PDE PROVIDER

Professional Development for the Expert

Course Title

Project Management: Past and Present

Instructor

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Credit

1 PDU

Questions

10

Adaptation Statement

1. Project Management: Past and Present

Careers Using Project Management Skills

Skills learned by your exposure to studying project management can be used in most careers as well as in your daily life. Strong planning skills, good communication, ability to implement a project to deliver the product or service while also monitoring for risks and managing the resources will provide an edge toward your success. Project managers can be seen in many industry sectors including agriculture and natural resources; arts, media, and entertainment; building trades and construction; energy and utilities; engineering and design; fashion and interiors; finance and business; health and human services; hospitality, tourism, and recreation; manufacturing and product development; public and private education services; public services; retail and wholesale trade; transportation; and information technology.

Below we explore various careers and some of the ways in which project management knowledge can be leveraged.

Business Owners

Business owners definitely need to have some project management skills. With all successful businesses, the product or service being delivered to the customer meets their needs in many ways. The product or service is of the quality desired, the costs are aligned with what the consumer expected, and the timeliness of the product or service meets the deadline for the buyer of that item.

The pillars of project management are delivering a product/service within schedule, cost, scope, and quality requirements. Business owners need planning, organizing, and scoping skills and the ability to analyze, communicate, budget, staff, equip, implement, and deliver.

Understanding the finances, operations, and expenses of the business are among the skills that project managers learn and practice. Some businesses may focus more on accounting, providing financial advice, sales, training, public relations, and actuary or logistician roles. Business owners may own a travel agency or provide hospitality. Business owners could be managing a storefront or a location in their town's marketplace.

Example: Restaurant Owner/Manager

Restaurant managers are responsible for the daily operations of a restaurant that prepares and serves meals and beverages to customers. Strong planning skills, especially coordinating with the various departments (kitchen, dining room, banquet operations, food service managers, vendors providing the supplies) ensure that customers are satisfied with their dining experience. Managers' abilities to recruit and retain employees, and monitor employee performance and training ensure quality with cost containment. Scheduling in many aspects, not only the staff but also the timing of the food service deliveries, is critical in meeting customer expectations.

Risk management is essential to ensure food safety and quality. Managers monitor orders in the kitchen to determine where delays may occur, and they work with the chef to prevent these delays. Legal compliance is essential in order for the restaurant to stay open, so restaurant managers direct the clean-

ing of the dining areas and the washing of tableware, kitchen utensils, and equipment. They ensure the safety standards and legality, especially in serving alcohol. Sensitivity and strong communication skills are needed when customers have complaints or employees feel pressured because more customers arrive than predicted.

Financial knowledge is needed for the soundness of running the restaurant, especially tracking special projects, events, and costs for the various menu selections. Catering events smoothly can be an outcome of using project plans and the philosophy of project management. The restaurant manager or the executive chef analyzes the recipes to determine food, labour, and overhead costs; determines the portion size and nutritional content of each serving; and assigns prices to various menu items, so that supplies can be ordered and received in time.

Planning is the key for successful implementation. Managers or executive chefs need to estimate food needs, place orders with distributors, and schedule the delivery of fresh food and supplies. They also plan for routine services (equipment maintenance, pest control, waste removal) and deliveries, including linen services or the heavy cleaning of dining rooms or kitchen equipment, to occur during slow times or when the dining room is closed. A successful restaurant relies on many skills that the project management profession emphasizes.

Outsourcing Services

Svc Sourcing Initiative Status Report 10/14/00

Overall Status — Red Yellow Green

Key Accomplishments:
- Defined catalog of services - current state (baseline)
- Completed Sourcing, Sponsor, LOB, and Legal Review of RFQ Document
- Conducted review of final RFQ with Project Steering Committee on 10/12
- Contained final approval of RFQ document

Key Upcoming Activities:
- Complete RFQ Technical & Functional requirements
- Release RFQ document to Bidders on 10/14
- Finalize RFQ Evaluation Criteria & Scoring Matrix
- Expedite & facilitate all inquiries received during Bidders Q&A period
- Bidders Responses due to ABC Inc 12/31/100

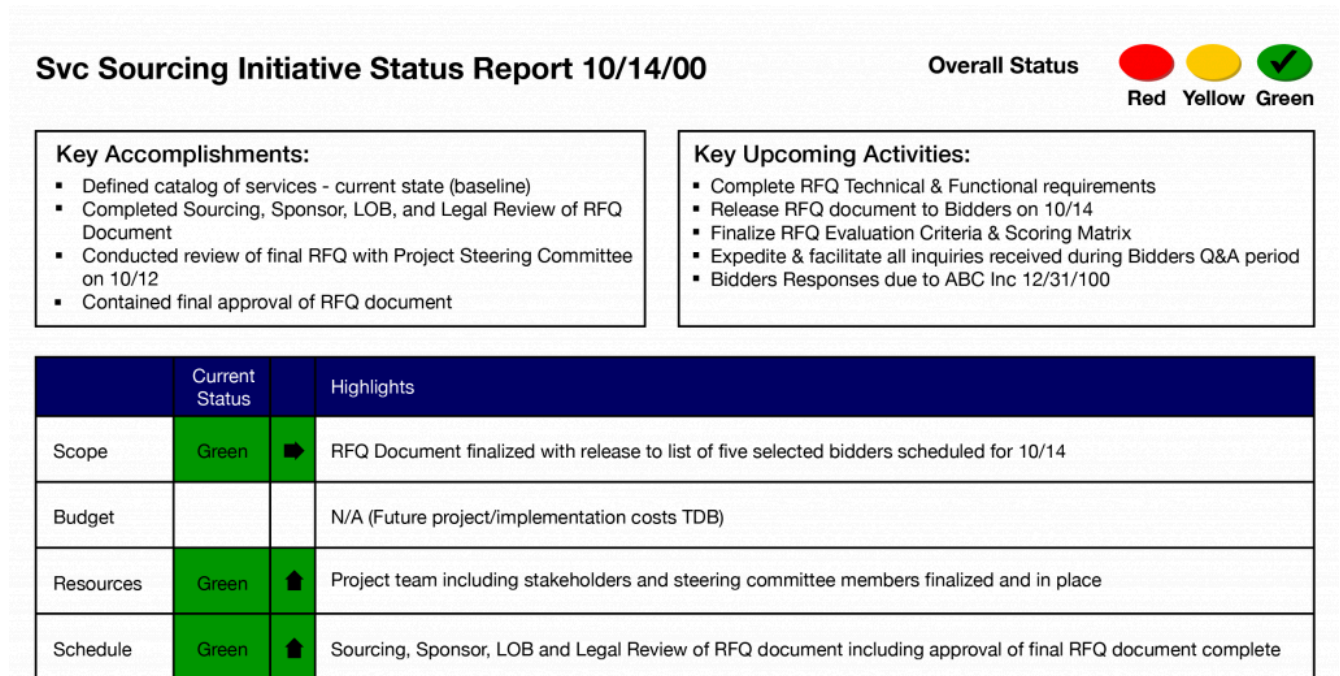|	Current Status		Highlights
Scope	Green	➡	RFQ Document finalized with release to list of five selected bidders scheduled for 10/14
Budget			N/A (Future project/implementation costs TDB)
Resources	Green	⬆	Project team including stakeholders and steering committee members finalized and in place
Schedule	Green	⬆	Sourcing, Sponsor, LOB and Legal Review of RFQ document including approval of final RFQ document complete

Figure 1.1: Sample status chart, which is typical with the use of a red-yellow-green

Many businesses explore outsourcing for certain services. Below is a sample status and project plan that reflects the various tasks needed for a project. A review of finances, the importance of communicating to stakeholders, and the importance of time, cost, schedule, scope, and quality are reflected. Many companies may use these steps in their business. These plans show the need for the entire team to review the various proposals to choose the best plan. Figure 1.1 represents a sample project status report.

Example: Construction Managers

Construction managers plan, direct, coordinate, and budget a wide variety of residential, commercial, and industrial construction projects including homes, stores, offices, roads, bridges, wastewater treatment plants, schools, and hospitals. Strong scheduling skills are essential for this role. Communication skills are often used in coordinating design and construction processes, teams executing the work, and governance of special trades (carpentry, plumbing, electrical wiring) as well as government representatives for the permit processes.

A construction manager may be called a project manager or project engineer. The construction manager ensures that the project is completed on time and within budget while meeting quality specifications and codes and maintaining a safe work environment. These managers create project plans in which they divide all required construction site activities into logical steps, estimating and budgeting the time required to meet established deadlines, usually utilizing sophisticated scheduling and cost-estimating software. Many use software packages such as Microsoft Project® or Procure® or online tools like Base-Camp®. Most construction projects rely on spreadsheets for project management. Procurement skills used in this field include acquiring the bills for material, lumber for the house being built, and more. Construction managers also coordinate labor, determining the needs and overseeing their performance, ensuring that all work is completed on schedule.

Values including sustainability, reuse, LEED-certified building, use of green energy, and various energy efficiencies are being incorporated into today's projects with an eye to the future. Jennifer Russell, spoke about project management and global sustainability" at the 2011 Silicon Valley Project Management Institute (PMI) conference. She informed the attendees of the financial, environmental, and social areas in expanding the vision of project management with the slide in Figure 1.2. These values are part of the PMI's code of ethics and professionalism. By adhering to this code, project managers include in their decisions the best interests of society, the safety of the public, and enhancement of the environment.
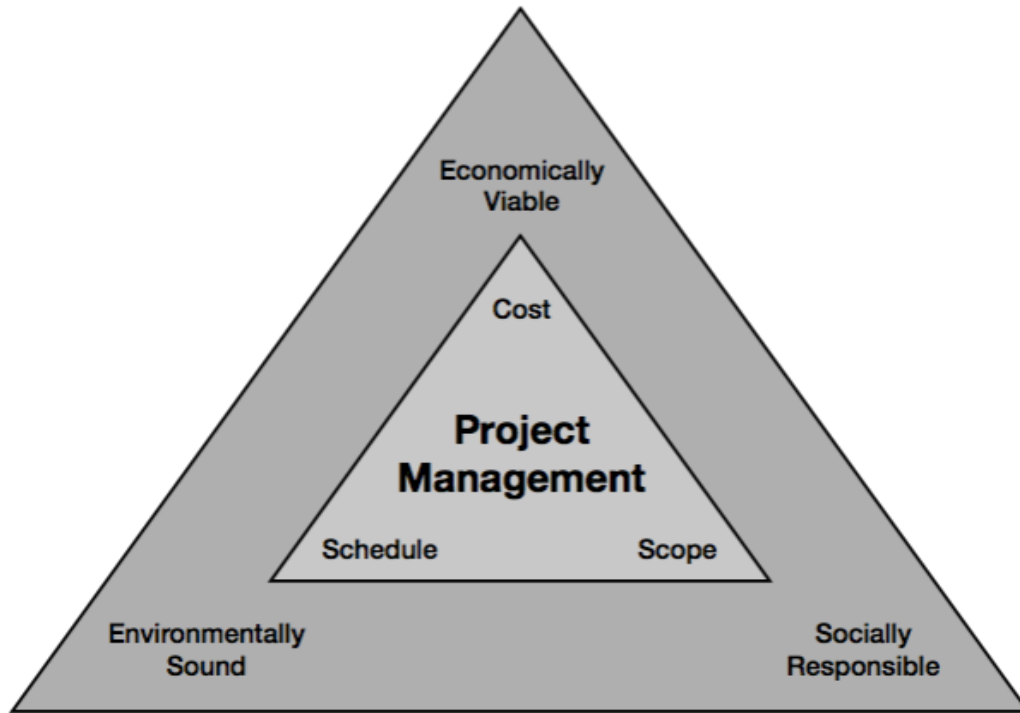
Figure 1.2: In addition to considering the cost, scope, and schedule of a project, a project manager should work to ensure the project is socially responsible, environmentally sound, and economically viable.

Creative Services

Creative service careers include graphic artists, curators, video editors, gaming managers, multimedia artists, media producers, technical writers, interpreters, and translators. These positions use project management skills, especially in handling the delivery channel and meeting clients' requirements.

Let us look at one example, graphic artists, to understand and identify some of the project management skills that aid in this career.

Example: Graphic Artists

Graphic artists plan, analyze, and create visual solutions to communication problems. They use many skills found in project management, especially communications. They work to achieve the most effective way to get messages across in print and electronic media. They emphasize their messages using colour, type, illustration, photography, animation, and various print and layout techniques. Results can be seen in magazines, newspapers, journals, corporate reports, and other publications. Other deliverables from graphic artists using project management skills include promotional displays, packaging, and marketing brochures supporting products and services, logos, and signage. In addition to print media, graphic artists create materials for the web, TV, movies, and mobile device apps.

Initiation in project management can be seen in developing a new design: determining the needs of the client, the message the design should portray, and its appeal to customers or users. Graphic designers consider cognitive, cultural, physical, and social factors in planning and executing designs for the target

audience, very similar to some of the dynamics a project manager considers in communicating with various project stakeholders. Designers may gather relevant information by meeting with clients, creative staff, or art directors; brainstorming with others within their firm or professional association; and performing their own research to ensure that their results have high quality and they can manage risks.

Graphic designers may supervise assistants who follow instructions to complete parts of the design process. Therefore scheduling, resource planning, and cost monitoring are pillars of project management seen in this industry. These artists use computer and communications equipment to meet their clients' needs and business requirements in a timely and cost-efficient manner.

Educators

"Educator" is a broad term that can describe a career in teaching, maybe being a lecturer, a professor, a tutor, or a home-schooler. Other educators include gurus, mullahs, pastors, rabbis, and priests. Instructors also provide vocational training or teach skills like learning how to drive a car or use a computer. Educators provide motivation to learn a new language or showcase new products and services. Educators use project management skills including planning and communication.

Let us look at teachers, since we all have had teachers, and see if we can recognize the project management skills that are demonstrated in this profession.

Example: Teachers

Some teachers foster the intellectual and social development of children during their formative years; other teachers provide knowledge, career skill sets, and guidance to adults. Project management skills that teachers exhibit include acting as facilitators or coaches and communicating in the classroom and in individual instruction. Project managers plan and evaluate various aspects of a project; teachers plan, evaluate, and assign lessons; implement these plans; and monitor each student's progress similar to the way a project manager monitors and delivers goods or services. Teachers use their people skills to manage students, parents, and administrators. The soft skills that project managers exercise can be seen in teachers who encourage collaboration in solving problems by having students work in groups to discuss and solve problems as a team.

Project managers may work in a variety of fields with a broad assortment of people, similar to teachers who work with students from varied ethnic, racial, and religious backgrounds. These teachers must have awareness and understanding of different cultures.

Teachers in some schools may be involved in making decisions regarding the budget, personnel, textbooks, curriculum design, and teaching methods, demonstrating skills that a project manager would possess such as financial management and decision making.

Engineers

Engineers apply the principles of science and mathematics to develop economical solutions to technical problems. As a project cycles from an idea in the project charter to the implementation and delivery of a product or service, engineers link scientific discoveries to commercial applications that meet societal and consumer needs.

Engineers use many project management skills, especially when they must specify functional requirements. They demonstrate attention to quality as they evaluate a design's overall effectiveness, cost, reli-

ability, and safety similar to the project manager reviewing the criteria for the customer's acceptance of delivery of the product or service.

Estimation skills in project management are used in engineering. Engineers are asked many times to provide an estimate of time and cost required to complete projects.

Health Care

There are many jobs and careers in health care that use project management skills. Occupations in the field of health care vary widely, such as athletic trainer, dental hygienist, massage therapist, occupational therapist, optometrist, nurse, physician, physician assistant, and X-ray technician. These individuals actively apply risk management in providing health care delivery of service to their clients, ensuring that they do not injure the person they are caring for. *Note: There is a section on nursing later in this chapter.*

Many of you may have had a fall while you were growing up, and needed an X-ray to determine if you had a fracture or merely a sprain. Let us look at this career as an example of a health care professional using project management skills.

Example: Radiology Technologists

Radiology technologists and technicians perform diagnostic imaging examinations like X-rays, computed tomography (CT), magnetic resonance imaging (MRI), and mammography. They could also be called radiographers, because they produce X-ray films (radiographs) of parts of the human body for use in diagnosing medical problems.

Project management skills, especially people skills and strong communication, are demonstrated when they prepare patients for radiologic examinations by explaining the procedure and what position the patient needs to be in, so that the parts of the body can be appropriately radiographed. Risk management is demonstrated when these professionals work to prevent unnecessary exposure to radiation by surrounding the exposed area with radiation protection devices, such as lead shields, or limiting the size of the X-ray beam. To ensure quality results, the health technician monitors the radiograph and sets controls on the X-ray machine to produce radiographs of the appropriate density, detail, and contrast.

Safety and regulations concerning the use of radiation to protect themselves, their patients, and their coworkers from unnecessary exposure is tracked in an efficient manner and reported as a control to ensure compliance. Project management skills are also used in preparing work schedules, evaluating equipment for purchase, or managing a radiology department.

Some radiological technologists specialize in CT scans; as CT technologists they too use project management skills. CT uses ionizing radiation to produce a substantial number of cross-sectional X-rays of an area of the body. Therefore, it requires the same precautionary measures that are used with X-rays, hence the need for risk management and monitoring for exposure.

Teamwork, not only with the patient that the radiological technologist supports and the doctor who ordered the request, but also with other health care providers, relies on strong communication, quality, work done in a timely manner, and wise use of hospital resources. This all boils down to ensuring that the three elements of the project management triangle of cost, schedule, and scope with quality delivered remain the essentials that provide a cornerstone to project management and the skills needed to obtain the objective.

Example: Nurses

Nurses treat and educate patients and their families and the public about various medical conditions and provide advice and emotional support. Nurses establish a care plan for their patients that include activities like scheduling the administration and discontinuation of medications (e.g., intravenous (IV) lines for fluid, medication, blood, and blood products) and application of therapies and treatments. Communication with the patient, their family, physicians and other health care clinicians may be done in person or via technology. Telehealth allows nurses to provide care and advice through electronic communications media including videoconferencing, the Internet, or telephone.

Risk management is very important for a nurse, with some cases having a life or death consequence. Nurses monitor pain management and vital signs and provide status reports to physicians to help in responding to the health care needs of the patient.

The nursing field varies. Some nurses work in infection control. They identify, track, and control infectious outbreaks in health care facilities and create programs for outbreak prevention and response to biological terrorism. Others are educators who plan, develop, execute, and evaluate educational programs and curricula for the professional development of students and graduate nurses. Nurses may use project management skills while conducting health care consultations, advising on public policy, researching in the field, or providing sales support of a product or service.

Paralegal

Attorneys assume the ultimate responsibility for legal work but they often obtain assistance. Paralegals assume this role in law firms and perform many tasks to aid the legal profession. However, they are explicitly prohibited from carrying out duties considered to be the practice of law (e.g., giving legal advice, setting legal fees, presenting court cases).

Project management skills such as planning are used in helping lawyers prepare for closings, hearings, trials, and corporate meetings. Communication skills are used in preparing written reports that help attorneys determine how cases should be handled or drafts for actions such as pleading, filing motions, and obtaining affidavits.

Monitoring skills aid paralegals who may track files of important case documents, working on risk containment related to filing dates and responses to the court. Procurement skills, which a project manager uses, can also be seen from a paralegal perspective in negotiating terms of hiring expert witnesses as well as other services such as acquiring services from process servers.

Financial skills may be used as well, such as assisting in preparing tax returns, establishing trust funds, and planning estates or maintaining financial office records at the law firm.

Government, litigation, personal injury, corporate law, criminal law, employee benefits, intellectual property, labour law, bankruptcy, immigration, family law, and real estate are some of the many different law practices where a paralegal professional may use project management skills.

Software developer

Computer software developers and computer programmers design and develop software. They apply the principles of computer science and mathematics to create, test, and evaluate software applications and systems that make computers come alive. Software is developed in many kinds of projects: computer games, business applications, operating systems, network control systems, and more. Software developers us project management skills to develop the requirements for the software, identify and track the

product development tasks, communicate within the development team and with clients, test cases, and manage quality, the schedule, and resources (staff, equipment, labs, and more).

Science Technicians

Science technicians use principles and theories of science and mathematics to assist in research and development and help invent and improve products and processes. In their jobs, they are more practically oriented than scientists. Planning skills project managers use can be seen as science technicians set up, operate, and maintain labouratory instruments; monitor experiments; and observe, calculate, and record results. Quality is a factor here as it is in project management; science technicians must ensure that processes are performed correctly, with proper proportions of ingredients, for purity or for strength and durability.

There are different fields in which science technicians can apply project management skills. Agricultural and food science technicians test food and other agricultural products and are involved in food, fibre, and animal research, production, and processing. Control and risk management are important here in executing the tests and experiments, for example, to improve the yield and quality of crops, or the resistance of plants and animals to disease, insects, or other hazards. Quality factors are paramount when food science technicians conduct tests on food additives and preservatives to ensure compliance with government regulations regarding colour, texture, and nutrients.

Biological technicians work with biologists studying living organisms. Many assist scientists who conduct medical research or who work in pharmaceutical companies to help develop and manufacture medicines. Skills in scheduling, especially in incubation periods for the study of the impact on cells, could impact projects, such as exploring and isolating variables for research in living organisms and infectious agents. Biotechnology technicians apply knowledge and execution skills and techniques gained from basic research, including gene splicing and recombinant DNA, to product development. Project management skills are used in collaboration and communication among team members to record and understand the results and progress toward a cure or product.

Other kinds of technicians are chemical technicians who may work in labouratories or factories, using monitoring and control skills in the way they collect and analyze samples. Again, quality assurance is an important factor for most process technicians' work in manufacturing, testing packaging for design, ensuring integrity of materials, and verifying environmental acceptability.

Technicians use a project management skill set to assist in their initiation, planning, and executing tasks, while managing risks with some measure of reporting to determine if their objectives satisfy the constraints of cost, schedule, resource, and quality standards set.

History

Could the Great Wall of China, the pyramids, or Stonehenge have been built without project management? It is possible to say that the concept of project management has been around since the beginning of history. It has enabled leaders to plan bold and massive projects and manage funding, materials, and labour within a designated time frame.

In late 19th century, in the United States, large-scale government projects were the impetus for making important decisions that became the basis for project management methodology such as the transcontinental railroad, which began construction in the 1860s. Suddenly, business leaders found themselves

faced with the daunting task of organizing the manual labour of thousands of workers and the processing and assembly of unprecedented quantities of raw material.
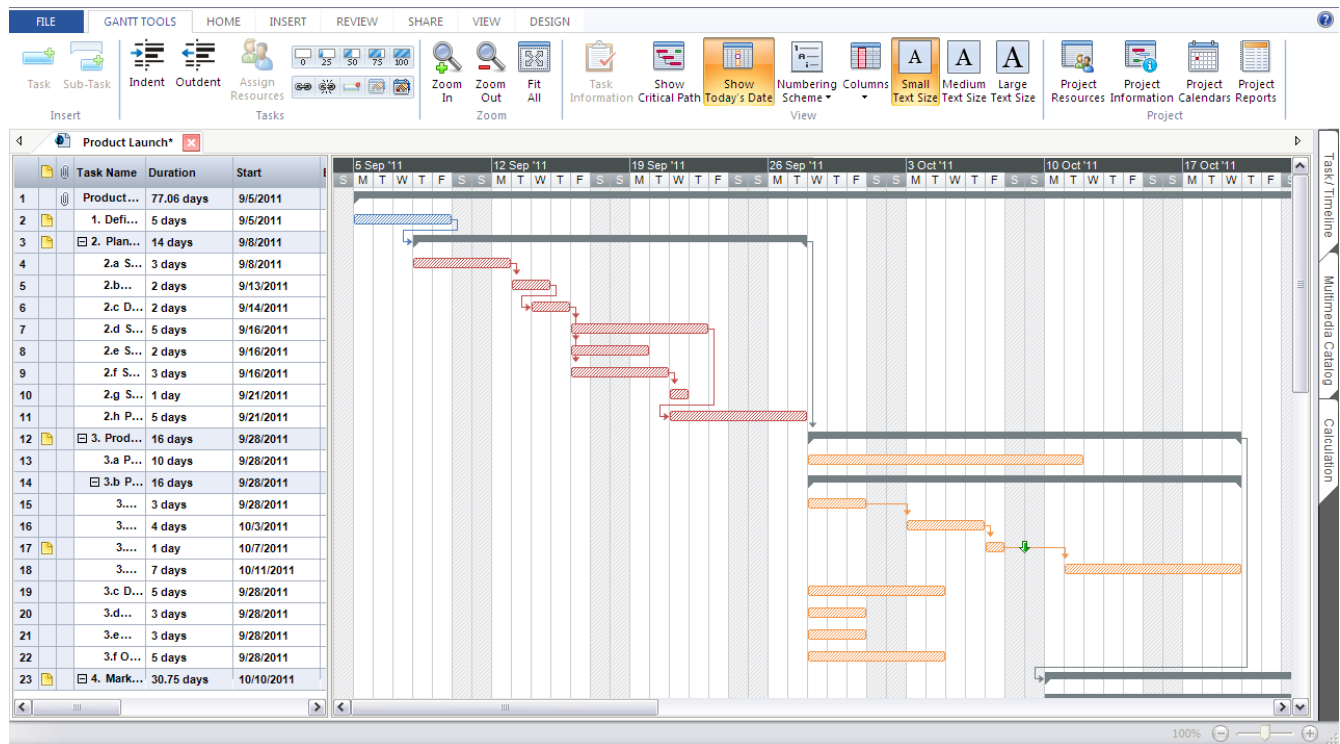

Figure 1.3: MindView Gantt Chart.

Henry Gantt, studied in great detail the order of operations in work and is most famous for developing the Gantt chart in the 1910s. A Gantt chart (Figure 1.3) is a popular type of bar chart that illustrates a project schedule and has become a common technique for representing the phases and activities of a project so they can be understood by a wide audience. Although now a common charting technique, Gantt charts were considered revolutionary at the time they were introduced. Gantt charts were employed on major infrastructure projects in the United States including the Hoover Dam and the interstate highway system and are still accepted today as important tools in project management.

By the mid-20th century, projects were managed on an ad hoc basis using mostly Gantt charts and informal techniques and tools. During that time, the Manhattan Project was initiated and its complexity was only possible because of project management methods. The Manhattan Project was the code name given to the Allied effort to develop the first nuclear weapons during World War II. It involved over 30 different project sites in the United States and Canada, and thousands of personnel from the United States, Canada, and the U.K. Born out of a small research program that began in 1939, the Manhattan Project would eventually employ 130,000 people, cost a total of nearly US$2 billion, and result in the creation of multiple production and research sites operated in secret. The project succeeded in developing and detonating three nuclear weapons in 1945.

The 1950s marked the beginning of the modern project management era. Two mathematical project-scheduling models were developed.

The program evaluation and review technique (PERT) was developed by Booz-Allen and Hamilton as part of the United States Navy's Polaris missile submarine program. PERT is basically a method for analyzing the tasks involved in completing a project, especially the time needed to complete each task, the dependencies among tasks, and the minimum time needed to complete the total project (Figure 1.4).

The critical path method (CPM) was developed in a joint venture by DuPont Corporation and Rem-

ington Rand Corporation for managing plant maintenance projects. The critical path determines the float, or schedule flexibility, for each activity by calculating the earliest start date, earliest finish date, latest start date, and latest finish date for each activity. The critical path is generally the longest full path on the project. Any activity with a float time that equals zero is considered a critical path task. CPM can help you figure out how long your complex project will take to complete and which activities are critical, meaning they have to be done on time or else the whole project will take longer. These mathematical techniques quickly spread into many private enterprises.
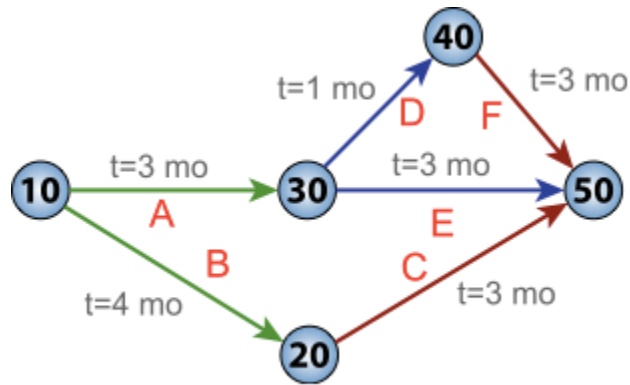

Figure 1.4: Pert Chart

Project management in its present form began to take root a few decades ago. In the early 1960s, industrial and business organizations began to understand the benefits of organizing work around projects. They understood the critical need to communicate and integrate work across multiple departments and professions.

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