



Generic characteristics

The development of formal project management approaches, an outgrowth of systems management, was spurred mainly because of the large-scale and costly US Department of Defense contracts (e.g. the building of the Polaris missile and submarine fleet, NASA and the space mission) during the Cold War period of the 1950s and 1960s. This management approach was quickly adopted by other industries and many organizations which recognized the potential of this powerful new management approach for all sorts of projects regardless of industry, professional field or project size[1,2]. In the context of project management, “projects” have the following generic characteristics[3,4]:

- Projects are typically unique, time-limited, complex and integrated sets of activities with little margin for errors.
- Projects follow a clear life cycle from a conceptual phase to some termination phase. Understanding the project life cycle permits managers to control resources better in the achievement of goals.
- Projects are established with specific goals, priorities and control criteria which are clearly documented.
- There are well-defined and documented authority, responsibilities and roles within projects.
- Formal, detailed project workplans set out the activities, resources, and so on, of a project.
- Explicit performance standards and project controls (e.g. milestones, project reviews) enable the early identification and correction of problems.
- The project manager exercises a high level of control over the project and its likely outcome: success or failure.

Consistent with the literature on project management that has evolved over the past 20 years or so, trainers and managers would do well to consider using project management if several of the following conditions exist in their situation:

Strengths of project management approach

- The assignment encompasses a set of substantial, interrelated activities which require the co-operative effort of team members with different areas of expertise, that is, a multidisciplinary team.
- The work is technically complex.
- The work to be undertaken is unique, that is, a one-time effort not likely to be repeated.
- The assignment has a clearly specified and limited goal or objective.
- The work has a definable life cycle – a clear beginning and end.
- The work requires tight budgetary and resource controls.
- The work requires quick responses to changing conditions either in the organizational or external environments.

If several of these conditions exist, then a project management approach offers the following strengths:

- It is results-oriented – it gets the job done.
- It is led. Projects require effective leadership to achieve goals successfully.
- It provides a single point of contact, management, and so on.
- It fosters a synergistic atmosphere because it brings together a multidisciplinary team focused on achieving a common goal within a deadline and within other resource constraints.
- It promotes strong team building because of the emphasis on a common goal and shared destiny: the project team succeeds or fails as a team not as individual members.
- It provides many opportunities for individual growth and development within the team because teams are made-up of interacting members who come from different disciplines and who have different skills sets.
- The team leader's or project manager's job is facilitated because all members are focused on the common goal and all members know that they will succeed or fail as a team, so co-operative efforts are necessary.

Six key variables for project success

Two examples of the power of the project management approach are briefly described to illustrate the points so far:

- (1) *Hospital project teams.* Recognizing that new health care services often require the creation of projects, Pinto[5] surveyed 72 hospital project teams in the eastern USA to identify the key variables for project success in terms of project outcomes and psycho-social outcomes. Based on her survey results, she presents six key variables for project success: managers must attend to the psycho-social effects of working on project teams (e.g. motivation, attitudes); co-operation is a vital element for project success; team members must identify not only with the goals of their project but also the superordinate goals of the whole organization to ensure co-operation among the various functional units in the organization; implement methods (e.g. formal project meetings, informal get togethers) to ensure that team members remain accessible to one another; recognize that the physical proximity of the team members facilitates co-operation and communication; and establish rules and

Project management training courses

procedures so that clear performance standards as well as acceptable procedures are known to all members.

- (2) *Consulting teams.* Kolenko and Covin[6] examined academic consulting teams and identified several major benefits not only for the academic faculty members who participated on these consulting teams but also for their college and the business community. Based on their experiences with academic consulting teams, Kolenko and Covin stressed key elements to team development and client satisfaction: the effective recruiting of team members; effective team development and management throughout the life of the project; and open communications in all project relationships among other elements not directly relevant to the present paper.

Recognition of the power of project management has resulted in many training organizations offering courses in this field. Also, many organizations offer their own project management training. Loo[7] found that just over one-third of responding Canadian organizations offered project management training to their employees either in-house or externally with short courses of one to four days being far more frequently used than longer courses. This author has successfully delivered short courses which both participants and client organizations/managers found cost-effective:

- *A telecommunications company.* A series of one-day, on-site training sessions was provided to a major player in the Canadian satellite/telecommunications business. The participants were project managers and professional staff, mainly engineers, who attended as intact work units. This approach was especially effective because both managers and their staff participated in the same training session, thus learning the same project management approach and techniques.
- *A public service department.* A one-day training session was provided to section heads and research officers in a government department. Although the participants found the techniques very useful for project planning and controlling, they were sceptical about their ability to implement this approach effectively because senior management had a tendency to change priorities frequently and, therefore, either kill or shelve current projects or assign new projects as well as shift research officers among the numerous projects.
- *An aboriginal reserve.* A one-day training session was provided to aboriginal managers and professional staff from a large Canadian Indian Reserve. These participants, who had limited management training, found the project management approach enticing and the techniques and tools for planning and controlling projects very useful.
- *A university.* A half-day training session was provided for faculty members interested in improving the management of their research projects, especially where large external research grants were awarded for three-year projects. The session also included several supervisors from various support services who wanted to improve their management skills especially in planning and controlling, and team building.

These examples demonstrate that useful project management training can be provided in one-day sessions, or in even less time, to a wide range of employees in different work units in a very cost-efficient manner. Those people interested in more advanced training can then attend longer courses or

Increasing individual and team effectiveness

be in a position to pursue self-directed study in project management given the many books and journals in this field.

Project management training for effectiveness

The purposes of this paper are to demonstrate the utility of project management training especially the short-course approach as a cost-efficient means of increasing individual and team effectiveness in any kind of organization and in any field. If a person has, say, five projects, then that person might benefit from a project management approach by viewing the situation as five concurrent projects to manage, that is, "management by projects". A project management approach with its detailed planning, task assignment and accountability could solve, in large part, the "free rider" problem[8] often found in group work while fostering co-operative learning and management skills development.

Anyone showing a particular interest in the project management field can be directed to the world's largest association, the Project Management Institute (PMI – Upper Darby, Pennsylvania 19082, USA), with over 10,000 members worldwide. PMI publishes two journals (*Project Management Journal* and *PM Network*) and holds an annual symposium which attracts almost 2,000 attendees.

Four key factors to success or failure

Implementation and recommendations

Any trainer or manager considering introducing project management should attend to four key factors which can mean the success or failure of this innovative management effort[9]:

- (1) *Trainer and staff commitment.* The genuine commitment of the instructor to a project management approach is essential; otherwise, staff will soon detect that the exercise is simply a token one and they will not make the effort to properly use the project planning tools and other techniques.
- (2) *Training.* The instructor needs to provide at least some minimum training in basic project-management skills. Loo[10] has shown that even a one-day course can be effective in organizations; however, even a 70-minute lecture with handouts and worksheets on basic project planning and controlling techniques can present an informative overview of project management and some useful techniques for getting started.
- (3) *Project management systems.* A variety of PC software packages are readily available at reasonable costs, especially for IBM-compatible systems. The US-based Project Management Institute publishes an annual software survey in their PM Network magazine[11]. A selection of readily available programs are listed below:
 - Artemis (Metier Management Systems, Houston, Texas);
 - Grenada (Netronic, Newport Beach, California);
 - Mac Project (Macintosh, Cupertino, California);
 - Microsoft Project (Microsoft, Bellevue, Washington);
 - Open Plan (Welcom Software Technology, Houston, Texas);
 - Prestige (K & H, Wayne, Pennsylvania);
 - Primavera Project Planner (Primavera Systems, BalaCynwyd, Pennsylvania);

- Synergy (Bechtel Software, Acton, Massachusetts);
- Time Line (Symentec, Cupertino, California);
- View Point (Computer Aided Management, Petaluma, California).

These sorts of software package offer a wide range of planning, controlling, resourcing and reporting capabilities which are useful throughout the project life cycle.

- (4) *Evaluation*. It is important that the introduction and effectiveness of project management in courses be evaluated to determine if, in fact, project management improves the effectiveness and efficiency of projects as well as the skills of participating staff in both the technical areas (e.g. planning and controlling) and people areas (e.g. interpersonal communications skills, conflict management and improved team cohesion) of management. A discussion of project evaluation approaches and techniques is provided by Loo[12], among others, in a special issue of the August 1985 *Project Management Journal*.

Select project management techniques and tools

The project life cycle

Project management follows a life cycle from a conceptual phase to a termination phase. This life cycle view obviously reflects the influence of the systems approach to the development of project management as a formal management discipline. Figure 1 shows a typical life cycle for projects from a conceptualization phase to the detailed project-development phase to the execution or implementation phase and, finally, to the project termination or close-out phase. This figure is a helpful framework on which to plan and control projects for successful completion.

Project planning

Like all planning, project planning in the conceptual and development phases consists of determining in advance what is to be done. Project planning typically starts with an overall plan and then detailed planning in the development phase. One planning tool in the conceptual phase is the project description. Typically, a one-page project description or project statement evolves over the conceptual phase. This document gives a concise and precise overview of the project's purpose or objective, the terms of reference or mandate under which the project is justified, and a brief description of the methodology (e.g. a market survey) to be used in the project as well as key

A project framework

Key milestones

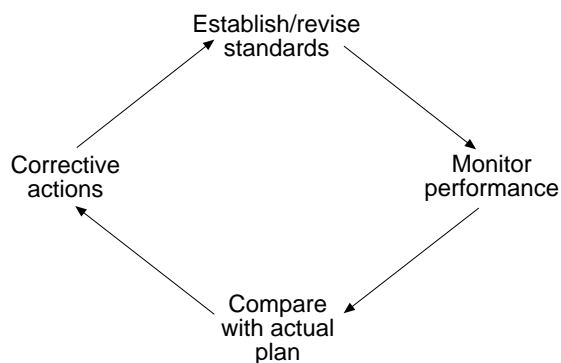


Figure 1. The project control cycle

Identifying major activities

milestones (e.g. project start and finish dates). This document is an important communication tool for the project team, the client, and other stakeholders (e.g. senior management) in the project. It can also be the stimulus for setting up a contract in the case of externally contracted projects. The following format could be used:

- (1) *Project title* – a unique, meaningful title.
- (2) *Unit* – the organizational unit/course/team conducting the project.
- (3) *Purpose* – a concise and clear statement of the overall objective of the project starting with an action verb, “To...” It is sometimes useful to also specify what the project is not addressing if there is any ambiguity.
- (4) *Terms of reference* – the client/organization and the client’s contract position and incumbent are identified. The project manager and any other key personnel already assigned to the project are identified. The reporting structure is specified as well as the estimated budget and budget constraints.
- (5) *Methodology and milestones* – a brief description of the main methodology is presented, e.g. a survey. Major milestones are specified, especially for the project start and completion dates.

Project planning charts are another essential tool, whether in paper or computerized form (Figure 2). These worksheets enable project team members to identify all the major activities required to complete the project, as well as identifying the specific person responsible for ensuring that the activity is completed successfully, the estimated actual work time (e.g. number of work hours/days) and elapse time (e.g. period of days over which the work will take place since staff do not spend all their time on just one activity – they work on several activities or projects concurrently), and the financial and material or other resources required for that activity. Once all major activities are identified in this manner, the detailed planning charts can be completed by breaking down each major activity into its various tasks. Note that each activity and task has its unique number to prevent any confusion in project discussions on the work to be performed. Also, this tool specifies the individual accountable for each activity; thus, helping to eliminate the “free rider” problem frequently reported in group work[8]. As we know from experience, we identify many potential problems or issues during any planning process; therefore, issues analysis is an important part of the planning process. The use of issues analysis charts (Figure 3) aids project staff in describing all potential issues or problems as they plan their activities

Project title: _____ Page: __/__

Date completed: _____

Activity and output	Accountability	Estimated		Resources
		Work time	Elapse time	
001				
002				

Figure 2. A generic project planning chart

Completed by: (Name of student/staff)

	Issue/problem	Impact	Action to be taken
001			
002			

Figure 3. A generic issues analysis chart

and sharing these issues with other project members and the client or senior management in order to determine its impact on the project and action to be taken. For example, if a mail survey of customer satisfaction is planned, then potential issues could include a disruption in the postal service or the length of time the postal service takes that would cause serious delays in obtaining the completed questionnaires. One possible action or contingency plan would be to use a telephone survey; however, extra resources would be required because a telephone survey is significantly more labour-intensive/expensive than a mail survey.

Visual presentation of project activities

Having completed the process of developing the planning charts along with the resource and time requirements as well as the issues analysis, the project team can now develop a Gantt chart, as seen in Figure 4, to display the activities over the time period for the project. The use of Gantt charts, unlike PERT (program evaluation and review technique) and CPM (critical path method), does not require any special training and it is quite suitable for small projects such as those conducted by small businesses. This visual presentation of project activities is easy to communicate to anyone and it serves to remind project staff at a glance of what activities are supposed to be done at what times.

Project title: Customer satisfaction survey

Project manager: Mary Smith

No.	Activity	Week												
		1	2	3	4	5	6	7	8	9	10	11	12	
001	Conduct literature search on customer satisfaction	[Bar]												
002	Draft customer satisfaction questionnaire			[Bar]										
003	Pre-test questionnaire with ten customers				[Bar]									

Figure 4. A generic Gantt chart

Using "milestones"

Project monitoring and control

With planning complete, the project implementation or execution phase can begin. The Gantt chart continues to be used to monitor progress on the project and identify problems, especially activities falling behind schedule. The use of "milestones" is essential in planning and controlling projects. Milestones are placed at critical points in a project where major decisions must be made. For example, in Figure 4, a milestone (open triangle) was placed after the pre-testing of survey questionnaire (activity 003) because the team would know whether the questionnaire was working as intended or whether there were serious problems with the questionnaire (e.g. misinterpreted questions). If there were serious problems, then management would have to decide whether to start over with the development of another questionnaire, to salvage the current questionnaire, replace the project manager, or another option.

The project status report

Besides the use of milestones, another commonly-used control tool is the project status report. These reports are typically scheduled monthly or, in very short projects, weekly or every two weeks to ensure that the project manager and client can track a project and take timely corrective action, if necessary, to modify a project. As seen in Figure 5, these reports briefly describe three main areas: the current status of the project, any problems or issues that arose since the last report and the actions taken, and any upcoming milestones and approved changes to the work plan. These reports are usually kept to one page; it is not the intent of project management to generate unnecessary paper or create bureaucrats, but simply to ensure project success through careful planning and controlling.

These are only a few of the commonly-used project planning and controlling techniques and tools. Stuckenbruck[9] presents eight appendices which illustrate a range of useful tools such as a work breakdown structure (WBS), project master schedule, and project cross-impact matrix. Similarly, Silverman[13] presents a variety of tools such as the line-of-balance (LOB) techniques for project planning. A wide variety of books are currently available from very readable introductions to project management[9,13] to more advanced or comprehensive handbooks[14,15].

Points for managers and trainers

The project management approach can be applied in virtually any discipline and work environment to help managers and staff to deal effectively with work assignments and workload stress, and to develop basic management skills that will serve them well throughout their work life. The keys to successful project management include the following points:

Project title: Customer satisfaction report
Date: 30 April 1996
Prepared by: Mary Smith

Status:	A brief, point-form description of activities and outputs completed since the last project status report
Issues and actions taken	What problems or issues have arisen during the reporting period and how they have been resolved
Upcoming milestones	Upcoming outputs and milestones covering the coming reporting period as well as changes to the work plan

Figure 5. A project status report

- A genuine commitment to the project management approach is needed from management, unions and employees.
- There should be formal training in project management for all employees, at least in the basics of project planning and controlling.
- It should be kept simple by easing work units and employees into the project management approach rather than trying a dramatic overnight shift in management approaches.
- Project management software and training should be introduced to support managers and staff, especially on larger or multi-year projects.
- The team concept versus the traditional view that emphasizes individual effort and recognition by providing recognition and rewards for team success should be reinforced.

References

1. Kerzner, H. and Thamhain, H., *Project Management for Small and Medium-size Business*, Van Nostrand Rinehold, New York, NY, 1984.
2. Larson, E.W., Gobeli, D.H. and Gray, C.F., "Application of project management by small businesses to develop new products and services", *Journal of Small Business Management*, April 1991, pp. 30-41.
3. Cleland, D.I. and King, W.R., *Project Management*, Van Nostrand Rinehold, New York, NY, 1983.
4. Kerzner, H., *Project Management: A Systems Approach to Planning, Scheduling, and Controlling*, Van Nostrand Rinehold, New York, NY, 1992.
5. Pinto, M.B., "Gaining cooperation among members of hospital project teams", *Hospital Topics*, Winter 1990, pp. 15-21.
6. Kolenko, T.A. and Covin, T.J., "Academic consulting teams: a case example and team management guidelines", *Journal of Education for Business*, Vol. 70 No. 1, 1994, pp. 38-41.
7. Loo, R., "Project management training in Canadian organizations", *International Journal of Project Management*, Vol. 9 No. 4, November 1991, pp. 250-7.
8. Holter, N.C., "Team assignments can be effective cooperative learning techniques", *Journal of Education for Business*, Vol. 70 No. 2, 1994, pp. 73-6.
9. Stuckenbruck, L.C. (Ed.), *The Implementation of Project Management: The Professional's Handbook*, Addison-Wesley, Reading, MA, 1988.
10. Loo, R., "One-day project management training: is it possible?", *1990 Proceedings of the Project Management Institute*, 1990, pp. 568-74.
11. Project Management Institute, "1995 project management software survey", *PM Network*, Vol. IX No. 7, 1995, pp. 35-44.
12. Loo, R., "Evaluation in the project management environment", *Project Management Journal*, August 1985, pp. 36-41.
13. Silverman, M., *Project Management: A Short Course for Professionals*, John Wiley & Sons, New York, NY, 1988.
14. Locke, D., *Project Management*, Gower, Brookfield, VT, 1990.
15. Meredith, J.R. and Mantel, S.J. Jr, *Project Management: A Managerial Approach*, John Wiley & Sons, New York, NY, 1995.

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