</td>
<td>Political structure</td>
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<tr>
<td></td>
<td>Political participation</td>
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<tr>
<td></td>
<td>Relevant laws, statues and policies</td>
</tr>
<tr>
<td></td>
<td>Predominant social structure</td>
</tr>
<tr>
<td></td>
<td>Gender role in the household</td>
</tr>
<tr>
<td></td>
<td>Decision making pattern</td>
</tr>
<tr>
<td></td>
<td>Condition of marginalized</td>
</tr>
</tbody>
</table>

ii) **Problem Analysis**

The second step in need identification is problem analysis. For understanding a situation to be influenced by a project, it is essential to know the problem conditions which constitute development constraints as well as their causes. Problem analysis is of prime importance to developmental project planning, as it strongly influences the design of all possible developmental interventions. Problem identification is a deductive process. It is a state of affairs or facts or figures that cause difficulties and sufferings. The problem analysis not only investigates What is wrong? but also try to understand ‘Why’ and ‘How’ it is wrong? in order to assign priority to the problem. It seeks to answer several questions these are:
What is the problem?

Why is this a problem?

a) What are the probable causes of the problem?
b) How serious is the problem?

Who are affected by the problem?

a) How many are they?
b) Where are they located?
c) What are their characteristics?

According to FAO, the problem tree is a visual problem-analysis tool that can be effectively used by both the field development staff and the community to specify and investigate the causes and effects of a problem and to highlight the relationship between them. The problem tree analysis helps to find out solutions by mapping out the anatomy of cause and effect around an issue.

The roots of the tree, is the lower part of the drawing, metaphorically represent the causes of the main problem. The tree trunk at the centre of the drawing represents the main problem and the tree branches, on the upper side of the drawing, provide a visual representation of the effects of the main problem.

Tips for Problem Analysis

★ Describe the key problem identified and its causes and effects.
★ Delineate how these problems affect the target group.
★ Explain how addressing the causes will lead to eradication of the key problem
★ The description should be clear, concise and convincing
★ For each specific problem selected, develop a problem tree

Fig. 3.2: Problem Tree of Urban Transport System
2) **Initiation**- Once the needs of the project are identified and decision is taken to do the project, the second step is to launch or initiate the project. There are number of activities associated in this stage. The project sponsor creates a project charter which delineates authorization of work on the project, define the authority, responsibility and accountability of the project team and establish scope boundaries of the project. The success of the project team veritably depends upon starting with complete and accurate information, management support and the authorization necessary to manage the project.

3) **Planning**- Planning phase is one of the important phases of the project cycle management. The project planning defines project activities that will be performed; the output that will be produced; and delineate how these activities will be accomplished and managed. Project planning defines each major task, estimates the time, resources and cost required, and provides a framework for management review and control. In other words, planning involves identifying and documenting scope, tasks, schedules, cost, risk, quality and staffing needs.

The project manager, along with his project team prepares project plan and gets it approved from the management. The project plan is a comprehensive document that allows a project team to begin and complete the work necessary to achieve the project goal and objectives. The project plan will address how the project team will manage the project elements.

4) **Executing**- After the project plan is prepared, it gets ready for execution or implementation. The project team acquire all necessary resources required to carry out the project and ready to perform project activities. The project manger along with the project team put their energy and efforts in participating, observing and analysing the project activities so that the output is produced and goal and objectives of the project achieved. In other words one is to execute the work that must be done to come out with the product of the project. Further, executing also refers to implementing the project plan.

In nutshell, executing refers to coordinating and managing the project resources while executing the project plan, performing the planned project activities and ensuring that they are completed efficiently.

5) **Monitoring/Controlling**- The functions of the project manger at this stage is to monitor and compare actual performance with the planned performance and take corrective measures to get the desired outcome when there are significant differences. By monitoring and measuring progress regularly, identifying variances from plan and taking corrective action if required, project control ensures that project activities are met.

6) **Closing out**- Closing out is the last but not the least phase of project cycle management. Once the output is produced to the customer’s satisfaction, the project is considered finished. However, this should not be the case. A final lesson-learned review should be done before the project is considered complete. Failing to do the lessons-learned review means that future project will likely to suffer. Although project close out is a routine process, it is an important one. According to Haugey, project closure means formal acceptance of the deliverables and disbanding of all the elements that were required to run the project.
In this section you studied about the project management cycle and now answer the questions given in Check Your Progress-2.

Check Your Progress 2

Note: a) Write your answer in about 50 words.
   b) Check your answer with possible answers given at the end of the unit

1) Discuss the importance of problems analysis in need analysis?

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2) What are the functions of project manager during monitoring and controlling of the project.

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3.4 PROJECT MANAGEMENT TECHNIQUES

The project management techniques helps the project manager to complete the project activities successfully and effectively and achieve the project goal and objectives within the assigned time period and budget. Broadly project management techniques are two types:

i) Bar Charts

ii) Networks

3.4.1 Bar Chart

Bar Charts are the pictorial representation of various tasks required to be performed for accomplishment of the project objectives. The bar charts are of two types: (i) Gantt Chart and (ii) Milestone Chart

i) Gantt Chart

Henry L Gantt in 1917 developed a system of bar charts for scheduling and reporting of a project. These charts, latter were known as Gantt Charts. It is a pictorial representation specifying the start and finish time for various tasks to be performed in a project on a horizontal time scale. The Gantt chart as a tool is used:

√ To plan time scale of a project
To estimate resources required for a project

For graphical illustration of schedule of tasks to be completed

Helps to plan coordinate and track specific tasks for project

Good for small projects when the number of tasks or activities is small and not complex i.e. good for simple projects.

Table 3.2: Task and Time Line of a Gantt Chart

<table>
<thead>
<tr>
<th>Task</th>
<th>Duration (Months)</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Planning of survey</td>
<td>1-3 Months</td>
<td></td>
</tr>
<tr>
<td>2. Designing of Questionnaire</td>
<td>1-3 Months</td>
<td></td>
</tr>
<tr>
<td>3. Hiring of Personnel</td>
<td>1-3 Months</td>
<td></td>
</tr>
<tr>
<td>4. Training of Personnel</td>
<td>1-4 Months</td>
<td></td>
</tr>
<tr>
<td>5. Collection of Data</td>
<td>2-6 Months</td>
<td></td>
</tr>
<tr>
<td>6. Data Entry</td>
<td>3-10 months</td>
<td></td>
</tr>
<tr>
<td>7. Data Analysis/Interpretation</td>
<td>3-10 Months</td>
<td></td>
</tr>
<tr>
<td>8. Report Writing</td>
<td>11th Month</td>
<td></td>
</tr>
</tbody>
</table>

The activities formulated in Table 3.2 have to be converted into bar diagram or chart form to be called as Gantt Chart. This is given below in graphical form. The horizontal axis depicts time and vertical axis represents tasks (Fig. 3.3).

Fig. 3.3: Graphical Representation of Gantt Chart

Here the project manager has to draw bar chart as per the scheduled activities. For example activity A is project planning plotted in first bar and likewise each activity is plotted according to planned time line. Though Gnatt chart is comprehensive, convenient and very effective, it has limitation of handling complex projects.
ii) Milestone Chart

Milestone Chart is an improvisation over the Gantt Chart by introducing milestones. The milestone represents a circle over a taste in the bar chart which indicates completion of a specific phase of the task. This was used because by drawing a simple bar chart one cannot monitor the progress of a particular task. In a milestone chart a task is broken down into specific activities and after accomplishment of the specific activity a milestone is reached or in other words an event occurs.

Graph on Milestone

In this bar chart, milestones are represented in circle. For example in Task A, the milestone two can not be reached until the milestone one is crossed and the activity between milestone one and two is over. For example in a socio-economic survey in an urban slum, the survey can not be possible unless questionnaires are prepared. Some of the weaknesses of the milestone chart are:

i) It does not show interdependence between tasks.

ii) It does not indicate critical activities.

iii) It does not consider the uncertainties associated with accomplishment of a certain task.

iii) It will be always cumbersome to draw the chart for large projects.

3.4.2 Networks

The best-known technique for network analysis is Programme Evaluation and Review Technique (PERT) developed during 1956-1958. The PERT was developed for US navy for scheduling the research and development activities for Polaris Missiles Programme. The heart of any PERT chart is a network of tasks needed to complete a project, showing the order in which the tasks need to be completed and the dependencies between them. Some of the key features of network are:

✓ It is a graphical depiction of project tasks and their inter-relationships.

✓ The important feature of network diagram is that the ordering of Tasks is shown by connecting with it predecessor and successor tasks.

✓ Net work diagramming is a Critical Path Scheduling Technique used for controlling resources.
Critical Path Scheduling is a technique whose order and duration of sequence of task activities directly affect the Completion date of a project.

A few steps to be followed in network analysis are:

i) Specify the individual activities: All the activities in the project are listed and this list can be used as the basis for adding sequence and duration information in the later steps.

ii) Determine the sequence of those activities: Sequencing is important because some activities are dependent on the completion of other activities.

iii) Estimate the completion time for each activity: The time required to complete each activity can be estimated using past experience.

iv) Draw a network diagram: Once the activities and their sequences have been defined, the network diagram can be drawn.

v) Identify the Critical path: The Critical Path is the longest duration path through the network. The significance of the critical path is that the activities that lie on it cannot be delayed without delaying the project. Because of its impact on the entire project, critical path analysis is an important aspect of project planning.

vi) Update the diagram as it progress: As the project progress, the actual task completion times will be known and the network diagram can be updated to include this information. A new critical path may emerge and structural change made.

During the process of project implantation, some activities would be dependant on the completion of other activities. For example training of personnel for survey depends on completion of hiring of personnel, design of questionnaires and printing of questionnaire. All these activities have to be completed for achieving the milestone of training of personnel.

Symbols to be used to create a network diagram are given below:
An arrow is used to represent each activity or tasks to accomplish and the duration of the activity is recorded below the arrow e.g. hours, days or months.

Each activity or task that happens, has preceding event (circle) and each circle is pre-numbered e.g. above circle ‘5’ is used as example to how this would be the 5th event.

The earliest event time (EET) displays the earliest time an activity (represented by an arrow) can start, given the interdependence of other activities that would be completed beforehand.

The latest event time (LET) for an activity is recorded in the circle following the activity (arrow) e.g. the latest time an activity must be completed by, in order to achieve the elapsed time of the project.

A dummy activity is used when a task or activity (represented by an arrow) follows more than one preceding activity e.g. the arrow could be drawn from more than one potential circle in the diagram.

An example of network analysis is given in the tabular as well as diagrammatic form below.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration (in Weeks)</th>
<th>Preceded by activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Preparation of Questionnaire</td>
<td>5</td>
<td>—</td>
</tr>
<tr>
<td>B: Recruitment and Training of field investigator</td>
<td>4</td>
<td>—</td>
</tr>
<tr>
<td>C: Conduction of Survey</td>
<td>3</td>
<td>A B</td>
</tr>
</tbody>
</table>

The networking technique for the conduction of a socio-economic survey in a urban slum. Here in this project activity ‘C’ that is conduction of survey depends a ‘A’ and ‘B’ activities such as preparation of questionnaire and recruitment of field investigators, and their training. Whenever you see an activity with more than one preceding activity, a dummy activity (broken arrow) will be required to
preserve logic within the diagram. Here, activity B is having more than two activities.

**Explanation**

- The elapsed (expected completion) time of the project is 8 weeks.
- The critical path activities are A and C that is both must be completed within their predicted durations, otherwise the project will be longer in duration than 8 weeks. Notice how the EET and LET of critical activities are identical.
- Activity B is non-critical activity and would have a ‘float time’ of 1 week. This is because its predicted duration is 4 weeks, but it can take 5 week to complete and still leave enough time left for activity C to completed, the elapsed time of the project will still be achieved. Notice how the EET and LET of non-critical activities are different; the difference is 1 week e.g. the float time, when you deduct one from the other.
- The broken arrow (or dummy activity) preserves logic within the diagram e.g. visually you can see that both activities A and B must be completed, before C can start. Notice also that the arrow representing activity C start from circle 3 (not circle 2), this is because the earliest time for C would be 5 weeks not 4 weeks as circle 2 displays.

Some of the benefits of network technique are:

i) It provides a graphical view of the project;

ii) It predicts the time required completing the project;

iii) It shows which the activities to be started simultaneous and the activities critical to the project;

iv) It highlights ‘float times’ for all activities;

Definitions of a few terms required in Network analysis are given below:

i) **Activity** – Customarily an activity consumes time and resources. It may include paper work in preparation of project proposal, conduction of survey, etc.

ii) **Critical Path** – A critical activity or event is one which has to be performed by a certain time. The critical path is the longest path through a network and determines the earliest completion of project work.

iii) **Events** – Beginning and ending points of activities are known as events.

iv) **Milestone** – This is an event that represents a point in a project of special significance. Usually it is the completion of a major phase of the work.

v) **Network** – Networks are called arrow diagrams. They provide a graphical representation of a project plan showing the relationships of the activities.

### 3.5 PREREQUISITES OF EFFECTIVE PROJECT MANAGEMENT

Some of the knowledge and skill required for the effective project management are as follow:
1) **Project Integration Management:** Project integration management ensures that the project is properly planned, executed, and controlled. In other words, every activity of the project must be well coordinated or integrated. The project is a culmination of activities and tasks and an integrated approach will enable the project to achieve its goal and objectives effectively. There must be proper coordination at each level from the management down the line workers level. It is studied that the project fails to achieve its goal at the grassroots level because of lack of people’s participation. There many project findings have suggested that the community must be integrated into the whole process of project i.e. planning, formulation of strategies, implementation as well as controlling of various project activities.

2) **Project Time Management:** In time completion of project not only gives a credit to the manager of but also can ensure further projects to the organization. Project time management refers to developing a time schedule that can be met and then controlling the activities to ensure that it happens. An efficient project manager tries to effectively manage the time and achieve the project tasks within the allocated time period. Taking long time adds to the inefficiency of the project. While taking too less time sometimes put question mark on the quality of the project delivery.

3) **Project Cost Management:** Cost management implies that project should be completed within the formulated budget. Therefore, proper estimation of the cost of resources i.e. manpower, equipment, materials and other things like travel and other miscellaneous expenses. Cost are budgeted and tracked to keep the project within the budget. The project cost must be appropriately budgeted. For example, in most of the action research project the expenditures on project interventional activities needed to be more compared to hiring of manpower. Some times good project proposals are rejected not for the technical but for the financial bid. Therefore costing is critical to project management.

4) **Project Human Resource Management:** Human resources are key to project. It is supreme over all other resources. It involves identifying the people needed to do the job, defining their roles, and responsibilities. Acquiring efficient people as per their job requirement is critical to project management. Besides training and capacity building of the manpower is also important to human resources management. The human resource management also includes the salary packages, leisure and medical and other benefits. Sometimes project staffs are less motivated to work for poor benefits. Therefore, many organizations depute its efficient staff to the project by offering them higher salary and grade.

5) **Project Quality Management:** The balancing between the quantity and quality of project deliverables is central to effective project management. Maintenance of quality is vital to project and any compromise with the quality will lead to dissensions among the project team and the beneficiaries. The qualified and experienced manpower employed in the project can effectively and efficiently manage the project then their counterparts those were less qualified and less experienced. Nepotism in selection process is a deterrent to quality.
6) **Project Communication Management**:- Communication Management refers to planning, executing, and controlling the acquisition and dissemination of all information relevant to the needs of all project stakeholders. Transparency in communication is an accountability of the project manager. Democratic way of communication where all the stakeholders participate and share their opinion regarding various aspects of project is critical to a good project proposal formulation. Communication and dissemination of findings of the project not only helps the policy makers to formulate policy but also helps the organization to fetch more projects.

7) **Project Risk Management**:- Risk Management is a systematic process of identifying, quantifying, analysis and responding to project risk. Higher is the risk lower is the efficiency and effectiveness of the project. The efficiency and effectiveness of a project is influenced by the risk factor. For example the training of Commercial Sex Workers on HIV/AIDS in urban slum depend on the identification of CSWs which is a risk factor. According to Lewis it includes maximizing the probability and consequences of positive events and minimizing the probability and consequences of advance events to project objectives. It is an extremely important aspect of project management.

In this section you studied about the project management technique and prerequisites of effective project management and now answer the questions given in Check Your Progress-3.

**Check Your Progress 3**

Note: a) Write your answer in about 50 words.

b) Check your answer with possible answers given at the end of the unit

1) Briefly discuss Gantt Chart

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2) Cost management and time management are the important prerequisites of project management- Discuss

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3.6 LET US SUM UP

Project Management is an important area of development, as all organizations big or small are implementing one or the other projects. The viability of many organization some times solely depends on projects. Besides, the funding agencies also needed to have adequate knowledge about the project management. The present unit at the outset has described the meaning and basic elements of project management. The second aspect which has been thoroughly covered in the unit is project cycle management. Later on, the project management technique which is vital to any project management has been discussed. The two techniques customarily used in project management are Gantt chart and Networks. The technicality in dealing with the project is judged from the technique used in project formulation. The last part of the unit contains the skill required for the project manager for the effective management of project.

3.7 REFERENCES AND SELECTED READINGS


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What is Project Management? http://www.managementstudyguide.com/wh


Project Management with Gantt-Chart, OpenOffice.org.20calc

Tools and Techniques of Project Management, Chapter 7, Acorn Professional Tutors, network diagram.pdf (SECURED)-Adobe Reader

2.7 CHECK YOUR PROGRESS: POSSIBLE ANSWERS

Check Your Progress 1

1) What do you mean by project?

A project is generally described as an initiative initiated to bring about change. This is done in order to achieve specific objectives, within a timescale and
in a given context. A project has normally an allocated budget. Viv Martin lists out the following attributes of a project:

6) has a clear purpose that can be achieved in a limited time;
7) has a clear end when the outcome has been achieved;
8) is resourced to achieve specific outcomes;
9) has someone acting as sponsor who expects the outcomes to be delivered on time; and
10) is a one-off activity that would not normally be repeated.

2) Time management is an important element of project management- Discuss.

Time management is one the important skills for any successful project manager. Most of the project fails due to poor time management by the project managers. For the effective management of time, a project has to broken down into number of tasks which are to be accomplished within time frame. To prepare the project schedule, the project manager has to figure out what the tasks are, how long they will take, what resources they require and in what order they should be done.

Check Your Progress 2

1) Discuss the importance of problems analysis in need analysis?

Problem analysis is of prime importance to developmental project planning, as it strongly influences the design of all possible developmental interventions. Problem identification is a deductive process. It is a state of affairs or facts or figures that cause difficulties and sufferings. The problem analysis not only investigates What is wrong? but also try to understand Why’ and ‘How’ it is wrong? in order to assign priority to the problem. It seeks to answer several questions these are:

★ What is the problem?
★ Why is this a problem?
   c) What are the probable causes of the problem?
   d) How serious is the problem?
★ Who are affected by the problem?
   d) How many are they?
   e) Where are they located?
   f) What are their characteristics?

2) What are the functions of project manager during monitoring and controlling of the project.

The functions of the project manager at this stage is to monitor and compare actual performance with the planned performance and take corrective measures to get the desired outcome when there are significant differences. By monitoring and measuring progress regularly, identifying variances from plan and taking corrective action if required, project control ensures that project activities are met.
Check Your Progress 3

1) Briefly discuss Gantt Chart

Henry L Gantt in 1917 developed a system of bar charts for scheduling and reporting of a project. These charts, latter were known as Gantt Charts. It is a pictorial representation specifying the start and finish time for various tasks to be performed in a project on a horizontal time scale.

2) Cost management and time management are the important prerequisites of project management- Discuss

The cost and time management are important challenges before a project manager. The task which he/she has to perform are narrated one by one

i) **Project Time Management**: Intime completion of project not only gives a credit to the manager of but also can ensure further projects to the organization. Project time management refers to developing a time schedule that can be met and then controlling the activities to ensure that it happens.

ii) **Project Cost Management**: Cost management implies that project should be completed within the formulated budget. Therefore, proper estimation of the cost of resources i.e. peoples, equipment, materials and other things like travel and other miscellaneous expenses. Cost are budgeted and tracked to keep the project within the budget.