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The Development of a Project Management Handbook for St. John's Mercy Medical Center

Angela D. Matherne

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An Abstract Presented to the Faculty of the Graduate School of Lindenwood College in Partial Fulfillment of the Requirements for the Degree of Master of Business Administration

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ABSTRACT

The purpose of this study is the development of a project management handbook, as a guide for Information Systems (I.S.) projects at St. John's Mercy Medical Center. The need for this study was supported by inconsistencies in project management methods observed at St. John's.

A review of project management literature revealed that there has been very little empirical research in this area, and suggested that the non-specific nature of project management literature may be contributing to the problem observed at St. John's. The literature review supported the view that a project management handbook should be developed, containing commonly accepted project management practices and principles for I.S. projects.

A project management handbook was developed, and evaluators for the handbook were selected. Criteria for selection of the evaluators were: knowledge of project management principles and practices, experience

in I.S. project management at St. John's, and knowledge of industry trends for I.S. projects. Evaluators were chosen from the I.S. Department, and a user department, to obtain both views of the handbook. The data collection instrument was a self-developed questionnaire.

The results of the evaluation supported the need for a project management handbook, as a guide for I.S. projects at St. John's. The results suggested an immediate need, and a future need for the handbook. The future need indicated that the handbook should eventually become part of a larger I.S. document, including standards, policies, and procedures, for I.S. projects at St. John's. As the standards, policies, and procedures were not yet developed for I.S. at St. John's, their inclusion in the handbook was stated as a suggestion for future research in this area.

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INTRODUCTION

Information Systems

In the 1990s information systems are widely used in business to collect and process data, and to provide information to help managers make business decisions. An examination of the history of computers explains the evolution of information systems, and the development of project management techniques that grew in parallel with these technological advances.

The origin of the computer can be traced back to the invention of the abacus, a mechanical counting device, by the Babylonians around 2,200 B.C. However, Fuori and Aufiero credit the Industrial Revolution to be a historical event that triggered invention of a variety of devices that are the ancestors of today's computers. These devices include the "difference engine," invented by Charles Babbage in 1822, and Herman Hollerith's "census tabulator," invented in 1890 (5 - 10).

Fuori and Aufiero explain that computers were not commercially available until 1951, although they were

used in government and research environments before this time. The invention of the "integrated circuit" by Jack Kilby in 1960 was the next significant event in the development of computers. The "integrated circuit" or "chip" allowed computers to become smaller in size, and greater in processing power (13 - 16).

As computers evolved, their use in business environments increased, and departments with responsibility for computerized applications were generally known as "data processing" departments. The department name accurately described that the computer performed a primary function of processing large amounts of data, mainly for accounting applications.

Today, data processing departments are often known as "information systems," "management information systems," or "information technology" departments. Fuori and Aufiero define information systems to be "the interacting of humans and machines for the purpose of gathering and disseminating information" (496). Furthermore, the new role of information systems has evolved to become the capability "of responding to the information needs of all the other departments in a company" (497). The change in name from data processing department to information systems department

appears to reflect the growing realization within organizations that as data are "unprocessed facts," information is the end-result of a process that "fits the current needs of the user" (496).

As activities in information systems projects are both technical and complex in nature, and support the organization's business goals, multi-disciplinary project teams are often assembled from many departments within the organization. The composition of information systems project teams require a non-standard management approach, to enable project completion. For this reason, Stuckenbruck views the emergence of project management to be "an answer to some of the management problems resulting from today's complex systems" (5). The growth of information systems in organizations therefore parallels and compliments the growth of project management philosophy and methods.

Project Management

Project management is found in many industries. Kerzner defines project management to be,

> the planning, organizing, directing and controlling of company resources for a

> relatively short-term objective that has been established to complete specific goals and objectives. Furthermore, project management utilizes the systems approach to management by having functional personnel (the vertical hierarchy) assigned to a specific project (the horizontal hierarchy). (4)

Project management is usually found in environments where tasks are lengthy and complex. These environments include construction, aerospace, defense, engineering, and information systems. For the purposes of this study however, project management will be considered in the context of information systems (I.S.) projects.

Project management grew rapidly in the I.S. environment as automated systems often served multiple departments within organizations. This process introduced a horizontal work flow into the vertical organizational hierarchy. Also, as I.S. projects were often very complex and involved many tasks, they tended to require individuals from non-I.S. departments to become involved in the projects.

Although project management methods were often utilized in I.S. projects, it was observed at St. John's Mercy Medical Center, St. Louis, MO., that there was a tendency to do so without sufficient

organizational commitment. This resulted in a lack of education in project management methods among I.S. and the user community, a lack of automated project management tools, and no standards or procedures for project management at the organizational level. Therefore, it appeared that a handbook containing project management guidelines would provide a solid foundation for the project management process at St. John's Mercy Medical Center.

Currently, in the St. John's environment, managers in the I.S. Department experience difficulty in planning projects properly, estimating project completion with accuracy, establishing appropriate project priorities, and planning future projects. These difficulties put I.S. Department managers into a "fire fighting" mode, and is one possible cause of customer dissatisfaction among the user community.

These problems were observed in a 1991 study that assessed the need for automated project management tools in the I.S. Department, and in part constituted the author's recommendations for further research. The lack of automated project management tools was resolved during 1992, with the purchase of PC-based software for I.S. Department managers in the mainframe group.

However, the lack of project management guidelines remains unresolved in this environment, and is the main focus of this study.

St. John's Mercy Medical Center

St. John's Mercy Medical Center and St. John's Mercy Hospital, Washington, MO., are members of the Sisters of Mercy Health System, a national organization. This organization is a Catholic non-profit health care provider, described in the 1989 - 1990 Annual Report to have a "primary commitment to use their financial and human resources to advocate and design programs for the poor and uninsured" (4). Although this is the organization's primary purpose, health care services are provided to all groups in the local area including privately insured, Medicare, and Medicaid patients.

The I.S. Department is one of many departments within St. John's Mercy Medical Center and exists to serve the data processing needs of the organization. This service role is fulfilled in a variety of ways: on-line systems to automate functions of the user departments, data reporting, PC hardware installation and support, consulting for user departments' business

needs, and special data reporting to outside regulatory agencies.

Information Systems Department at St John's

The I.S. Department differs from other departments at the Medical Center, as it is not wholly staffed by St.John's employees. The department managers, programmers, and technical support staff are employees of HBO & Company, Atlanta, Ga. Managers and employees of the operations, production control, and internal audit subdepartments are St. John's employees.

HBO & Company describes its business in the 1992 Annual Report to be "a healthcare information solutions company that provides information systems and technology for the healthcare enterprise" (1). At St. John's Mercy Medical Center, there is a "facilities management" contract with HBO & Company. This contractual agreement allows HBO & Company to run the Information Systems Department for the Medical Center and to provide employees to perform the department management, applications programming and technical support functions.

HBO & Company also supplies a variety of software products to the Medical Center, that are documented in

the department's Standards and Procedures Manual. The supplied minicomputer systems include: MedStar, ClinStar, TrendStar and Patient Scheduling. The supplied mainframe systems are: MedStar/MediPac Interface, MediPac Admissions/Discharges/Transfers (A/D/T) and Insurance Verification, MediPac Patient Accounting, Medical Records Abstracting, TrendStar Interface, Nomad Reporter, and ASSIST/GT (1).

The I.S. Department, and implicitly HBO & Company, provides a service to many other hospital departments, and experiences high visibility throughout the hospital organization. Although many of the I.S. Department employees are not directly employed by St. John's Mercy Medical Center, they comply with St. John's policies and procedures. The only difference is in the administration of payroll and benefits.

The I.S. Department is logically and physically divided into two groups: minicomputer and mainframe. Although the employees and computers "interface" or talk to each other as necessary, this split is functionally correct as the minicomputer group tends to serve the "clinical" user community, and the mainframe group serves the "financial" user community.

The minicomputer and mainframe groups are further

subdivided by function into applications programming groups, computer operations and technical support. In this manner the I.S. Department is organized by function. There are four subdepartments within the mainframe group: MediPac Applications Programming, General Accounting Applications Programming, Technical Support, and Computer Operations.

"MediPac" is a product line of application software developed and licensed by HBO & Company, Atlanta, Ga. The General Accounting application software is developed and licensed by Dunn and Bradstreet, Atlanta, Ga (1).

The area of responsibility covered by each of the applications programming teams in this environment includes: installation of system upgrades and enhancements as supplied by the vendor, customization of the base product software as defined by user departments, ongoing support of production jobs, resolution of production problems, definition of user reporting requirements and other enhancements, support and enhancements to other minor subsystems developed in-house by the I.S. Department.

The MediPac applications area is defined to include: MedStar/MediPac Interface, MediPac A/D/T and

Insurance Verification, MediPac Patient Accounting, Medical Records Abstracting, TrendStar Interface, Refunds subsystem, Collection Letters subsystem, UB82 Edit, Nomad Reporter, and ASSIST/GT. All systems excluding Refunds, Collection Letters and UB82 Edit are products of HBO & Company, or are sold by HBO & Company in joint marketing ventures. The General Accounting applications area includes: Payroll/Personnel, Accounts Payable, General Ledger, Fixed Assets, Materials Management, and Information Expert (1).

The Medipac applications programming team is currently comprised of four full time programmer/analysts and one manager. The General Accounting applications programming team is comprised of three full time programmer/analysts and one manager. The managers of each team report directly to the Director of Financial Systems, who reports to the Chief Information Officer (CIO). The CIO directly reports to the Chief Financial Officer (CFO) of St. John's Mercy Medical Center.

Project Management at St. John's Mercy Medical Center

The manager of each programming team is responsible for the daily supervision and activities of

the group, including personnel management and project management activities. The manager organizes and prioritizes each programmer's workload based on user department requirements, monitors and coordinates project activities, receives periodic status updates, provides both periodic and monthly status reports to management and user department heads, manages their own project list, calculates programming backlog hours and project statistics, and plans future projects.

Each manager is also responsible for communication with user department heads. They attend meetings on behalf of their team, act as liaison between users and programmers, and generally function as an ambassador of HBO & Company to the client hospital.

Project lists are the master lists of all current and future projects. Project requests usually originate from user departments, but may be internal department projects. Project priorities are often determined by a user committee, but are subject to review and revision by the I.S. Department. Project hierarchies, logical combination of projects, availability of resources and availability of product updates from vendors can cause project priorities to be revised.

The MediPac project list is typically comprised of one hundred or more projects of varying size and complexity. An average of twenty to twenty-five projects may be active at any one time, but will be in various stages of completion. New projects are added to the MediPac project list on a continual basis. The General Accounting project list is typically comprised of less than twenty projects.

The Technical Support team is responsible for maintaining the system software on the mainframe, allocation of disk space, and screen-to-screen response time for on-line applications. This team is the least exposed to other hospital departments and provides service to the applications and operations groups.

The Computer Operations group is responsible for the daily operation of the mainframe in a 24 hour production environment. Operators work three shifts per day, every day of the year. There are two Production Controllers who schedule the daily workload with the assistance of scheduling software, and one operations manager.

The Computer Operations group is the most exposed to hospital departments, as they receive and process special request jobs from all users. They are also

responsible for equipment, telecommunications, and delivery of all production output. The output includes: reports, microfiche, and tape.

Project Request Procedure

User departments submit a project request to Information Systems describing the project to be undertaken. At times the requesting department assigns a user project manager to coordinate project activities across departments. This most often occurs when the Patient Accounting Department or Fiscal Services Department is the requestor. When the user department does not assign a project manager, the I.S. Department manager responsible for the application area assumes the project manager role by default.

When the Information Systems manager performs the project manager role in a project that results in procedural changes within the user department, or when user responsibilities extend beyond the scope of the project, this can cause projects to be incomplete or unsuccessful. This occurs because the I.S. Department manager is not an expert in user department operations, in most instances.

Radding observes that many organizations are using

a "sponsor-as-project-leader approach," to insure that I.S. projects meet the needs of the business. He also comments that this approach is becoming popular among Chief Information Officers as they view it "as a way of spreading the risk to the sponsoring department" (55). Therefore, it appears to be most appropriate that project managers should be drawn from user departments, and that they should operate with a standard set of project management guidelines that are accepted on the organizational level.

Statement of Purpose

The purpose of this study is to compile a handbook containing guidelines for commonly accepted Project Management methods and procedures. This handbook is intended to be used for mainframe-based projects at St. John's Mercy Medical Center, and other HBO & Company client hospitals. The intended audience for the material is: project managers from hospital user departments, or I.S. Department managers in the mainframe group. However, it is expected that the handbook will be applicable to other audiences either within St. John's Mercy Medical Center, or in other environments.

Chapter II

LITERATURE REVIEW

A review of the literature on project management and related topics revealed that there were many books and articles written on this subject. However, further examination of the available material disclosed a lack of empirical research.

Ford and Randolph conducted a similar literature review to determine the advantages and disadvantages of cross-functional organizational structures. Cross-functional organizational structures are often associated with project management, so Ford and Randolph's study was considered pertinent. The researchers felt that the lack of empirical research was due to confusion among researchers in defining such terms as "matrix organization," and "project management." In their opinion, this lead to "the lack of any solid theoretical framework within which hypotheses might be formulated and tested" (268).

Ford and Randolph explained that the available project management literature was found to be mainly "anecdotal and opinion-based articles," written by

project management practitioners (268). To a large extent, the same was found to be true for this literature review, which in part parallels Ford and Randolph's study in the area of organizational structure.

This study is partly based upon literature obtained from the Project Management Institute (PMI). Wideman explains that the Project Management Institute was founded in 1969 with a mission of being "the leading recognized professional and technical association in advancing the state of the art of program and project management" (A-1).

In more recent years the PMI recognized the need to formalize and standardize a core body of project management knowledge, to enable project management professionals to be certified, and academic programs to be accredited by institutions of higher learning. A number of the books referenced in this study are part of the PMI's "body of knowledge," as described by Wideman (A-2).

To supplement the PMI materials, a variety of articles from trade publications and other sources were referenced, which tended to fall into Ford and Randolph's category of opinion-based articles.

However, these articles were considered to be valuable as they reflect the experience and thinking of practicing project managers, many of which are also professors at institutes of higher learning.

The third main source of information was a collection of project management textbooks. It was interesting to note that Ford and Randolph's study, and number of authors of PMI texts, cited two of the texts referenced by this study. The texts, one written by Harold Kerzner, Ph.D., and the other written by Linn C. Stuckenbruck, Ph.D., appear to contain the basis of later project management theory and seem to be the recognized authorities among project management professionals and academic circles.

This literature review first explores project management as it relates to the organization, then it introduces the roles and responsibilities of the project sponsor, project manager, and project team member. Next, the project management process and Information Systems projects are discussed, and finally, the need for a project management handbook is presented.

The Organization

Project management exists within many different types of organizational structures, and can take different forms. According to Cable and Adams,

> Uniqueness represents the basic premise of project management and as such, the form of organizational structure chosen will be as original as the project characteristics and organizational environment in which it will operate. (11)

Cable and Adams explain that "the level of authority the project manager enjoys depends primarily on which of these structures is chosen." By this definition, the project manager's level of authority can be little or none in a functional organization, or can be high in a strong matrix organization or project organizational structure, with a spectrum of authority levels in between, as illustrated by Table 1 (2). The authors also indicate that organizations rarely adopt just one organizational form, but may temporarily select an alternative structure that seems to be appropriate for the particular project to be undertaken (25).

Table 1

Organization/Authority Continuum

Organization	Project Manager's Authority
Projectized	High
Strong Matrix	Medium
Weak Matrix	Low
Project Coordinator	
Project Expeditor	
Functional	None

SOURCE: Dwayne Cable and John R. Adams, Ph.D., Organizing for Project Management, (1982): 11.

Cable and Adams identify a number of project management problems associated with organizational structure. If project management is introduced into a functional organization, conflicts arise over relative project priorities and competition for resources (13). Whereas in cross-functional structures, such as matrix

organizations, the "unity of command principle" is violated, causing similar conflicts but supporting the project management process (20-21). The "projectized organization" resolves these problems, but raises the issue of what the resources will do when the project is complete (15).

Other literature agrees that either the project can influence organizational structure, or that organizational structure can influence project management style, as project management generally requires a cross-functional organizational structure. Ford and Randolph define a cross-functional organizational structure to be "an overlay on the functional structure that creates temporary teams of organization members" (272).

Dekom supports the view that projects are temporary conditions found within an organization, based on the fact that projects often begin with an idea from management, and that "end-dates may be specified in advance, as with a deadline, or they can be the product of the project-scheduling process" (2-3). In contrast, Stuckenbruck suggests that "Organizing for project management starts with an analysis of project characteristics to determine the

extent and type of organization needed" (67).

Regardless of whether the organization is created for the purposes of the specific project, or whether the project is a temporary condition overlaid upon an existing organizational structure, there are a few common requirements for successful project management. Stuckenbruck identifies these requirements to be "commitment and visible endorsement" by top management, and selection of the right person for the role of project manager (67). Nicholas agrees, suggesting that there should be "a corporate culture which understands and supports project management" (26). Cable and Adams suggest that organizations should be ready to accept change and "shifts in authority" that may be associated with project management (7), and Kerzner saw education to be a key success factor in his study of the implementation of project management methods at the IRS (8).

Project Sponsor

Wideman defines the project sponsor to be "the source of the project manager's authority," and that this individual could be an owner, financier, or senior manager (E-3). Nicholas describes the project sponsor

to be the "champion" of the project, who is assigned to the project during the early planning stages (25). Stuckenbruck adds that this individual, who is often part of the top management team within the organization, is responsible for a number of actions. These actions should take place before project implementation and include,

1. Completely selling the project management concept to the entire organization.
2. Choice of the type or form of project organization to be utilized.
3. Issuance of a project charter to completely delineate project vs. functional authority and responsibilities.
4. Choice of project manager.
5. Choice of the right functional managers to participate in the project and/or matrix organization.
6. Supplying adequate resources to the project organization such as finances, equipment, personnel, computer support, etc.
7. Continuing support to the project manager. (35)

It appears, however, that top management may not always provide the type of support needed for successful project implementation. Kerzner suggests that executives may "avoid identification with a project for fear that project failure may have an adverse impact upon their careers" (8).

Ford and Randolph's research revealed that two of the top ten factors that are critical to project management success are "project mission clarification," and "gaining top management support." These conclusions were based on the researchers' review of Pinto and Slevin's studies from 1986 to 1988. Ford and Randolph then determined that project mission clarification was important because it provides the basis for acquiring resources, setting schedules, and evaluating project success. Similarly, top management support was considered vital as it includes a "general managerial and organizational culture that supports the need for projects and believes that the organization should enthusiastically support them" (288-289).

This discussion supports the importance of the project sponsor to the success of any project, as this individual or group has the influence to carry the project forward within the organization. The project sponsor also selects the right person for the role of project manager, who may also be called a project expeditor, project coordinator, or project leader.

Project Manager

The literature suggests that project managers need

to possess a wide range of abilities and skills to enable them to drive projects to successful completion. Peters considers these abilities and skills to be at times paradoxical in nature. He describes the traits of project managers to include the ability to see the "big picture" and the small details, to invest their egos in the project but have no egos at all, to be dictators and delegators, to be leaders and managers at the same time, and to "acknowledge complexity" but "champion simplicity" (52).

Lackman believes that good project managers often possess a combination of technical, managerial and interpersonal skills. The technical skills are necessary as the project manager needs to have "command of the vocabulary and basic principals of the content of the project." Managerial skills allow the project manager to be able to use commonly accepted management techniques such as "team building, scheduling and planning, product development, project monitoring and control, financial and capital resource management" (13). Interpersonal skills are considered vital, as the project manager is a negotiator, communicator, and problem solver (14). As project management is often a high pressure job, Lackman suggests that good health is

also a requirement (15).

Nicholas adds to this description that project managers must be both "people-oriented and results-oriented," with "strong leadership styles which allow them to compensate for the gap between their authority and responsibility" (26). Ford and Randolph found that project managers need to be able to handle conflict "caused by the need to secure scarce organizational resources from functional managers who are reluctant to give them up" (285).

In summary, the literature describes the project manager to be a multi-faceted individual with many talents. However, Lackman points out that the many talents and traits of a good project manager cannot be taught, and that some must be "gained through experience" (15). It therefore appears that there is an element of trial and error, or success and failure, associated with developing the skills that are necessary for project management.

Kerzner's text supports the trial and error view of gaining project management skills, and identifies the skills to be: team building, leadership, conflict resolution, technical expertise, planning, organization, entrepreneurship, administration,

management support and resource allocation (167). Table 2 provides Kerzner's view of how project management skills may be developed. He also goes a step further to explain that project managers should not be selected based upon age or time on the job, for using "hard-nosed tactics" to get the job done, for being immediately available, solely for technical ability, or to satisfy a customer request (175-177).

In Information Systems departments, Reynolds identifies project managers to be "the first-level managers for systems analysts and programmers." Sometimes, the project manager can be an experienced programmer or systems analyst who assigns project activities to other members of the project team. This individual is also responsible for working with the users to define system requirements and resolve conflict (372).

One of the most important roles of the project manager is conflict management. Kirchof and Adams identify conflicts to arise most often in matrix organizations due to "ambiguous jurisdictions" caused by multiple managers directing common resources, competition for the resources, barriers to

Table 2

Methods and Techniques for Developing Project Managers

I.	Experiential training/on-the-job
	Working with experienced professional leader
	Working with project team member
	Assigning a variety of project management responsibilities, consecutively
	Job rotation
	Formal on-the-job training
	Supporting multifunctional activities
	Customer liaison activities
II.	Conceptional training/schooling
	Courses, seminars, workshops
	Simulations, games, cases
	Group exercises
	Hands-on exercises in using project management techniques
	Professional meetings
	Conventions, symposia
	Readings, books, trade journals, professional magazines
III.	Organizational development
	Formally established and recognized project management function
	Proper project organization
	Project support systems
	Project charter
	Project management directives, policies and procedures

SOURCE: Harold Kerzner, Ph.D., Project Management: A Systems Approach to Planning, Scheduling and Controlling, Second Edition (1984): 179.

communication, and conflicts of interest (15-16). Different types of conflict can arise at different stages of the project, such as project priorities or technical issues in the planning stage, and manpower

and schedules in the implementation stage (23-24).

Kirchof and Adams explain that the project manager may use the five different power sources defined by French and Raven to manage and resolve conflict, they are: legitimate power, coercive power, reward power, expert power, and referent power. Exerting these different types of power can influence behavior (26). Other approaches to conflict resolution that are often used by project managers are identified to be problem solving and compromise. The authors consider compromise to be the most effective technique as it "promotes both a free exchange of ideas and improved communication" (28).

Project Team

As part of the planning process, the project manager decides how to staff the project team. Kerzner outlines the process to be: determining the types of individuals required, how many are necessary, and when they enter the project. The next decision is whether the human resources will be drawn from within the existing organization or from outside (183-185).

Dekom portrays the variable nature of the sources of project team members, as shown in Table 3. Where

team members are drawn from functional areas within the organization, Dekom points out that the project manager often does not have direct control of the resource. In this case the resource may be assigned to the project by the functional manager, not be chosen by the project manager. This team selection process varies from organization to organization (293, 298). Stuckenbruck cautions that in organizations where the team member has a functional manager and a project manager, this can result in a "two boss" conflict situation where the team member becomes caught in the middle (78).

Nicholas feels that the project should be staffed "to achieve the necessary expertise and experience" mix for the project at hand, and that all participants "must understand and be dedicated to achieving the goals of the project." Furthermore, to insure a successful project, all team members "must understand the project management process, its purpose and values, and be committed to following the steps and procedures necessary to conduct the process" (25-26).

Lackman agrees with these views and adds that the project manager is responsible for providing team members with training, an understanding of how each individual's contribution helps to achieve project

Table 3

Variations on a Team

Project Team members may be:

- Under the hierarchical control of the project leader
  - Usual employees of the department
  - Transferred, for the duration, from other departments
  - Part-time
- Under hierarchical control of others
  - Full-time, assigned to the project but remaining in function
  - Part-time
  - Dual-assigned - matrix members, working both for the project and functionally
  - Dedicated - assigned to project, but staying in function
- Outsiders
  - Full-time, as employees to others
    - Hired for the project
    - Engaged for limited time, limited work, or specialty
  - Consultants

SOURCE: Anton K. Dekom, Practical Project Management (1987): 293.

goals, and providing "an exciting and rewarding work environment" for the team members (13-14).

Ford and Randolph attempted to discover the characteristics of project teams in successful project management. Although their research found a great deal of literature on group effectiveness, they concluded

that "The area of project team characteristics offers an important and largely undeveloped area for future research" (285).

Project Management Process

Stuckenbruck views planning to be the most basic function of management, preceding all other functions. He defines planning to be "anything that affects future thought and action" (97). Project planning is one of the primary functions of the project manager, and Stuckenbruck defines its purpose to be,

1. Directing the intent of the project
2. Identifying actions, risks, and responsibilities within the project
3. Guiding the ongoing activities of the project
4. Preparing the project for changes. (99)

Stuckenbruck observes that the amount of planning required depends upon the complexity of the project, and that the core of the project planning effort is contained in the Work Breakdown Structure (WBS). The WBS breaks the project into its component parts, subprojects and tasks. This process of breaking the work down into small parts produces "manageable units which can be planned, budgeted, scheduled, and

controlled" (105).

Many project plans are part of an overall business plan, and are comprised of a number of different parts. Stuckenbruck explains that the component parts of the project plan are smaller plans, detailing the master schedule, policies and procedures for the project, the budget and cost control for the project, materials and equipment requirements, project activities, resource requirements, and any other elements that may be necessary for the project plan. In essence the plan needs to be flexible, as change is bound to occur within the duration of the project. To accomplish all of these project planning requirements, the project manager often uses a computerized project management tool (106-114).

Stuckenbruck observes that other elements of the project management process are leading, scheduling, monitoring and control. The project manager accomplishes these functions by using a variety of different methods and tools. Barcharts or Gantt charts are extensively used in project management, as are PERT (Program Evaluation and Review Technique) or CPM (Critical Path Method) charts, and network diagrams. Resource allocation or leveling is a relatively new

technique that allows tasks to be distributed so that resources are evenly consumed during the life of the project (118-122).

Leadership is vital to project management, as the project manager "needs to hold team members accountable, as well as motivate, coach, and inspire them" (Cash and Fox, 11). Leadership is also important to the scheduling process. Lackman suggests that the project schedule should be realistic, and one that the "development team believes in and will commit to" (10). Projects often fail, in Lackman's opinion, due to improper scheduling. Schedules should allow for "Unexpected technical difficulties and complications," and should be the result of a team effort (11-12).

Monitoring and control are an essential part of project management. Cash and Fox suggest a daily review of progress on each task as a control mechanism, and to bring potential problem areas to the attention of the project manager. Each task should be budgeted in hours and dollars, and "To control risk, each task should be reduced so it can be completed in a relatively short period of time" (11).

Another aspect of project control suggested by the authors is change management. Although change is

expected in project management, Lackman feels that change should be "an orderly, controlled process if the project is to be successful." Otherwise, change may "adversely affect schedules, costs, and team morale." He suggests a "Project Change Request" form to control and document the process (20). Cash and Fox agree, and add that changes should not "evolve over time," as this will cause the scope of the project to change, and add to project risk (11).

Information Systems Projects

Project management in Information Systems can differ from project management in other environments, due to the fact that an I.S. project manager may be responsible for many different application development and maintenance projects, all at the same time. Riciutti states that I.S. managers often keep track of project status, cost and productivity with the help of project management software packages. The problem with this approach to project management is that the capabilities of the packages may be limited, often causing project managers to use them in combination to gain a full view of all projects and resource allocation (61).

Riciutti cites examples of how this problem was solved at Mead Data Central, and offers advice for those who are evaluating project management packages. His list of five capabilities to look for in project management packages is shown in Table 4. However, Riciutti cautions that project management packages are not a panacea, they will not solve all problems. It is necessary to first understand project management and the projects to be undertaken, before complicating the picture with a project management package (62).

Table 4

Five Tips For Project Management

When shopping for project management tools for large systems, be sure to look for the following capabilities.

1. A centralized database, or repository, of project information, so that all managers and application developers can access and work with the same information.
2. The ability to schedule, track and control multiple projects of virtually any size.
3. A built-in executive information system (EIS).
4. Built-in time-reporting, project-accounting and chargeback features so that IS can account for every dollar spent on any project underway.
5. Ties to CASE tools to let project management tools act as a consistent methodology for users' existing CASE tools.

SOURCE: Mike Ricciuti, "Easy Ways To Manage Multiple IS Projects," Datamation 15 November 1991: 62.

As the I.S. project manager is managing many different projects, priorities become a problem. Larsen and Luecke observe that the I.S. manager often has the task of juggling project priorities, and that the manager "may not properly respond to the most essential needs of the . . . organization". The authors propose a priority worksheet "that combines the objectivity of measurable indicators with a manageable, systematic framework for making sound decisions," to be the solution to the project priority problem (44).

Larsen and Luecke suggest the following steps in designing and implementing a project priority worksheet:

- develop decision indicators,
- assign weights to each indicator,
- determine measurement criteria for each indicator,
- gain institutional acceptance for the methodology, and
- process all existing and new project requests through the new methodology.

The authors explain that the decision indicators are six to nine items that "summarize the overall vitality of the organization." Each indicator is assigned a relative weight to indicate importance, and each has measurement criteria associated with it (44-47).

For this project prioritization methodology to work, it is necessary to obtain acceptance within the organization, and to process all existing projects according to the methodology. In following this process, Larsen and Luecke feel that project evaluation will become structured, and easily understood within the organization (47).

One of the distinctive characteristics of I.S. projects is uncertainty, according to Winkler. This is due to the rapidly changing nature of technology, particularly in telecommunications, and emerging technologies such as imaging. If projects are lengthy, the risk is that the technology may become old and outdated before project implementation (95).

As a hedge against uncertainty and risk, Winkler suggests an "ongoing assessment approach" to project management, that builds decision points into the process. Cost is another problem in I.S. projects, and increases risk. For this reason upper management are often more involved in decision making associated with I.S. projects than in the past. Also, to insure that the right system is being delivered to meet the organization's needs, "users are heavily involved in all aspects of project design" (96).

Winker's view of I.S. projects agrees with Radding's opinion that users are becoming more involved with I.S. projects, particularly in the role of project manager. This involvement makes I.S. "more sensitive to the concerns and interests of the business side" of the project, and tends to produce better results from the project than I.S. working alone (56-58).

An alternative view from McConnell and Koch is that I.S. projects often run into problems due to lack of business education among the ranks of I.S. professionals, and "failure of the company to manage the relationship between its technology and its users." This results in misuse of information technology, and abuse of users in the manner that automated systems are implemented. Two solutions offered by the authors are "a collaboration between technician and user during systems development," and "an organized methodology for implementing computer systems and information technologies" (67).

The organized methodology proposed by McConnell and Koch involves "setting clear and stated expectations for the user," and planning for the human aspects of implementing technological change. McConnell and Koch's view of how information technology

should be implemented is presented in Tables 5a and 5b.

Table 5a

The Technology Implementation Life Cycle
A guide for implementing information technology

Leadership stage	
Phase 1:	Pre-implementation
	Goal: Determine planning alternatives, needed resources and possible roadblocks
	Activity: Gather data on workplace, personnel, work and tasks
Phase 2:	Human design
	Goal: Eliminate deterrents and establish incentives for worker productivity and wellness
	Activity: Study automated workplace and establish criteria for its human design
Phase 3:	Marketing
	Goal: Introduce technology so that the employee "buys" and "owns" the system
	Activity: Develop and implement a strategy for "selling" technical systems and the changes they cause
Phase 4:	Education
	Goal: Reduce employee stress concerning technology and increase confidence in their ability to use it productively
	Activity: Educate employees about the demands new technology will make on them and the benefits it will provide

SOURCE: Vicki McConnell and Karl Koch, "Misuse of Power," ComputerWorld 28 January 1991: 67-69.

Table 5b

The Technology Implementation Life Cycle
A guide for implementing information technology

Administrative Stage	
Phase 5:	Training Goal: Develop employees who are minimally computer competent and primed to learn additional computer skills Activity: Develop and implement a sequential, natural program of skill growth
Phase 6:	Documentation Goal: Provide easy access to and effective assistance from reference materials so that employees can complete automated tasks Activity: Compose and distribute documents that explain how the system works
Phase 7:	Human communication Goal: Create opportunities for dialog between employees and information technology, technicians and management Activity: Establish and maintain continuing means of communication with employees
Phase 8:	Postimplementation Goal: Feed forward evaluation results to improve the next technology implementation Activity: Compile the evaluation of each phase into one document and review entire implementation process

SOURCE: Vicki McConnell and Karl Koch, "Misuse of Power," ComputerWorld 28 January 1991: 67-69.

Stevens agrees with the emphasis on implementation strategy as the key to project success. He notes that many large companies separate the responsibilities of development and implementation to improve resource

utilization, but that this lack of continuity often causes projects to fail (21).

For a more standardized view of the activities normally associated with I.S projects, Wideman presents a four-phase approach to systems development projects. This is illustrated in Table 6, and shows the planning, user definition, technical activities, and implementation activities that are typical to I.S. projects.

Project Management Handbook

Cash and Fox state that "there is no exact prescription or formula to ensure that a project will produce the desired results" (10). This opinion explains why there is a wide variety of literature examining the topic of project management, and its application in different industries and organizations.

When an organization decides to implement project management, Stuckenbruck suggests that one of the first tasks is to decide what approach should be used. Not only does this include the choice of organizational structure, but it also includes defining and documenting the procedures which outline how the project management process will be undertaken.

Table 6

Project Life Cycle: Stages/Activities
Systems Development

Total Project Life Cycle			
TIME →			
Plan		Accomplish	
Phase 1	Phase 2	Phase 3	Phase 4
CONCEPT	**DEVELOPMENT**	**IMPLEMENTATION**	**TERMINATION**
Conceive (C)	Develop (D)	Execute (E)	Finish (F)
Objectives	Operations and systems analysis	Systems technical specification	Conversion and phased install
Resources			
Initial feasibility	User requirements	Technical support development	Refinement and tuning
Top management go/no-go decision	Technical support or original development	User controls or procedures	Terminate project effort
		User training	Post implementation review
	Conceptual design and commercial package review	Applications specification	
		Applications programming and testing	Top management approval/ sign off
	Alternatives evaluation		
		System test	
	Top management go/no-go decision	Top management go/no-go decision	

SOURCE: R. Max Wideman, A Framework for Project and Program Management Integration, (1991): III-6.

Stuckenbruck describes this document to be the "Project Procedures Guide," and recommends that it should contain the following sections:

1. The duties and responsibilities of staff reporting to the project office
2. The duties and responsibilities of functional personnel working on the project
3. Time-keeping methods
4. Methods of obtaining priorities
5. Methods for resolving priority and conflict problems
6. Type and frequency of computer feedback of project expenditure and schedule status
7. The formal and contractual reporting and review procedures
8. The informal reporting and review procedures. (44)

Pinnell and Busch agree, and suggest that once an organization has decided to adopt a project management approach, the process should be defined as clearly as possible. They feel that "The definition of the PM process becomes the standard for the organization." This standardization process will provide ways to measure performance, and improve project success (36).

There are a number of project management textbooks and handbooks available for use by organizations when adopting project management methods, and some provide case studies illustrating how organizations solved certain problems. However, they do not meet the

specific needs of any single organization, as defined by Stuckenbruck, and Pinnell and Busch, as they are written in a very general manner. A practical approach to this problem would be to write a handbook that is tailored to the organization, for specific types of projects.

A telephone interview with Carol Pope, a project management consultant for IBM Corporation, revealed that IBM developed a project management manual and training materials in-house, as commercially available project management literature did not support the organization's requirements. IBM now offers these project management materials for sale to clients, to supplement project management consulting services.

Ziomek and Meneghin describe how project management training materials were developed for their organization. They first considered a variety of sources for the training materials, including outside consultants. Eventually it was decided to produce training material in-house because "Outside consultants frequently do not understand the company and offer approaches which are not entirely compatible with company policy" (79).

These views are supported by Kliem and Doughty's

article which suggests that if organizations "take time to develop a Project Management Manual (PMM). They can use the PMM to help them better plan, organize, and control their projects." The advantages of the manual described by the authors include the standardization of project management practices within the organization, use of the manual as a communication vehicle, development of a formal structure for project management, and a way to present the organization's project managment policies and procedures (17-18).

Kliem and Doughty offer practical suggestions in how to compile a project management manual. The authors suggest that the manual should include the following sections: introduction, planning functions, organizing functions, controlling functions, report interpretation, and miscellaneous. The authors also suggest that information to be used in compiling the manual should be collected by conducting personal interviews with individuals within the company (19-20).

Conclusion

A review of project management literature supports the purpose of this study, that a project management handbook should be developed for I.S. projects at St.

John's Mercy Medical Center. The organization's need for the handbook is evidenced by the non-specific nature of project management literature. There is no single source of information for I.S. project managers at St. John's, describing how I.S. projects should be managed or how to apply general project management principles and practices. Neither are there any I.S. project management standards, policies or procedures. The lack of a project management handbook has therefore resulted in an inconsistent, unpredictable approach to I.S. project management at St. John's.

An organization-specific handbook, should contain a concise summary of the views and recommendations of the most prominent project management authors, as outlined in this literature review. It should also contain an overview of commonly accepted project management practices, an explanation of the steps in an Information Systems project cycle, and project management policies and procedures that are specific to the organization, as recommended in Stuckenbruck's text, and Kliem and Doughty's article.

Chapter III

METHODS AND EVALUATION

Materials

The project to be undertaken in this study was the preparation of a project management handbook for Information Systems (I.S.) projects. The handbook was to be written in simple, non-technical language, for project managers responsible for I.S. projects at St. John's Mercy Medical Center (SJMMC).

The method of preparation planned for the handbook was: informal discussions with project managers in the I.S. Department to determine the general content requirements for the handbook; reviewing examples of published project management books for content, format, and style; and examining the I.S. Department's standards and procedures manual for any applicable documents. Other project management literature would be reviewed for tables, charts and sample reports for possible inclusion in the handbook.

Goals and objectives for preparation of the handbook were determined to be: that the focus should be on I.S. projects only, project management practices

presented in the handbook would be those commonly observed in an I.S. setting, that the handbook would introduce the concept of procedural change at St. John's and not become a policy and procedure manual in itself, and that the volume of the text would be limited to approximately 50 pages.

The limited scope in the area of policies and procedures was eventually decided upon as the I.S. Department was undergoing a reorganization at the time that the handbook was in the planning stage. Policy change was an expected outcome of the reorganization. However, as senior management was fairly new to the organization, it could not be anticipated how policy would change, nor the extent of the probable change. For this reason it was determined that the handbook should introduce the idea of procedural change without proposing the procedures themselves.

The page limit was planned to insure that the handbook would be read in its entirety, and that it would be a useful reference document in a business setting. During the literature review it was noticed that project management books tended to be lengthy, and as such were unlikely to be read by busy project managers.

The handbook (Appendix A) is spiral bound, with a title page, table of contents, nine chapters as described below, two appendices, and a bibliography of project management literature as suggested further reading material.

The introduction is two pages and describes the audience for the handbook, provides an explanation of why the handbook was written, and explains the organization of the handbook. The introduction was written in this manner to set the stage for the rest of the material.

The second chapter introduces the topic of project management in a question-and-answer format. The subject headings include: what is a project, who is involved in a project, what is project management, where is project management found, what is a project sponsor, what is a project manager, who can be a project manager, training for project management, and project management software. The project management questions were included to insure that the reader would understand the terminology, roles and functions, before reading further. The topic of project management software was introduced because most project managers would be using some form of project management

software, or may need to select a package. A two-page sample of a project management software evaluation questionnaire was included at the end of the chapter for this purpose.

The third chapter introduces the topic of project management in Information Systems. The opening section describes the I.S. environment, with a focus on I.S. as a multi-project environment. The types of project management problems unique to I.S. are presented and discussed. These include: project priorities, resource availability, the changing technological environment, and the human aspect of coping with technological change. A two-page table containing practical guidelines for implementing information technology is provided as supplementary information.

The different types of I.S. projects are described next in the third chapter. Definitions and examples are provided for production problems, maintenance projects, enhancement projects and development projects. I.S. Department resources are described, including the different types of human resources, and computer resources. The latter was included as this type of resource is often overlooked, or taken for granted, by non-I.S. project managers.

The closing section of this chapter is a discussion of open systems architecture, designed to heighten the project manager's awareness of new trends in I.S. projects that may also influence I.S. projects at St. John's in the future.

The fourth chapter describes the development project life cycle in great depth, as this type of project is unique to I.S., and activities need to follow a pre-determined sequence for project success. It was also included as non-I.S. project managers often do not understand, or plan for, this sequence of events, and projects may be improperly scheduled if this occurs. Underestimating project schedules due to activities missing from the project plan, was previously observed at St. John's. A table depicting a development project life cycle is included as an illustration, and each of the project phases are explained in detail.

The next four chapters each examine the major functions of project management as they relate to I.S. projects. These are defined to be planning, scheduling, leading, and monitoring and control. Chapter 5 describes components of the project plan most often seen in I.S. projects, but that are not often

seen at St. John's. A section on change management follows, because improperly managed change is a very serious, but common, problem in I.S. projects, causing cost and time overruns. A description of the "Work Breakdown Structure," Gantt charts, and PERT/CPM charts, and their use in I.S. projects is provided at the end of the chapter. These items were included as they are most often used for I.S. project planning. Examples of the charts were provided in Appendix A as supplementary material. However, the method of producing the charts is not described, as they would typically be generated by project management software, and would not be hand-drawn.

Chapter 6 presents the challenges associated with scheduling I.S. projects, and briefly discusses scheduling techniques. The topic of project priorities is discussed in greater detail in this chapter, including the various reasons for assigning priorities to projects, and what would happen if higher priority projects were added to the project list. The latter section was included to address project priority problems that are specific to St. John's.

Chapter 7 introduces the project manager's leadership role including the communications aspect,

conflict management, negotiation, compromise, and team building. In-depth treatment is given to each topic, as there were problems observed in each area at St. John's, and practical advice is offered to assist project managers in their leadership roles. To supplement the section on team building, a table is provided listing the types of information that the project manager should provide to team members.

Chapter 8 discusses project monitoring and control, a significant problem in I.S. projects at St. John's. This was observed on a number of occasions when non-I.S. project managers failed to take ownership of their assigned I.S. projects. Commonly practiced control techniques are presented in this chapter, including team meetings, status reporting, and other types of project management reports.

Chapter 9 concludes the handbook by explaining the steps that St. John's would need to take, to more successfully implement project management for I.S. projects, and it introduces the concept of procedural change within the organization. As supplementary material, Appendix B contains a set of revised procedures for requesting I.S. projects, and gaining user acceptance for project implementation. These

procedures were selected as a starting point, as they are the only formal, written procedures available that even began to address project management at St. John's.

A list of supplementary reading material is provided to add credibility to the handbook, and for the interest of the reader. It was also considered necessary if the handbook was to be used for training future project managers.

Subjects

It was planned that the project management handbook would be evaluated by two members of the SJMMC management team. They were to be selected for their knowledge of project management principles and practices, their experience of working with I.S. projects at St. John's, and their knowledge of St. John's future direction for Information Systems projects.

Another criterion for selection was that one evaluator would be affiliated with the I.S. Department, and that the other would be drawn from the user community. It was thought that this method of selecting evaluators would provide a well-balanced critique of the handbook, and better quality results

than those that would be obtained from using two I.S. Department evaluators or two user evaluators.

The first evaluator is Grace Lange, Vice President of Information Systems, St. John's Mercy Medical Center. Lange was recently appointed to the position of Vice President of Information Systems, and was previously employed by Blue Cross and Blue Shield of Missouri. She has a bachelor's degree in medical technology and chemistry, a master's degree in computer science, and is working toward her doctoral degree. She was also a guest lecturer at Washington University, on project management topics.

With over 17 years experience in Information Systems, and over 15 years experience in project management, Lange brought strategic planning experience to St. John's. She recently launched an I.S. planning assessment project where members of the organization investigate and determine their future direction in the use of information technology. This planning process is seen to be the prerequisite for future I.S. projects, including the development of an integrated healthcare delivery system, and a data integration project for the 14 hospitals in the Sisters of Mercy Health System to be piloted at St. John's.

During her I.S. career, Lange was project manager for approximately 30 large projects. Her most successful projects for previous employers include: a real-time flight simulator for McDonnell Douglas, hand-held sales computing for Ralston Purina, and the implementation of Computer Assisted Software Engineering (CASE) at Blue Cross/Blue Shield. Her project management experience took place in traditional project management environments, in addition to CASE-based, and information engineering environments.

The second evaluator, Lynne Davis, is Director of Patient Accounting, Admitting, and Utilization Management, St. John's Mercy Medical Center. Davis has over 15 years project management experience, and holds bachelor of science and master of science degrees. Her professional certifications include: Fellow, Hospital Financial Management Association (HFMA); Certified Patient Accounting Manager (CMPA); Medical Technologist (ASCP); Clinical Chemistry Specialist (ASCP); and Utilization Review Specialist (ABQUAR).

Davis cites her most successful projects to be the design of a credentialing system for Metropolitan Life Insurance Company, the development of a business plan for receivables management at St. John's, the selection

and implementation of an electronic claims submission system at St. John's, and the selection and implementation of a predictive dialing system for collections at St. John's. Davis was most recently named project manager for the selection of a managed care package, for later implementation at St. John's.

Instrument

The instrument used to evaluate the project was a written questionnaire. The 3-page questionnaire is comprised of 12 questions presented in 3 sections, as shown in Appendix B.

The first section asks for an overall evaluation of the handbook. The first seven questions ask the evaluator to rate the handbook on the overall presentation, the length of the text, the style of writing, the use of language, tables and charts, I.S. content, and project management content. A 5-point Likert scale is provided, and the evaluator is instructed to circle the response number which best describes an overall impression in each response category. Above the scale, it is explained that a response of 5 indicates "excellent," 4 indicates "good," 3 indicates "average," 2 indicates "mediocre,"

and 1 indicates "poor." At the end of this section a question is provided asking for additional written comments on the evaluator's overall impression of the handbook.

In section 2, three questions are provided that investigate the applicability of the handbook for future use at St. John's. The first question asks how applicable is the handbook for use at St. John's, the second question asks how the handbook could be improved to increase its usefulness to St. John's, and the third question asks how the handbook may be used at St. John's. A space following each question is provided for the evaluator's comments.

In section 3, the evaluator is instructed to provide a critical evaluation of the handbook content, noting any topics that need to be added, expanded, removed or corrected. The remaining page is blank to provide space for comments, and the evaluator is invited to attach additional sheets as necessary.

Procedure

Before sending the material and instrument to the evaluators, both were field tested. The subjects for the field test were two I.S. Department project

managers. They were provided with a sample of the handbook, comprised of a few chapters, and a copy of the questionnaire. They were asked to read the handbook sample for content and clarity, and review the questionnaire for ease of use.

Initial results indicated that the handbook was useful, pertinent to the project managers' jobs, interesting to read, and clearly written. The field test did not result in changes to the handbook. However, the project managers' comments indicated that the first draft of the questionnaire was too lengthy and complicated. These results caused the questionnaire to be revised, shortened, and simplified.

The individuals chosen as possible evaluators were first contacted by sending an introductory memorandum to explain the purpose of the study, and to invite them to participate as evaluators. Demographic information was requested from the evaluators, along with their agreement to participate. The demographic information was requested to establish the experience and credibility of each individual as an evaluator.

As both individuals agreed to evaluate the handbook, packages were later assembled and delivered to their offices by interdepartmental mail. The

packages contained a cover letter, the questionnaire, and a copy of the project management handbook.

The cover letter thanked the evaluators for their participation, explained the purpose of the study, and outlined the procedure associated with reading the handbook and completing the questionnaire. The cover letter also requested that the questionnaire should be completed and returned within a two week time frame. It was planned that if the questionnaire was not returned in the time specified that the researcher would follow up with telephone reminder.

Chapter IV

RESULTS

Both evaluators returned the completed questionnaire and copy of the project management handbook within the specified time frame. In each case, the responses to the questionnaire were supplemented by written comments and notes in the margins or text of the handbook. Responses to section 1 of the questionnaire are presented in Table 7 below.

Table 7

Responses to Section 1: Overall Evaluation

Question	Responses	
	Lange	Davis
1a. Overall presentation	4 (Good)	4 (Good)
1b. Length of handbook	4 (Good)	4 (Good)
1c. Style of writing	4 (Good)	4 (Good)
1d. Use of language	4 (Good)	4 (Good)
1e. Tables and charts	4 (Good)	4 (Good)
1f. I.S. content	3 (Average)	4 (Good)
1g. Project management content	4 (Good)	4 (Good)

The evaluators were invited to provide additional comments on their overall impression of the handbook, in response to question 1h. Lange commented, "Good work - would like to see more about phases, deliverables, and a detailed WBS." Davis did not provide a comment in this section.

In section 2, the evaluators were asked to respond to three questions concerning the applicability of the handbook for future use at St. John's. Question 2a asked for the evaluator's view of how applicable the handbook would be. Lange responded, "Very, if developed in more detail. Need more concrete project examples for SJMMC environment." Davis commented, "Very applicable. Better project management skills are needed at SJ's. (Would remove the terminology of "the authors" from the text to make it less like a school project.)"

Question 2b asked how the handbook could be improved to increase its usefulness to St. John's. Lange suggested, "Better defined phases, deliverables, discussion on actual standards for monitoring, controlling, reporting, etc." Davis responded, "Add more on Pert and Gantt, perhaps with SJ project examples."

Question 2c inquired into the ways that the handbook may be used at St. John's. Lange replied, "As a guide for all I.S. personnel and user team members. In a more detailed version, as the reference text/guidelines/policy for all project managers and P.M. trainees." Davis suggested, "To improve project management skills - could be used in an inhouse seminar on the subject."

In section 3, the evaluators were invited to provide a critical evaluation of the handbook content, noting any topics that need to be added, expanded, removed or corrected. Lange referred the reader to comments written within the handbook, but also added the following ideas for future development of the handbook for St. John's: information on project management tools that would be selected at a future date, standards for projects, cost/benefit analysis guidelines, and application development versus package selection guidelines.

Davis' response to section 3 was provided in the form of a one-page memorandum. She mentioned that the software evaluation guide was "particularly interesting," and that she had never seen anything like it before. She found the manual to be comprehensive,

specified that nothing was missing, and suggested a section on "system philosophy" for a future version of the handbook. She explained that "system philosophy" was a stated position of how and when applications would be maintained, and that this position could affect the way that projects are managed and priorities are established.

Davis also noted that she edited the text, and that she liked the way that "human resources issues, such as project leadership" were treated. Her final comment was, "Thank you for giving me the opportunity to review the manual. It is a subject of great interest to me."

Lange's comments in the margins of the handbook in chapter 2 added that project managers could be analysts assigned from within the I.S. Department. She also provided a supplemental feature for project management software evaluation described as "interfaces to other systems."

In chapter 3, Lange suggested adding that a third source of conflict in a multi-project environment could be "imposed deadlines." In chapter 4, Lange commented that all projects should include a make/buy analysis, and that the analysis phase should also include a

cost/benefit analysis.

In chapter 5, Lange wanted the "Project Summary" to be renamed the "Project Charter," and mentioned that this should include a list of high-level deliverables that are associated with the project's goals and objectives. Under "Project Specifications," Lange wanted the entire description removed with the exception of the functional specifications document. Her comment explained that to leave the brief forms of project specification in the text would reinforce the undesirable behavior of providing incomplete program specifications. She also suggested that an example of a functional specifications document would be helpful.

Lange suggested that the "Master Schedule" description should include a definition of the critical path for the project. Under the subheading "Change Management," Lange commented that a way to document, review and approve the change is required, and that such changes would tend to alter a project's schedule.

Other than the comments described above, there were also a few small changes to wording, punctuation, and grammar, suggested by both evaluators. These changes did not significantly alter the meaning of the text.

Chapter V

DISCUSSION

Summary

The results of the evaluation of the project management handbook indicated that both evaluators were very thorough in their analysis of the material, as evidenced by comments and notes scattered throughout the text. In general, the responses to questions in section 1 indicated that the evaluators found the handbook to be better than average in all categories except I.S. content. These results indicated that the handbook was written appropriately for the intended audience.

Lange was more critical of the I.S. content of the handbook than Davis, both in her response to question 1f, and in her critical evaluation. Lange offered many ideas for improvement and future development of the handbook at St. John's. In comparison, Davis tended to edit the handbook, and viewed the content very favorably.

It was thought that this difference in approach occurred because Lange has a very extensive I.S.

background, and is accustomed to a rigorously structured project management environment. Therefore, Lange's expectations for the I.S. content of the handbook were very high. In contrast, Davis has an extensive user background and limited I.S. exposure. For this reason, and as project management is generally not practiced at St. John's, the handbook tended to exceed Davis' expectations. The responses to the questionnaire left the reader with the impression that Davis found the handbook to be very informative and helpful.

Lange's comment on the way that the handbook may be used at St. John's revealed that she saw it to be part of a larger document, to include project management policies and guidelines that reflect the organization's standard for project management. Davis recognized the handbook as informational material, or a training tool. It was felt that Davis' view was closer to the original intent and purpose of the handbook than Lange's.

Both evaluators responded that they would like to see examples drawn from the St. John's pool of I.S. projects, for inclusion in the handbook. It was concluded that this type of example was suggested

because it would be useful as a model for future projects, and could reinforce a standard for I.S. project planning at St John's.

The need for a project management handbook at St. John's was supported by both evaluators. They commented that the handbook was very applicable for the St. John's environment, and Davis added that better project management skills were also needed for managing I.S. projects at St. John's.

Lange's critical evaluation highlighted a number of topics to be included or expanded. An additional section suggested was one covering project management tools that would be selected at a future date for use at St. John's. Other sections suggested included project standards, cost/benefit analysis guidelines, and guidelines for application development versus package selection. Standards and guidelines were mentioned repeatedly as ideas for future development of the handbook by Lange.

Davis' one-page memorandum revealed that she had not previously been exposed to the idea of a list of features and functions for software evaluation, like the example provided in the handbook. Her request for more information on PERT and Gantt charts also

indicated that she did not have experience in using project management software, as these charts are usually available as part of the software's features and are automatically generated.

Davis' comment on how a "system philosophy," or a stated position of how applications will be maintained in an organization, can affect project management and priority-setting, was interpreted to be a reference to the way that I.S. projects were handled in the past. This guideline was developed by the user community along with senior management's direction to purchase software in preference to in-house development. As discussed in greater detail below, St. John's approach to I.S. is in a transitional stage, so Davis' view may no longer be valid for the organization.

Davis seemed pleased with human resource aspects of project management that were addressed in the handbook, and particularly noted the topic of project leadership. It was concluded that this appealed to Davis because the human aspects of I.S. projects are often superseded by technical issues. As the director of a user department that utilizes technology to solve business problems, it was thought that Davis may have participated in projects in the past where the human

impact of project implementation was lost among the technical activities and considerations.

Davis' notes within the text were mainly suggestions to improve the punctuation, grammar and readability. She tended to accept the content as written. Lange, however, added to the content by suggesting wording to supplement the text, in four of the nine chapters. These additions seemed to be mainly drawn from her own experience. For example, she had probably observed situations where I.S. Department analysts may have served as project managers, or where imposed deadlines on projects had caused problems with resource allocation, and resulted in conflict.

Lange's suggested feature for project management software evaluation, identified to be "interfaces to other systems," was considered to be an excellent addition to the example provided in the handbook. Interfaces between applications often save a great deal of manual intervention in passing data from one system to another. For example, cost information captured during a project could be interfaced to an accounting application.

It was interesting to note that Lange wanted the description of "Project Specifications" to be altered

so drastically. Again, it was concluded that Lange was viewing the handbook from an I.S. standards perspective, and that in her view anything less than a functional specification document would not be acceptable. A functional specification document is typically very extensive, and is usually associated with development projects. The abbreviated forms of specifications described in the handbook are often associated with maintenance projects.

As the handbook was evaluated by individuals with very different backgrounds, a user department head, and an I.S. professional, this in part explains the differences in the results of each evaluation. Another explanation may be that each evaluator has a different set of business problems and needs, and may have viewed the handbook from the perspective of how well the handbook solves the problems and meets the needs of their own department, in its current form.

The varied results support the choice of evaluators. If the evaluators had similar backgrounds, then the evaluation would not have represented the diverse opinions of both the I.S. and user communities. It was concluded that the evaluation approach chosen yielded better quality results than with any other

combination of evaluators. However, it was also recognized that as the evaluation of the project management handbook relied on the opinions of the evaluators, the results would probably have varied if different evaluators had been chosen.

The results suggest that the handbook meets the immediate user department needs for information about project management practices and principles. However, the results of Lange's evaluation suggests that although the handbook may be a good start, it needs additional development before it can be implemented in the I.S. environment that she is trying to create for St. John's future.

Both conclusions are considered reasonable in the current climate of change and reorganization at St. John's. Change in the I.S. Department was heralded by the appointment of Lange as Vice President of Information Systems, and Chief Information Officer. Coming from a structured project management background, Lange immediately saw the need for project management to be implemented for I.S. projects at St. John's. Her recent actions, and results of the evaluation, support the need for the handbook as described earlier in this study. However, Lange is in a very early stage of

effecting change at St. John's, and this explains why Davis' evaluation seemed to concentrate on the present, and Lange's evaluation was firmly focused on the future.

Although the need for the project management handbook has been supported by the results of the evaluation, difficulties were encountered in producing the handbook as described in the "Limitations" section. These limitations will continue to be a problem until Lange's I.S. Department reorganization is complete. Therefore, further development of the handbook beyond the immediate changes marked in the text by the evaluators is not considered to be possible at this time, and becomes a suggestion for future research as described below.

Limitations

The timing of the project in relation to an I.S. Department reorganization at St. John's caused the most significant problem during the development of the handbook. For this reason, it was decided that I.S. Department policies should not be included in the handbook, as they were about to be substantially revised. To have included any policies and procedures

in the version of the handbook that was sent for evaluation would have rendered it immediately out of date. To avoid this problem, the handbook was written in a more general manner than originally intended, and the scope of the handbook was purposely limited to project management practices and principles that would normally be found in an I.S. setting.

Another problem encountered during development was the lack of available examples to include in the appendices. The original idea was to use real examples of project plans used at St. John's for completed projects. In researching the materials available in the I.S. Department, it was found that there were very few project plans prepared in the past, and that there were no acceptable copies on file. One solution to the problem was to create sample project plans and associated charts using project management software. However, it was then found that the project management software available in the I.S. Department did not produce PERT/CPM charts. It was later decided to use examples found in project management texts.

Suggestions for Future Research

If this project is to be repeated, the

difficulties outlined above lead to the suggestion that there would be fewer problems encountered in developing a project management handbook in an environment where project management principles have been actively practiced for a year or more, and where project management tools are already in use. In this type of environment, the policies and procedures would already have been developed, standards would have emerged, and examples would be available. The project management handbook could then be written more specifically, and could be used to promulgate the I.S. Department's policies, procedures, and standards, as suggested by Lange.

A topic not examined during this research was the level of readiness for an organization to accept project management in Information Systems, which may also be suggested as an area for further empirical research. Introduction of the project management handbook at St. John's confirmed that a great need exists in this environment, but as the organizational framework is not in place, development and use of the handbook is naturally limited in its current state. These findings suggested that as St. John's is still in its early development stage of adopting project

management practices, the handbook may be too early for this organization.

This conclusion leads to the suggestion that further development of the handbook beyond the changes already incorporated into the text, should take place in a year or two. Alternatively, the handbook could be allowed to evolve along with the maturity level of the I.S. organization. This could be achieved by adding the missing components such as the policies, procedures, standards, and examples, as they are developed over time by I.S Department managers and analysts, under Lange's leadership.

APPENDIX A

PROJECT MANAGEMENT HANDBOOK

A

Project Management Handbook

for

I.S. Projects

Prepared for

ST. JOHN'S MERCY MEDICAL CENTER

by

Angela Matherne

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Chapter I

INTRODUCTION

Audience

This handbook introduces the topic of project management for Information Systems (I.S.) projects. It is written in simple, non-technical terms for a wide audience, including project managers and project team members from the I.S. department or the user community, of St. John's Mercy Medical Center (SJMMC).

Why This Handbook Was Written

The need for this handbook was supported by the inconsistent project management procedures used for I.S. projects at SJMMC, and the general quality of available project management literature. A literature review conducted before this handbook was written revealed that project management textbooks tend to be written for all types of projects in all industries, so are very detailed and lengthy. Project management articles are more readable than the textbooks, but tend to be opinion-based and do not fully examine all of the issues surrounding project management in I.S.

It was later discovered that large I.S. organizations often develop their own project management handbook and training materials, for similar reasons. IBM Corporation provides one example of an organization with its own project management literature, which is offered for sale to the company's customer base.

Handbook Organization

Each chapter of the handbook examines aspects of project management in an I.S. setting. The principles and suggestions offered are either a composite view of what the more prominent project management authors suggest, or are the result of this author's experience and observation.

Chapters 2 and 3 discuss project management in general, and in the I.S. environment. Chapter 4 highlights the development project life cycle, which is unique to I.S. projects. The four major functions of project management, which are planning, scheduling, leading, and controlling, are presented in Chapters 5 to 8. Chapter 9 proposes an approach to I.S. project management for St. John's Mercy Medical Center.

Chapter II

PROJECT MANAGEMENT

What is a Project?

A project is a unique event to achieve a specific purpose. Unique because it will probably not be repeated in exactly the same way, and an event because it will have a definite beginning and ending. By this definition, a project is a temporary condition undertaken by a group within an organization.

A project is usually broken down into many small activities that take place at predetermined times during the project. Projects usually have a distinct life-cycle, and may be a small part of a business plan or strategic plan for the organization.

Who is Involved in a Project?

Depending on the size and complexity of the project, there may be a few or many people who will work on project activities. People are chosen to contribute to the project depending on the skills required for particular project activities, and the availability of the individual in relation to the time

when the activity needs to take place.

What is Project Management?

Project management is a term used to describe commonly accepted methods and techniques of planning, scheduling, leading, and controlling, that are utilized in managing a project. Although methods and techniques used in project management are fairly standard, project management may differ from organization to organization. This occurs because project management may be adopted by organizations to varying degrees, and with different levels of commitment. Generally, the more important the project is to the organization's goals, the greater the commitment to the project.

Sometimes, organizations may function differently during the course of a project, or may create a new organization for the duration of the project. Other types of organizations may be specially structured to accommodate project management, such as "matrix" organizations.

Where is Project Management Found?

Project management is found in industries where projects are lengthy, complex, or technical. Most

often project management is found in construction, engineering, and aerospace. However, project management is often found in Information Systems.

What is a Project Sponsor?

A project sponsor is a "champion" of a project. The sponsor could be a member of the organization's senior management team, or may be a group of managers, or may be a client, or may be a group providing financial backing for the project. The sponsor is the final authority for the project, is responsible for carrying the project forward within the organization, often selecting the project manager, and supplying resources that are required for the project.

What is a Project Manager?

A project manager is a multi-talented individual who is responsible for bringing a project to successful completion within a specified time and cost. The project manager will plan the project by breaking the work down into tasks or activities, schedule the activities, locate and negotiate availability of suitable resources, control the activities to determine if the project is on schedule, and provide a leadership

role throughout the project. A project manager may also be called a project leader, project coordinator, or project expeditor.

Who can be a Project Manager?

A project manager should not only have knowledge of project management, but should also have knowledge of the business or technical problem to be solved. This is necessary as the project manager needs to understand the full scope of the project, and to be able to communicate the goals of the project to the team.

For a purely technical project, the project manager could be a technician. For example, if an Information Systems project is the installation of a new operating system, the project manager should be a technical support specialist or systems programmer.

In the case of a project that has a business impact, or that affects operations of a business department, the project manager may be drawn from that business area or have an in-depth knowledge of it. In the past, I.S. projects that had a business impact, often had technical project managers assigned from the I.S. department. Today, the trend has changed for I.S.

projects, and most often the project manager is drawn from a user department, or may be a business analyst.

Training for Project Management

Until recently, formal project management education was rare, and difficult to find. For this reason on-the-job experience used to be the main method of gaining project management qualifications. Today, there are many courses available in project management. These include short seminars offered by commercial training organizations, and graduate-level courses offered at colleges and universities. Although these seminars and courses provide a good foundation upon which to build a project management career, experience in working on or leading projects is still considered by most authors to be vital to successful project management.

Project Management Software

There are many project management software packages available on the market. These packages range from PC-based packages costing only a few hundred dollars to large mainframe-based packages costing hundreds of thousands of dollars. Although the smaller

and more reasonably priced packages contain many features that enable the project manager to plan a project and resources, and produce a variety of charts, they have their limitations. Usually, problems associated with PC-based packages are difficulties in planning multiple projects, and the inability to integrate the project and resource databases among all project managers.

A centralized database is the key element for success in using project management packages in a multi-project environment. Unfortunately, this feature is usually only found in the bigger, more expensive packages.

Some project management packages are not as user-friendly as they might be, causing difficulty in learning how to use the package, and interpreting the results. A solid background in project management methods and techniques is therefore recommended before using project management packages.

A sample software evaluation questionnaire is presented on the next two pages, containing a list of project management software features. The sample questionnaire could be modified to suit individual requirements.

Sample Software Evaluation Questionnaire

Project Management Software Evaluation

Reviewer Name:_____
Date:_____

Software
Evaluated:_____

Please rate each feature/function listed below on the 0 - 5 scale, where: 5 indicates a high rating, 1 indicates a low rating, and 0 indicates that the function was not readily available. Please circle your choice.

Feature/Function	Rating
Easy to learn and use	5 4 3 2 1 0
Ability to set project priorities in multi-project environment	5 4 3 2 1 0
Ability to schedule projects from start date or end date	5 4 3 2 1 0
Multi-project resource management	5 4 3 2 1 0
Resource driven scheduling capability	5 4 3 2 1 0
Report generator capability	5 4 3 2 1 0
Project tracking features, ie. baseline comparison, % complete	5 4 3 2 1 0
Status reports by resource and task	5 4 3 2 1 0

Feature/Function	Rating
Capability of reporting project statistics	5 4 3 2 1 0
Use of standard project management methodology and terminology	5 4 3 2 1 0
Ability to specify task durations in hours, days, weeks, or months	5 4 3 2 1 0
Capability of performing 'what if' analysis without destroying original plan	5 4 3 2 1 0
Flexible graphical output, on reports and screens	5 4 3 2 1 0
Context sensitive help screens or windows	5 4 3 2 1 0
Resource summarization on reports and screens	5 4 3 2 1 0
Capability to enter resource time against projects	5 4 3 2 1 0
Interfaces to other systems	5 4 3 2 1 0

Please list any other important features of this software not listed above, in the area below.

_____	5 4 3 2 1 0
_____	5 4 3 2 1 0
_____	5 4 3 2 1 0

Chapter III

PROJECT MANAGEMENT IN INFORMATION SYSTEMS

The I.S. Environment

Project management in an I.S. setting may differ from that found in other environments. In I.S., there may be many projects underway at the same time, and resources will be shared among the projects. This includes human resources, computer resources, and other types of resources. Therefore, I.S. is a multi-project environment.

In a multi-project environment, three areas of potential conflict arise: imposed deadlines, project priorities, and availability of resources. Each of these areas of conflict will need to be negotiated and resolved by the project managers.

Projects with imposed deadlines are a problem because they can interfere with scheduling of other projects. For project priorities to be established in a manner that supports the goals of the organization, a project prioritization methodology should be decided upon and agreed to by all affected parties. Once the project prioritization methodology is defined, then it

should be uniformly applied to all projects. This should take place for current projects, to re-prioritize the list, and for new projects. If project priorities need to fall outside the realm of the prioritization methodology, then priorities should be established by a higher authority such as an Information Systems Steering Committee.

Once project priorities are established, resource availability is the next problem to be resolved. Naturally, all project managers see their projects to be of the highest importance, and most worthy of the available resources. Unfortunately, resources are usually limited, so resources must be carefully planned and scheduled. Human resources may be obtained from a variety of sources depending on the requirements of the project. These sources include: permanent staff, and temporary staff obtained from outside agencies.

Another challenge associated with I.S. projects, is rapidly changing technology. For very lengthy or complex I.S. projects, there are no guarantees that the technology adopted in today's plans will be appropriate in a few years. This introduces a level of uncertainty and risk into many I.S. projects. Project management practitioners recognize this problem, and suggest that

a process of periodic assessments and decision points should be built into I.S. projects. The idea being that a level of flexibility is built into the project plan, so that the project can be modified dynamically with the changing technological environment.

Although technology plays a major role in most I.S. projects, the human aspect of I.S. projects should not be ignored. Many I.S. projects have a direct effect on the user community. These can range from major impacts associated with automation of manual processes, to small procedural changes. Either way, the human impact of technological change should be planned, and should be clearly understood among all involved parties.

McConnell and Koch suggest a framework for implementing information technology with the user in mind. The authors' guidelines provide a phased set of goals and practical activities that provide a method for implementing technological change. The guidelines are presented in tables 1a and 1b, on the following pages.

Table 1a

The Technology Implementation Life Cycle
A guide for implementing information technology

Leadership stage	
Phase 1:	Pre-implementation Goal: Determine planning alternatives, needed resources and possible roadblocks Activity: Gather data on workplace, personnel, work and tasks
Phase 2:	Human design Goal: Eliminate deterrents and establish incentives for worker productivity and wellness Activity: Study automated workplace and establish criteria for its human design
Phase 3:	Marketing Goal: Introduce technology so that the employee "buys" and "owns" the system Activity: Develop and implement a strategy for "selling" technical systems and the changes they cause
Phase 4:	Education Goal: Reduce employee stress concerning technology and increase confidence in their ability to use it productively Activity: Educate employees about the demands new technology will make on them and the benefits it will provide

SOURCE: Vicki McConnell and Karl Koch, "Misuse of Power," ComputerWorld 28 January 1991: 67-69.

Table 1b

The Technology Implementation Life Cycle
A guide for implementing information technology

Administrative Stage	
Phase 5:	Training Goal: Develop employees who are minimally computer competent and primed to learn additional computer skills Activity: Develop and implement a sequential, natural program of skill growth
Phase 6:	Documentation Goal: Provide easy access to and effective assistance from reference materials so that employees can complete automated tasks Activity: Compose and distribute documents that explain how the system works
Phase 7:	Human communication Goal: Create opportunities for dialog between employees and information technology, technicians and management Activity: Establish and maintain continuing means of communication with employees
Phase 8:	Postimplementation Goal: Feed forward evaluation results to improve the next technology implementation Activity: Compile the evaluation of each phase into one document and review entire implementation process

SOURCE: Vicki McConnell and Karl Koch, "Misuse of Power," ComputerWorld 28 January 1991: 67-69.

What are Information Systems Projects?

Projects in Information Systems can fall into a number of broad categories: production problems, maintenance, enhancement, and development. Production problems have been included in this category, as they consume I.S. Department time and resources. However, project planning is usually not viable as production problems occur unexpectedly, but production problems may take important resources away from previously planned activities on other projects. So it is important for project managers to be aware of the possibility of production problems, and plan extra time into project schedules to accommodate unexpected events.

Maintenance projects can be defined as upgrades to the current system that do not substantially change features or functionality for the end-user. Although maintenance projects may be complex and involve many resources over an extended period of time, they are usually limited in scope and utilize mainly I.S. Department personnel. User involvement and business impact are typically small in this type of project. An example of a maintenance project is an operating system

upgrade, or a rewrite of an application from one programming language to another.

Enhancement projects are changes to the current system to provide a new feature or functionality, like adding a new screen or report group to an application. A system enhancement may have a business impact, and may be defined by users to solve a specific business problem. Enhancements will most likely involve resources from user departments and I.S., and the project manager may be assigned by the requesting user department.

Development projects occur when a business need dictates the creation of a new application, either to replace an old system, or to automate a manual process, or to provide a completely new set of automated systems to support additional business requirements. Development projects can vary widely in scope, cost, length of time, and resource requirements. Usually, development projects begin with a group of individuals from various departments who define a business problem to be resolved, and who formulate a set of needs and requirements for the new application. The development project life cycle is discussed in a later chapter, for in-house development projects.

Alternatively, the group may assess packaged software, to find a solution meeting most of the business needs and requirements. Advantages of this approach are decreased project risk, and decreased time and resource requirements. Disadvantages are that it is rare to find a package that meets every need and requirement, and that it may cause the organization to rely upon a third party software vendor for system upgrades.

I.S. Department Resources

A variety of different types of employees work in the I.S. Department, and they tend to be classified as programmers, analysts, computer operators, production controllers, technicians, and managers, although their job titles may vary. As I.S. projects are usually complex in nature, they may involve any number of different types of individuals from within the I.S. Department and from user departments. I.S. projects are rarely so purely technical that user departments are not involved. On the contrary, it is most typical that a project team will be formed with representatives from I.S. and business areas within the organization. In this manner, technology and human resources will be

combined to find the most effective solution to the business needs.

Another important type of resource is the computer itself. Computer resources may not be readily available for all I.S. projects, as in most environments they are already being consumed by production jobs that support daily operations of the business. As a early activity in an I.S. project, availability of computer resources should be ascertained, or part of the project plan could be the evaluation of equipment requirements and acquisition of the necessary hardware.

Open Systems Architecture

A fairly new term in the I.S. vocabulary is "open systems," and there are a variety of explanations available that describe what this means. In the context of I.S. project management, an open systems approach indicates freedom from the restrictions of hardware platform, and conceptually, applications that can operate on any type of computer. The implication is that within any organization there could be combinations of different types and sizes of computers, all functioning together in an integrated manner, to

support the information needs of the end-users.

The open systems view is quite opposite to the position taken by vendors of computer hardware and software in the past. For example, only a few years ago organizations decided their I.S. direction in terms of computer hardware and software, and became locked into that direction due to their investment and availability of software for their chosen type of hardware. Today, vendors of hardware and software are recognizing that the industry is demanding combinations of technology to meet their business needs, and applications that are transportable across hardware platforms. These hardware platforms include mainframe, minicomputer, and PC workstations.

It is necessary for project managers to understand the idea of open systems, as I.S. projects of yesterday should not be used as models for I.S. projects of today. Available technology should be evaluated to make sure that it is appropriate for the future direction of the business, and new applications should be designed or acquired with an open systems direction in mind.

Chapter IV

THE DEVELOPMENT PROJECT LIFE CYCLE

Overview

The development project is comprised of many steps, which may vary depending on the type of project to be undertaken. However, a development project has a distinct life cycle. One view of the development project life cycle is presented in table 2. Wideman is a project management author who breaks the project down into four phases, which are: concept, development, implementation, and termination. Within each phase are a number of activities, in typical order of completion, followed by a series of management decision-making points that are built into the process.

It should be noted that Wideman's project phases are named a little differently than those usually encountered in I.S. projects. Implementation is execution of the plan in Wideman's terms, including all of the programming steps. Installation of the new system is part of project termination.

Table 2

Project Life Cycle: Stages/Activities
Systems Development

Total Project Life Cycle			
TIME →			
Plan		Accomplish	
Phase 1	Phase 2	Phase 3	Phase 4
CONCEPT	**DEVELOPMENT**	**IMPLEMENTATION**	**TERMINATION**
Conceive (C)	Develop (D)	Execute (E)	Finish (F)
Objectives	Operations and systems analysis	Systems technical specification	Conversion and phased install
Resources			
Initial feasibility	User requirements	Technical support development	Refinement and tuning
Top management go/no-go decision	Technical support or original development	User controls or procedures	Terminate project effort
		User training	Post implementation review
	Conceptual design and commercial package review	Applications specification	
		Applications programming and testing	Top management approval/ sign off
	Alternatives evaluation		
		System test	
	Top management go/no-go decision	Top management go/no-go decision	

SOURCE: R. Max Wideman, A Framework for Project and Program Management Integration, (1991): III-6.

Concept Phase

The "concept" phase may also be described as an identification of need. This may take the form of a written request to the I.S. Department from an individual user, or group of users. A feasibility study will often follow, to determine if the request can be accomplished. An analyst will usually conduct the study, and report the findings to management. The feasibility study will then trigger a management decision, whether to approve or deny the project. Management approval will depend upon a variety of factors including: cost, business justification, time, and resource availability.

Development Phase

The development phase contains many important steps that are vital to the success of the overall project. In many organizations, there is a tendency to try to cut down the activities and elapsed time in this phase, and to accelerate the project into the "implementation" phase. When this happens the implementation phase becomes very prolonged and problematic. This is due in part to an improper or

incomplete statement of user requirements in the previous phase. The investment in time in the development phase is therefore justified by time savings in the implementation phase.

The definition of user requirements in phase 2 is often known as "functional specification." A functional specification is a non-technical document that details the requirements of the application. For an in-house development project, this may contain samples of what the input and output needs to look like, and details of processing requirements. For a project involving the purchase of packaged software the functional specification may be a list of features and functions to look for in the software evaluation step.

Following either a conceptual design, or an evaluation of packaged software, all of the alternatives should be evaluated and presented for management decision. It is rare when there is only one alternative to consider, if so, then this may be an indication that parts of the development phase should be re-visited to insure that the business problem is being solved in the best possible way. The findings of the development phase should be presented to management with a business justification, including estimates of

time, cost, resource requirements, risk analysis, and cost/benefit analysis.

Implementation Phase

The implementation phase contains the detailed specification, technical support prerequisites, development of controls and user procedures, user training, applications programming specification, programming, testing, and full system test. User training and procedures may fall later in the cycle depending on the type of project, possibly during the full system test. At the end of this phase, management is presented with a final decision, whether or not to install the system into the production environment.

Termination Phase

The termination phase is often called "implementation" in I.S. circles, but it actually contains far more than just installing the new system into the production environment. The technical activities may include file conversions, moving programs, and so on. The user community should also be prepared to receive the new system and implement procedural changes within the departments.

Often, a new system will require some refinement during the post-implementation phase. If the development phase was properly executed, then post-implementation changes will be decreased. However, it is not possible to emulate all of the conditions that may be found in a production environment within the full system test. An example of this is a volume test, which is often very difficult to accomplish without special tools or high user participation. For this reason, it is best to plan time to allow for resolution of unexpected problems.

Terminating the project effort can involve many different types of activities and tying up loose ends, such as making sure that programs and documentation are properly saved. Post-implementation review can be viewed as a learning experience. What could have been done differently? Could certain problems have been avoided? Can the process be improved next time? Were all of the requirements of the project met? Are any further modifications to the system required? These are some of the questions that may be asked.

Management approval or user acceptance of the new system or package is the final step in the I.S. project life cycle. This is necessary because the resources

involved in the project need to be released to return to their functional responsibilities, or start work on a new project. To officially "sign off" on a project represents closure. This is necessary so that the project team can feel a sense of accomplishment in completing a long project, and so that the user community can take ownership of their new system.

Chapter V

PLANNING

Overview

Planning is fundamental to project management. Project plans have limited objectives, which need to be clearly defined at the outset of the project. The project plan can be simple, or highly complex, depending on the requirements of the project, and the controls that are deemed necessary.

The Project Plan

There may be many elements to a project plan, some of those which are commonly found in I.S. projects are described in this section. Not all are required for smaller projects.

The "Project Summary" or "Project Charter" is an executive overview of the project which identifies the objectives, goals, and constraints of the project. The objectives and goals are the expected results of the project. It will also include a list of high-level deliverables associated with the objectives and goals. The constraints could vary, and could possibly include

the environment, the computer equipment, or a time frame for project completion.

The "Project Specifications" define the requirements of the project in greater detail. Specifications are very common in I.S. projects, and quite often take the form of a functional specifications or functional requirements document that outlines the desired features and functions for an entire system.

A "Work Statement" is not often seen in in-house developed I.S. projects, but is applicable where a contractor is performing all or part of the work on a project. This document outlines the type of work that will be done.

The "Master Schedule" is a list or chart containing all of the activities identified in the WBS (Work Breakdown Structure), with names of responsible parties, the starting and ending dates of each activity, and the duration of each activity. This document may be presented in the form of a Gantt or PERT chart, as described later in this chapter.

The "Procedures Guide" outlines any special procedures that are required for the project. This is a set of guidelines and standards for the project. In

I.S. projects, this may be a set of naming conventions, coding standards, or rules that are specific to the application.

An "Activity/Event Network Plan" may be found in projects that have many activities. This plan shows the relationship between activities, any dependencies, and the critical path. Most often this plan appears as a PERT chart, and a project management software package will most often be used to create and update the plan.

A "Materials and Equipment List" is often found in I.S. project plans that require additional hardware or software to be purchased. Third party vendors usually provide this type of list with their contract for services, whether they are providing the additional hardware and software or not, as purchase of such items may be a prerequisite for other contracted activities.

An "Impact Analysis" document is sometimes seen in large I.S. projects. This identifies the impact of the project on departments and processes within the organization.

A "Project Organization Plan" identifies key areas of responsibility, with a brief statement of responsibilities, and names of responsible parties. This could also include a list of committee or task

force members involved in the project.

The "Project Personnel Plan" is a list of all job titles involved in the project, with starting and ending dates. Names can be added to the list later when personnel are identified.

The "Review and Reporting Procedure" is a control mechanism for the project. It is a plan of the type of communication that will take place, such as meeting schedules, and recipient lists for memos and other documents.

Identification of the "Budget and Cost Control System" may be applicable, however in many I.S. projects the budget may have been established based upon a cost/benefit analysis that was provided to justify the project. The cost control system may simply be a chart of accounts that project costs will be allocated to.

There may be other types of plans that are applicable to I.S. projects. Examples of these could be: a "Facilities Plan" for a computer room, or a user test plan for applications development, or a user training plan.

As previously mentioned, the components of the overall project plan will vary according to the type of

project, but even a simple project plan will tend to generate a large volume of paper. As the project plan will be referenced throughout the project, it needs to be well organized so that parts are not misplaced. Many project managers organize the project plan into a large 3-ring binder, called a "project notebook." This keeps all of the papers together, and assembly of the project notebook becomes a self-documenting record of the project.

Change Management

Although planning is a key element of project management, even the best plans will change. This is an inevitable outcome as the project progresses, because unforeseen events or problems may arise. Knowing that change is inevitable, the project plan should be flexible enough to accommodate change, as it is used as a guide for directing and controlling the project.

Many project management packages allow the project manager to make changes to the project plan, and perform a "what if" analysis to assist in determining the impact of the change on the overall project. These tools save the project manager many hours of laborious

work in determining how schedules will change.

In I.S. projects the most common type of change is when users modify their requirements or specifications for the project. Even the smallest change to specifications tends to increase the scope of the project, resulting in changes to schedules and increased cost. Specifications that seem to evolve over time tend to result in projects that seem to never end, and it becomes impossible for the project manager to plan future projects.

Change also negatively affects team morale, as participants will lack a sense of accomplishment if a piece of work is discarded and has to be repeated. This destructive effect is often seen among programmers when specifications keep changing, this can result in eventual lack of interest for the project, and an increase in programming errors.

For the above reasons, and others, uncontrolled change can be a cause of project failure. Project management authors recommend controlling change by making it into an orderly, documented process. A project change request form is recommended as the vehicle. It should be completed and submitted for evaluation. The impact of the requested change can

then be analyzed, and decisions can be made whether the change should be incorporated into the project or not.

Work Breakdown Structure

One method commonly used in the project planning effort is the Work Breakdown Structure (WBS). As the name suggests, WBS is a way to break the project down into small manageable tasks with measurable inputs and outputs. WBS is hierarchical, so depending on the size of the project, the project will be broken into subprojects, then into tasks or activities. The activities will be named and numbered according to a pre-defined naming convention. In this manner, the WBS process forces the project manager, or project team, to think through the entire project during this initial stage.

In Information Systems projects, an action-oriented WBS is often used. For example, a project may be broken into phases such as: define user requirements, analysis, design, programming, testing, user acceptance, and installation. Within each phase there may be many activities such as draw system flowchart, or code program to specifications. Each of the activities represents a unit of work, and has a

responsible party assigned to it. A goal for preparation of the WBS is to break down the work into units that are small enough so that reasonable estimates of time and cost can be made. A rule of thumb suggested by project management practitioners, is that each unit of work should take no longer than either forty or eighty hours to complete. If the activity is not completed within its specified time, this rule of thumb provides an early warning of a problem developing within the schedule. An example of a WBS is provided in Appendix A.

Gantt Charts

A Gantt chart is simply a bar chart that illustrates where activities fall in relation to elapsed time. Activities are listed on the vertical axis, and time is plotted on the horizontal axis. The start, stop and duration of each activity are represented by horizontal bars on the chart. Gantt charts are useful for graphically representing a project schedule, or progress, but are less useful for planning purposes as they do not illustrate the relationship between activities. A milestone chart is a Gantt chart with additional symbols that identify

control points in the project. An example of a Gantt chart can be found in Appendix A.

PERT/CPM Charts

PERT (Program Evaluation and Review Technique) and CPM (Critical Path Method) charts are very similar to each other, and illustrate the relationship between activities within the project. PERT/CPM charts are both a planning and a scheduling tool.

In a project some activities can take place at the same time as others, and this effect shortens the overall project time. Certain activities may depend upon the completion of others, this is known as a "dependency," and this tends to lengthen project completion time. A PERT/CPM chart or "network diagram" shows the combination of activities within the least possible time. There may be many paths of activities and events within the network, the path that represents the longest series of activities is known as the "critical path," and this dictates the overall duration of the project.

A PERT/CPM chart or "network diagram" can be manually drawn by using standard notations and formulae. However, this is a laborious task even for

small projects, so the use of project management packages is recommended for this purpose. A sample PERT chart can be found in Appendix A.

Chapter VI

SCHEDULING

Overview

Scheduling is the second major function of project management, but it is probably the most difficult. Scheduling is not an exact science, as it requires estimates and good judgement. The project manager alone will not be able to estimate the duration of all of the project activities. The project manager will need to interview individuals who have sufficient knowledge of the activity to estimate a duration. The estimates will tend to vary according to the level of optimism or pessimism of the individual interviewed. So the project manager will need to arrive at a reasonable estimate based upon the ranges of times provided. Involving others in the time estimating process adds the advantage of achieving "buy in" to the project and commitment to the schedule.

Project Schedules

Once the duration of the activities in the project have been estimated, the project manager will be able

to use this information in determining the project schedule. Project schedules may be determined in different ways. If the end date of the project is not predetermined by external factors, then the project schedule can be planned in a forward manner. If the start date, and the duration and the relationship of the activities are known, by using a network diagramming technique an end date can be established.

If the end date of the project is predetermined by external factors such as an effective date for a regulation, then the project schedule should be planned in a backward manner. Again, if the ending date, and the duration and relationship of the activities are known, the start date can be established.

Both of the above scheduling methods assume that resources will be available as the schedule dictates. This is often an unreasonable assumption, particularly in multi-project environments such as I.S. In this case, the start and end dates may be dictated by resource availability, unless the project has a higher priority than others.

In cases where the resource continues to have functional responsibilities in addition to project responsibilities, activities should not be scheduled

using optimistic durations. For example, in I.S. environments programmers may have ongoing functional responsibilities to support the production systems. Functional responsibilities will depend on whether production problems occur, so are variable. However, when they do occur, production problems will negatively impact project activities. In this scenario, it would be better to schedule an elapsed time for the project activity, and not an actual duration.

Project Priorities

In a multi-project environment, projects can be prioritized in different ways to meet the needs of the organization. Ideally, projects should be prioritized in accordance with the business goals and objectives of the organization. This being the case, then the organization can be assured of the fact that the right projects are being worked on, at the right time, and in the right order. For all practical purposes, however, this is not the case, and at times project priorities may be set for far less honorable reasons. One example is when a project is given a higher priority than its business justification calls for, because the requestor is a "squeaky wheel" within the organization. In order

to avoid this problem, it is better that project priorities are set at a high level within the organization.

I.S. project priorities may be set for a variety of reasons. Production problems generally receive a very high priority, as they are viewed as being support for an essential business function. Projects such as system upgrades may become high priority in order to maintain vendor support for a purchased product, which may be either hardware or software. Other priorities may be driven by external factors such as government regulation changes.

Changes to project priorities, and introducing new projects with higher priorities than older projects on the list, will have the effect of delaying older projects indefinitely in a multi-project environment. These delays can become a source of customer dissatisfaction, particularly in I.S. So although delays to older projects may be unavoidable, the effect on the overall project list should not be ignored by those who are responsible for setting project priorities. Delaying projects for a long period of time may also cause projects to become so outdated that they are no longer needed by the organization. Where

this occurs, older projects should be periodically reviewed and removed from the list.

Project priorities are often a source of conflict in I.S., because I.S. serves many different departments within the organization. Each department's business goals and objectives may differ, resulting in equally high priorities for projects. To solve this problem, all departments should utilize the same method for establishing a business value and priority for projects, so that this method is understood and accepted by everyone within the organization. Then the final priority-setting should take place at a higher level in the organization. For I.S. projects, establishing relative project priorities is usually an I.S. steering committee function. In this manner, the I.S. steering committee insures that the organization's overall business goals and objectives will be met.

Chapter VII

LEADERSHIP

Overview

Leadership is the third major function of project management, and demands flexibility and innovation from the project manager. The project manager may have little or no formal authority in functional areas of the organization, but will be leading personnel drawn from those areas, and at the same time will have responsibility for project completion. The inequality between authority and responsibility will demand that the project manager is skilled in negotiation, compromise, team-building, and conflict management. Communication is also a very important aspect of project leadership. This section discusses the reasons why these skills are important in project management.

Communication

The project manager knows the scope of the project, what the end product will be, who the project team is, and how the team will work through the set of activities to achieve the desired result. This is the

"big picture" view of the project. It is likely that the project manager is the only person who has this level of understanding for the whole project. Project team members are involved on the individual activity level, so may not understand the value of their contributions to the project unless the project manager shares the vision of the project's goals and purpose. This sharing of the vision will have a motivating effect on the project team, and will help participants to see beyond the daily frustrations or conflicts associated with trying to complete their activities.

Communicating expectations to team members who are working on individual activities is essential to keeping the project on track. The project manager also represents the project to management, so will communicate information about the project status, progress, and problems, upward in the organization.

The project manager ties together the various components and groups involved in the project, by calling for meetings, written correspondence, and discussions with individuals on the project team. All of these are essential communication functions, and help to keep the group focused on the goals of the project.

Conflict Management

There can be many sources of conflict in project management, and conflict can have either positive or negative effects on a project. The reason why conflict is prevalent in project management is mainly due to the inequality between the project manager's authority and responsibility. This can result in a "two boss" problem for project team members, each of which may have a conflicting set of expectations or requirements. Conflict can also occur when departments have different business goals, when there are disagreements over resource availability, schedules, priorities, or technical opinions.

This type of conflict can become destructive to the project if not managed properly. The decision-making process may become lengthy, there may be competition among functional departments, or participants may lose sight of organizational goals.

Conflict can have positive effects if it is channelled to stimulate new thoughts, ideas, and solutions to problems. If the project manager takes a problem-solving approach to conflict, that is defining the problem, collecting information, developing

alternatives, and selecting the best alternative based upon consensus, this will result in a more satisfying outcome for all parties than any other approach. Negotiation and compromise is an alternative approach to conflict management and is discussed below.

Negotiation and Compromise

Project managers often utilize resources from different functional areas in the organization, so the availability of resources for a period of time to work on the project is a negotiated item, agreed to by all parties. Often, when durations of project activities are determined, negotiation is required to achieve "buy in" to the project, and commitment to the schedule. In this manner, a project manager is a negotiator.

Compromise suggests that bargaining may take place between parties, and that each side may need to give something up in reaching a mutually agreeable solution. In this manner, compromise may be a lower quality solution to conflict issues than the problem-solving method described above. Nevertheless, the project manager's job is to bring a project to completion. Therefore, if negotiation and compromise become necessary to achieve the project's goals, even this

method will be more beneficial than more authoritarian approaches.

Team Building

Once the project is planned, scheduled, and resources are identified, it is time for the project manager to start building the project team. Team members can come from a variety of sources, but are most often drawn from functional departments. Team members should be requested sufficiently in advance to allow the functional manager to plan the individual's time away from usual activities.

Quite often the project manager is not able to hand-pick team members, but must rely on the functional manager to allocate an employee with the right skill set for the project. In this case, the project manager can have little influence on the personality mix of the project team members, and this may result in conflict within the team. When the team members can be hand-picked, the project manager can select individuals who are known to be good team players. Either way, when the team members are assigned to the project, it is the project manager's job to clearly state the duties and expectations for each team member. Dekom, a project

management author, suggests that the information shown in Table 3 should be provided to each team member.

Table 3

Delegations to Team Members

Team Leaders must specify to team members
o The job assigned and expected - the what
Technical
Administrative
o Kinds and extent of delegations
o Hierarchical duties
o Project phases during which a team member is
On the team
On call for project duties
o Resources available to the team member
o Timing of the duties delegated
o Costs and other conditions
o Standards of performance
For the member's work
For the product of the task
o Information requirements
Technical documentation and reports
Administrative reports and controls

SOURCE: Anton K. Dekom, Practical Project Management, (1987): 301.

Chapter VIII

MONITORING AND CONTROL

Overview

Monitoring and control is the fourth major function of project management. The type of controls needed for the project will be specified during the planning phase, and will appear in such documents as the "Review and Reporting Procedure," or the "Budget and Cost Control System" as described in Chapter 5.

The requirements for project monitoring and control will vary according to the requirements and size of the project, and there is no pre-defined formula. This aspect of project management is fairly consistent across industries, and types of projects. Most likely, the only difference between monitoring and control for I.S. projects and any other type of project will be the type of activities, and content of reports. Monitoring progress of project activities is an ongoing process, and provides the project manager with early warnings of slippage in the project plan. Monitoring the progress of the project may be achieved in a variety of ways, as described in this chapter.

Monitoring and Control by Information

Project progress can be monitored by information provided by project team members. A project status meeting is a commonly used method of gathering this type of information. The meeting also provides a vehicle for dissemination of information by the project manager to the project team.

In the "kick off" meeting, the project manager will set the ground rules for status reporting. This will include the frequency of status reporting, which will bear a direct relationship to the way that the project activities are scheduled. For example, if project activities are scheduled in increments of weeks, the status reporting schedule will be in weeks. If the project activities are scheduled in increments of months, the status reporting schedule will be in months. This coordination of the project schedule and status reporting is an important control mechanism for the project manager, because lack of a unified time scale will cause misunderstandings and loss of control for the project manager.

Project management authors recommend that the project team meetings should be formal, with an agenda,

and planned well in advance. Ideally, the project manager will publish a schedule of meetings as part of the project plan. Another useful recommendation is that project team members should submit their status report in writing, following a specified format. A practical reason for this is that it shares the work among the project team, and saves the project manager a lot of writing. Status reporting may be a significant effort for larger projects.

Other Types of Control

A project manager may gather information outside the formal status meeting in other ways. Personally checking on the progress of activities is a good method. The written report then confirms the project manager's observations. There may be many different types of reports produced to assist the project manager in controlling the project, and in reporting overall project status to management. The status report mentioned above is a narrative report, but reports can be in the form of charts, graphs, or tables. Project management packages are usually capable of providing a wide variety of management reports. Examples of these are completion statistics, time reporting, cost

reporting, problem reporting, and schedule changes. For these reports to be meaningful however, the data to be captured and reported, and the format and content of the report should be defined in the planning stage. The distribution of the reports should also be planned in advance to ensure that the copies are distributed to the correct parties.

Documentation

As a final word on all of the reports that may be produced during a project, reports become an audit trail of all of the events, problems, and circumstances surrounding the project. Inevitably, the project plan may change, or unforeseen events may occur. Where this happens, the project manager may need to provide explanations to management, and the paperwork generated during the project is a valuable source of information.

Particularly in I.S., old project plans are often revisited to see how a system installation or upgrade was previously accomplished, and in what time frame. When these old documents are available, they provide a valuable source of information, and may save many hours of planning. At times, old specifications are useful in trying to explain why enhancements were applied to

systems, and who requested the change.

For these reasons and more, project paperwork should be archived indefinitely in project notebooks or project files. This type of historical recording of the event also provides a hedge against the problems caused by staff turnover.

Chapter IX

I.S. PROJECT MANAGEMENT AT SJMMC

Current Environment

The I.S department at SJMMC is transitioning from one organizational structure to another, and the focus of the I.S. function is changing along with the healthcare industry and technological advances. Until this time project management was not consistently practiced, nor uniformly adopted, within the I.S. department or the user community.

Implementation of Project Management Practices

To enable project management practices to be uniformly adopted for all I.S. projects certain prerequisites need to be met. These include: organization-wide commitment to a set of standard policies and procedures for I.S. projects, education in project management principles and the organization's standards for project management, agreement from I.S. department personnel and the user community to follow the standards and procedures for the organization, and use of a common set of project management methods and

tools.

Emerging from the I.S. department reorganization should be the development of project management policies and procedures for I.S. projects, addressing such topics as: the project request procedure, business justification for the project, project prioritization method, assignment of the project manager, project planning, resource scheduling, duties of project team members, how project time will be tracked and charged, how project expenditure and status will be reported, and any project review procedures.

This handbook does not attempt to specifically answer these questions for SJMMC other than in general terms, because the procedures need to be developed, refined, and agreed to, by all parties involved over a period of time. However, a set of sample procedures for requesting I.S. projects and obtaining user acceptance are furnished in Appendix B. These revised procedures are intended to be used as a model for other new or revised policies and procedures.

There may also need to be a certain level of experimentation, or evolution of the procedures, to find out what works for this organization. Any procedures developed should be reviewed for consistency

with I.S. department goals and objectives, and organizational goals and objectives. This handbook will be useful in this process as an educational tool, or as a starting-point for development or revision of I.S. standards and procedures.

Standards, policies, and procedures for I.S. project management at SJMMC should be developed with the goal of defining the process as clearly as possible. Although a laborious job, the end products and benefits will include: an eventual method of measuring project performance, improved project success, and improved end-user satisfaction.

APPENDIX A

EXAMPLES

WORK BREAKDOWN STRUCTURE

001 GENERIC APPLICATION DEVELOPMENT PROJECT
- 100 Analyze User Requirements
  - 110 Review functional requirements
  - 120 Verify stated requirements
  - 130 Assess existing software
  - 140 Make/buy decision: buy package or develop in-house
  - 150 Document approved requirements
- 200 Develop Software Architecture
  - 210 Determine architectural approach
  - 220 Develop internal software architecture
  - 230 Develop external functional requirements
  - 240 Negotiate proposed course of action
  - 250 Revise, review, formalize
  - 260 Document formalized requirements
- 300 Develop Functional Specifications
  - 310 Define standards and conventions
  - 320 Refine, negotiate, formalize
  - 330 Define functional acceptance tests
  - 340 Verify against requirements
  - 350 Document final functional specifications
- 400 Develop Technical Specifications
  - 410 Define programming approach
  - 420 Define standards and conventions
  - 430 Define test and verification procedures
  - 440 Define documentation requirements
  - 450 Define interface specifications
  - 460 Define data sources
  - 470 Draw system flowchart(s)
  - 480 Document final technical specifications

500 Programming and Testing
- 510 Define record layouts
- 520 Define subroutine calls
- 530 Program specifications
- 540 Code and debug programs
- 550 Program unit testing
- 560 System or parallel test
- 570 Demonstrate results
- 580 Program documentation

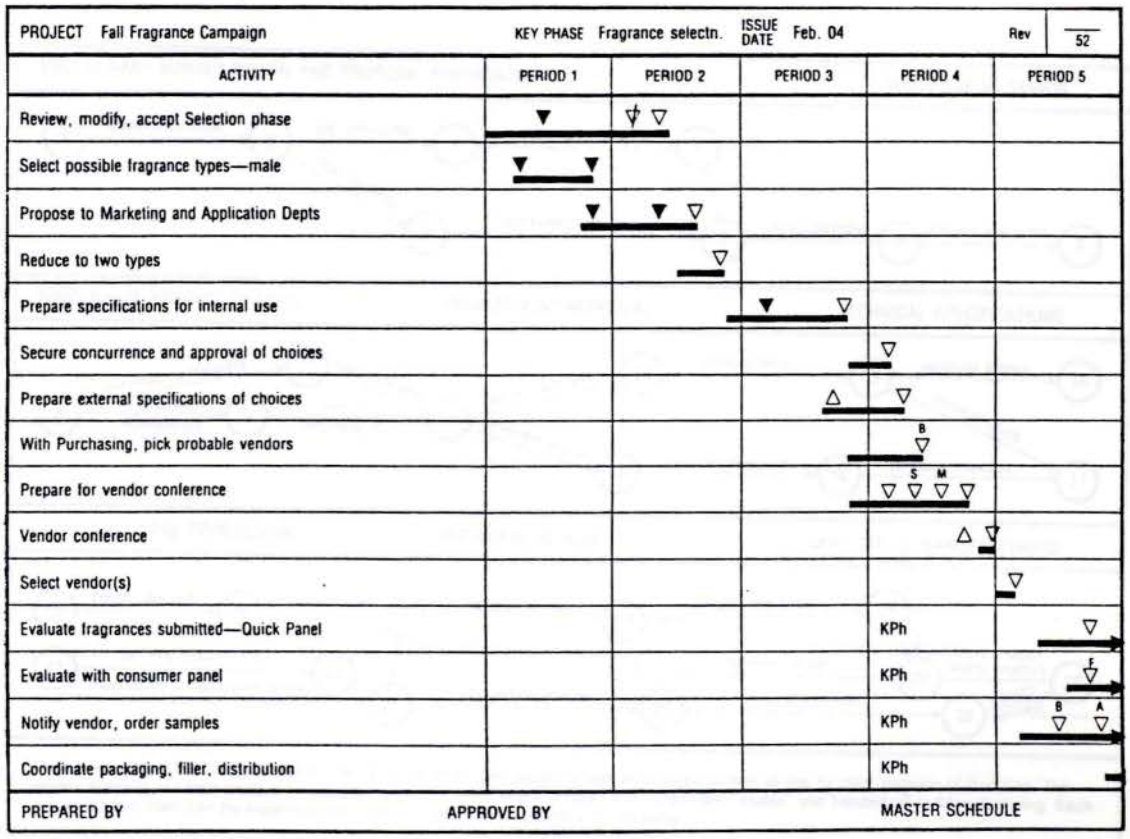
600 End-user Procedures
- 610 Define procedural changes
- 620 Update procedure manual
- 630 Write user manual and documentation
- 640 User training

700 Operational Procedures
- 710 Define production files
- 720 Define CICS table updates
- 730 Production JCL set-up
- 740 Write procedures for operations
- 750 Define report distribution

800 User Acceptance
- 810 Demonstrate product to users
- 820 Conduct functional acceptance tests
- 830 Document user acceptance

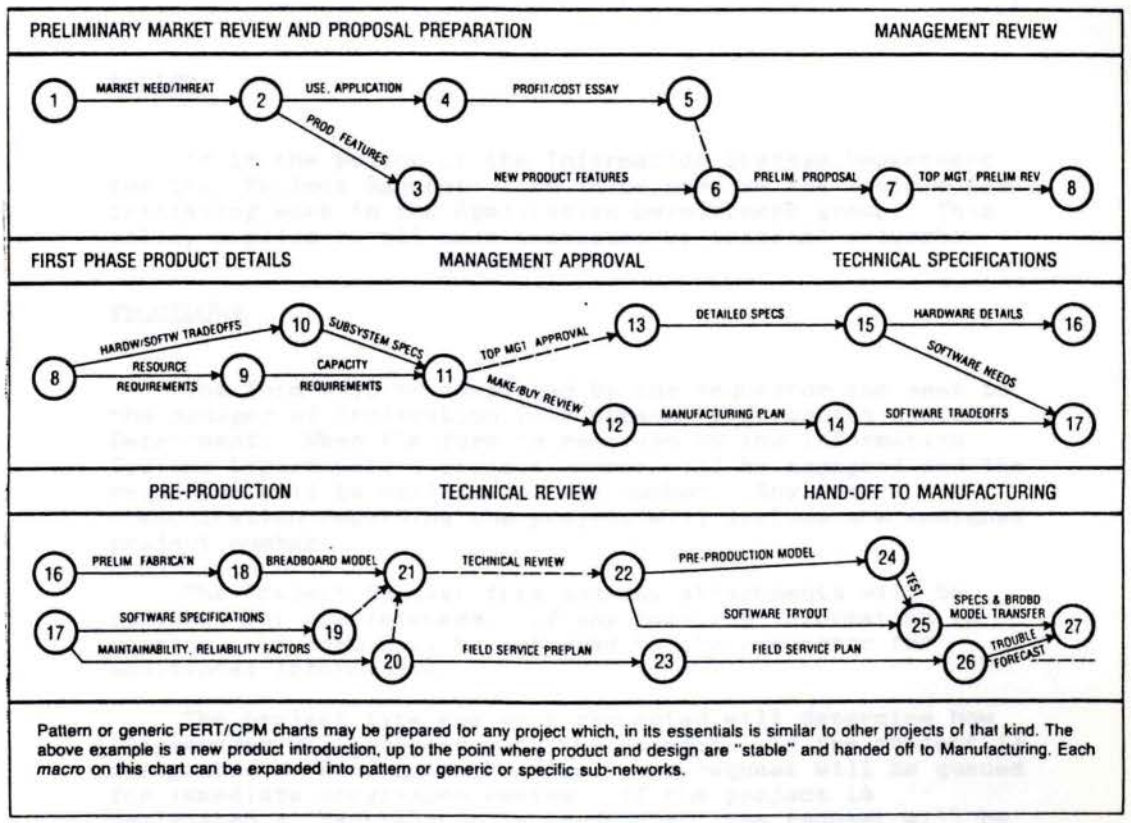
900 Implementation planning
- 910 Negotiate implementation date
- 920 Plan down time/ file conversions
- 930 Define backout plan
- 940 Document implementation procedures
- 950 Obtain management approval for implementation
- 960 Notify user community and participants of implementation schedule

GANTT CHART WITH MILESTONES



SOURCE: Anton K. Dekom, Practical Project Management. (1987): 144.

PERT/CPM CHART



Pattern or generic PERT/CPM charts may be prepared for any project which, in its essentials is similar to other projects of that kind. The above example is a new product introduction, up to the point where product and design are "stable" and handed off to Manufacturing. Each *macro* on this chart can be expanded into pattern or generic or specific sub-networks.

SOURCE: Anton K. Dekom, Practical Project Management. (1987): 188.

APPENDIX B

INFORMATION SYSTEMS DEPARTMENT

STANDARDS AND PROCEDURES MANUAL

SECTION: APPLICATION DEVELOPMENT	SECTION NO.: G.1
SUBJECT: PROJECT REQUEST FORM	PAGE NO.: 1
EFFECTIVE DATE: 02/23/89	REVISION DATE: 07/01/93

POLICY

It is the policy of the Information Systems Department for the "Project Request" form to be used as the vehicle for initiating work in the Application Development group. This policy applies to all user-initiated or internal requests.

PROCEDURE

The form will be completed by the requestor and sent to the Manager of Application Development, Information Systems Department. When the form is received by the Information Systems Department, a project number will be assigned and the requestor will be notified of the number. Any future communication regarding the project will include the assigned project number.

The Project Request form and any attachments will be reviewed for completeness. If any required information is missing, the form will be returned to the requestor for additional information.

The project type and work requested will determine how the manager will proceed with the request. If the project is designated a "Production Problem," the request will be queued for immediate programmer review. If the project is designated a "Maintenance/Table Update," the request will be queued for programmer review with a lower priority than "Production Problem." Following this review, if the "Maintenance/Table Update" project requires more than four hours programming time, it will be prioritized with other project types as described below.

INFORMATION SYSTEMS DEPARTMENT

STANDARDS AND PROCEDURES MANUAL

SECTION: APPLICATION DEVELOPMENT	SECTION NO.: G.1
SUBJECT: PROJECT REQUEST FORM	PAGE NO.: 2
EFFECTIVE DATE: 02/23/89	REVISION DATE: 07/01/93

PROCEDURE Continued.

Projects designated "Regulation Update" will include a regulation effective date, and documentation or specifications describing the type of regulation change. For projects designated "Enhancement/Development, the requestor will provide items from the "attachments" list on the form as applicable. The attachments to either type of request will provide information to assist in assigning a priority to the project, and resource scheduling.

The above project types will initially be queued for analysis by a member of the Application Development group, or the Business Analysis group, as appropriate. The analyst will contact the requestor to discuss the project or request additional information. The analyst will provide an hours estimate for I.S. resources, and other information to assist in assigning a priority to the project, and resource scheduling.

Project priorities will be assigned either by the I.S. Steering Committee for projects which meet the committee's criteria for review, or will be negotiated by the requestor, the responsible I.S. manager, and user group, as appropriate. When the project priority is assigned, the project will be queued for technical analysis or programming.

At each stage of the process the requestor will be sent a "User Acceptance" form with a copy of the Project Request form attached (See Section G.2). The original Project Request form and attachments are kept in I.S. as a permanent record of the project.

INFORMATION SYSTEMS DEPARTMENT

STANDARDS AND PROCEDURES MANUAL

SECTION: APPLICATION DEVELOPMENT	SECTION NO.: G.1
SUBJECT: PROJECT REQUEST FORM	PAGE NO.: 3
EFFECTIVE DATE: 02/23/89	REVISION DATE: 07/01/93

PROJECT REQUEST FORM

The following is an explanation of each field or box on the Project Request form:

Project Number	A number assigned by I.S. to identify the project.
Requestor Name	The initiator of the request, may also be designated the project manager.
Department	The department of the requestor.
Date Requested	The date of the request.
System	Major system affected by the project. May be left blank if unknown by the requestor.
Requestor Phone	Requestor's telephone number.
Hospital	Facility affected by this request.
Date Required	Effective date, if any.
Project Sponsor	Name of V.P. sponsoring the project, leave blank if not applicable.
Project Manager	Project manager designated by the requestor, if different.
Project Type	Check one box in this section to categorize the project. If unknown, leave blank.

INFORMATION SYSTEMS DEPARTMENT

STANDARDS AND PROCEDURES MANUAL

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SUBJECT: PROJECT REQUEST FORM	PAGE NO.: 4
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PROJECT REQUEST FORM Continued.

Work Requested	Check one box in this section to indicate type of work requested. If unknown, leave blank.
Project or Problem Description	A brief description or title for the project.
Attachments	Check appropriate boxes to indicate the type of attachments submitted with the form.
For I.S. Department Use	This section is used by the I.S. Department as the project progresses to record certain activities. The fields are self-explanatory.

PROJECT REQUEST	ST. JOHN'S MERCY INFORMATION SYSTEMS DEPARTMENT		Project Number
	Requestor Name	Department	Date Requested
System	Requestor Phone	Hospital	Date Required
Project Sponsor		Project Manager	

PROJECT TYPE

- ☐ Production Problem
- ☐ Regulation Update
- ☐ Maintenance/Table Update
- ☐ Enhancement/Development

WORK REQUESTED

- ☐ Feasibility Study
- ☐ Project Analysis
- ☐ Programming
- ☐ Other _____

Project or Problem Description (Brief)

Attachments

- ☐ Project Summary
- ☐ Cost/Benefit Analysis
- ☐ Specifications/Documentation
- ☐ Project Plan

FOR I.S. DEPARTMENT USE

I.S. Evaluation			Date Rec.
			Est. Hours
Analyst	Began	Complete	Priority
Description of Work			Anal. Approv.
			Date Sched.
Programmer	Began	Complete	Act. Hours
Date Completed	User Acceptance		Date Implemented

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INFORMATION SYSTEMS DEPARTMENT

STANDARDS AND PROCEDURES MANUAL

SECTION: APPLICATION DEVELOPMENT	SECTION NO.: G.2
SUBJECT: USER ACCEPTANCE FORM	PAGE NO.: 1
EFFECTIVE DATE: 02/23/89	REVISION DATE: 07/01/93

POLICY

It is the policy of the Information Systems Department for the "User Acceptance" form to be used as the vehicle for identifying work as complete in the Application Development group. This policy applies to all user-initiated or internal projects.

PROCEDURE

The form will be completed by the Manager of Application Development, Information Systems Department, or the I.S. Department team leader designated responsible for the project. The top portion of the form will be completed and sent to the requestor of the project, who will coordinate the user acceptance process with the user-designated project manager and affected user departments. The requestor will complete the bottom portion of the form, and return the original signed form to the named I.S. contact on the form.

When the signed form is received in the I.S. Department, either the project will be prepared for implementation in the production environment, or analysis activities will be considered complete, depending on the type of user acceptance required. The project request and user acceptance will then be matched and filed in the closed project book, or open project book, as appropriate.

INFORMATION SYSTEMS DEPARTMENT

STANDARDS AND PROCEDURES MANUAL

SECTION: APPLICATION DEVELOPMENT	SECTION NO.: G.2
SUBJECT: USER ACCEPTANCE FORM	PAGE NO.: 2
EFFECTIVE DATE: 02/23/89	REVISION DATE: 07/01/93

USER ACCEPTANCE FORM

The following is an explanation of each field or box on the User Acceptance form:

Project Number	A number assigned by I.S. to identify the project.
To	The recipient's name.
Department	The recipient's department.
Date	The date of form preparation.
I.S. Contact	The name of the initiator of the request for acceptance.
Request For Acceptance	This section describes the type of user acceptance requested. One of the four boxes will be checked and comments may be provided in the "Other" category. This section is completed by I.S., and attachments will include test data or analysis documents, as appropriate.
User Response	This section describes the type of user acceptance granted. One of the three boxes will be checked and comments may be provided in the "Other Response" category.
Signed	Signature of the individual granting user acceptance of the project.
Date	Date the form was signed.

INFORMATION SYSTEMS DEPARTMENT

STANDARDS AND PROCEDURES MANUAL

SECTION: APPLICATION DEVELOPMENT	SECTION NO.: G.2
SUBJECT: USER ACCEPTANCE FORM	PAGE NO.: 3
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USER ACCEPTANCE FORM Continued.

CC	If copies of the form are to be sent to multiple users, names will appear in this box.
Other PR #	If this project is related to, or should be coordinated with other projects, the project numbers are indicated in this box.
Other Info	An additional area available for a small note.
Implementation Date	Date of the project's implementation in the production environment (ie. "move" date).

USER ACCEPTANCE	ST. JOHN'S MERCY INFORMATION SYSTEMS DEPARTMENT		Project Number
	To	Department	Date
I.S. Contact		Phone	

****** REQUEST FOR ACCEPTANCE ******

☐ Please review attached test output and indicate your acceptance of this project to be implemented in the production environment.

☐ This project is ready for user testing. When user testing is complete, please indicate your acceptance of the project for implementation in the production environment.

☐ Please review the attached analysis document for this project. If the analysis satisfies your requirements, please indicate your acceptance below.

☐ Other: _____

_____

****** USER RESPONSE ******

☐ **ACCEPTANCE:** I have reviewed the test results for this project, and accept the project for implementation in the production environment.

☐ **ACCEPTANCE OF ANALYSIS:** I have reviewed the analysis document provided, and it satisfies my request.

☐ **OTHER RESPONSE:** _____

_____

_____

_____

Signed: _____ Date: _____

CC: _____	Other PR #: _____ _____
_____	Other Info: _____
_____	Implementation Date: _____

ISD002-7/1/93

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APPENDIX B

INSTRUMENT

ANGELA D. MATHERNE
1007 Spencer Road
St. Peters, Mo 63376

July 22, 1993

Name
St. John's Mercy Medical Center
615 New Ballas Road
St. Louis, MO 63141

Dear _____,

Thank you for agreeing to evaluate the enclosed project management handbook. The handbook was prepared in partial fulfillment of the requirements for the degree of Master of Business Administration, at Lindenwood College.

After reading the handbook, please complete the enclosed evaluation questionnaire. Your honest critique of the handbook will enable me to make improvements to it, and hopefully will increase its usefulness to St. John's.

I anticipate that it will take approximately two hours to read the handbook and complete the questionnaire. Please return the questionnaire to my office location by August 9, 1993. If you have any questions, please do not hesitate to call me at the telephone numbers listed above.

I appreciate your time and effort in evaluating my project management handbook.

Sincerely,

Angela D. Matherne

Project Management Handbook Evaluation

QUESTIONNAIRE

Name: _____

Section 1: Overall Evaluation

After reading the project management handbook, please answer the following general questions by circling the number of the response which best describes your overall impression.

		Excellent	Good	Average	Mediocre	Poor
1a.	Overall presentation	5	4	3	2	1
1b.	Length of handbook	5	4	3	2	1
1c.	Style of writing	5	4	3	2	1
1d.	Use of language	5	4	3	2	1
1e.	Tables and charts	5	4	3	2	1
1f.	I.S. content	5	4	3	2	1
1g.	Project management content	5	4	3	2	1

1h. Please provide additional comments on your overall impression of the handbook:

_____

_____

_____

Section 2: Use of the Handbook at St. John's

Please respond to the following questions concerning the applicability of the handbook for future use at St. John's.

2a. In your view, how applicable is the handbook for use at St. John's?

_____

_____

_____

_____

2b. How could the handbook be improved to increase its usefulness to St. John's?

_____

_____

_____

_____

2c. In what ways do you think the handbook may be used at St. John's?

_____

_____

_____

_____

Section 3: Critical Evaluation

Please provide a critical evaluation of the handbook content, noting any topics that need to be added, expanded, removed, or corrected. Please attach additional sheets if necessary.

Thank you for taking the time to respond to this questionnaire.

APPENDIX C

GLOSSARY OF TERMS

Application	A system or problem to which a computer is applied.
Base product	Computer programs as supplied by the software vendor, with no modifications.
Minicomputer	An inexpensive computer, simple to install, not requiring a controlled environment.
Mainframe	A term designating medium to large scale computers, generally expensive and requiring a controlled environment.
PC	Personal Computer.
Project	A group of related activities constituting a unit of work, a product, or a user request.
Software	A term used to describe the non-hardware components of the computer, often referred to as programs.

Technical Support	Otherwise known as "Systems Programming," the role of this function is to load and maintain software that allows the computer to operate. This software is often called the "Operating System."

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