

# Project Management for Instructional Design in Higher Education

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An Analysis of the Schreyer Institute  
for Innovation in Learning's  
Problem-based Learning Workshop Development

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## Executive Summary

Project management for instructional design in higher education has been facetiously called an oxymoron and at worst, “Mission: Impossible”. It is demonstrated in this report that it is possible to integrate the two seemingly incongruous concepts of project management with higher education culture and to then meld instructional design methodologies into that combination. The new concept can hold together through the deft skills of a versatile project manager who fluently handles the demands of each of the three elements. The purpose of this report is to bring together the standards for project management endorsed by the American Management Association and apply them to an instructional design process within a higher education setting.

This report, in general, addresses the skills needed by a project manager who is implementing an instructional design process in higher education. In particular, the context of the report is set in the Schreyer Institute for Innovation in Learning at Penn State University and examines their project management process for developing a workshop. At one level, the report is a general guide for project management in higher education. At another level, it is a case study analysis of the Schreyer Institute project team’s project management process. Reading it from either perspective should enlighten and inform, as well as provide practical tools for handling the challenges of melding three imperfect processes together.

The analysis of the Schreyer Institute project management process was conducted by observation of project team meetings, interviews with some project team members, and review of communication documents. The analysis write-up is included within the body of the report following discussion of the accepted standards for project management.

The major sections of the report

**Project Management for Instructional Design.** A review of the rationale for widely accepted practices for managing ID projects and explains the basic principles of project management that underscore the remainder of the report.

**Comparative Analysis of Schreyer Institute.** The heart of the report examines the Schreyer Institute methodology with the standards of the American Management Association. Observations, outcomes, and recommendations for Schreyer Institute are included after the presentation of each of the five-phases of the project management cycle.

**Appendices.** Practical examples and useful tools.

## Summative Analysis

The following points are ascertained from this report:

- Project managers, who effectively use the tools of project management, can handle the challenges of managing an instructional design process within the cultural context of higher education.
- The Schreyer Institute for Innovation in Learning should make some adjustments to their project management process to more effectively and efficiently handle workshop development projects.
- The nature of the challenges for instructional design project management in higher education are inherent in the three concepts being melded together and should be handled thoughtfully to maximize the potential for integrating the differing philosophical perspectives and methodological approaches.

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## Introduction

A comparative analysis of the project management processes used to develop the Problem-based Learning (PBL) Workshop at the Schreyer Institute for Innovation in Learning (Schreyer) at the Pennsylvania State University and the project management processes and models endorsed by the American Management Association (AMACOM) and described in the book, *Project Management: How to Plan and Manage Successful Projects* by Joan Knutson and Ira Bitz.

The analysis was conducted by the author through participation in meetings and from interviews with project team members at the Schreyer Institute's offices. The period of time covered by the analysis was mid-February to April 29, 2000. The total project timeline was January 2000 to May 11, 2000. By some accounts, the project was initiated in December 1999, but actual work did not begin until early February 2000.

## Purpose of this report

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### Vision, mission, goal

The vision of this report is to present an assessment of an ISD project management process in higher education from the perspective of an outside observer or consultant.

The mission is to consolidate and integrate a common model of instructional system design with an accepted business-style project management process and tie-in specific elements of Schreyer's process used to develop the PBL workshop.

The goal is to create a document that could be used as a blueprint for a "new" ISD-project management process that could serve as a guide for future Schreyer workshop development projects.

The following objectives support the goal:

- Explain the underlying principles of project management, the economics of project management, and the role of the ISD consultant on a project management team in a general workplace context.
- Compare current Schreyer project management methods for workshop development with standards and practices accepted by the American Management Association as a type of needs assessment for analyzing project management skills.

- Provide recommended guidelines and suggestions to Schreyer regarding the management of any workshop or instructional design project to increase efficiency, effectiveness or productivity.
- Develop examples, templates, outlines, and project management charts for adoption or modification.

## What this report is not

Following the explanation of the purpose of this document, it is worth clarifying some purposes for which it was not produced. The document was not written as a performance review of the PBL workshop team or the Schreyer Institute, nor was it written to evaluate the PBL workshop.

## Origins of the report

The vision for the document emanated from a project assignment in a graduate course at Penn State University, *Project Management for Instructional Development*. The project was initiated through personal contact with the instructional designer at the Schreyer Institute for Innovation in Learning. The PBL workgroup accepted my proposal to observe their teamwork and analyze their project management process for developing a workshop on the problem-based learning model.

In essence, my role was a consultant hired to observe a project management process and offer recommendations and suggestions for improving efficiency, effectiveness, and productivity. See the Consultant Contract in Appendix C.

## A consultant's role in ISD project management

This section is included for the dual purpose of describing the author's consultant role with respect to the Schreyer workshop development project and as a guide for the Schreyer instructional designer and project team.

The role of the consultant in ISD project management requires a person with 360 degree vision and the ability to handle multiple roles with equal balance. In the higher education setting, the role has two unique components: filters for understanding the economics of and the culture of academia in higher education. See Figure 1, a concept map titled *Consulting Strategies for Instructional Design Project Management in Higher Education*.

The characteristics that are most valued in a project management consultant are professionalism, objectivity, influence, and the ability to effectively play one of four roles (mediator, prescriber, provider, collaborator). Professionalism is the basic ability to do what one says they will do and to do so with integrity, seeking the best interests of their client. Objectivity is reporting both sides of a situation with as little bias as possible when the client must make a decision about a course of action. At times the consultant must take a course of action, then the skill and art of influencing is invaluable for persuading stakeholders. The professionalism characteristic becomes a fulcrum on which the consultant must carefully balance objectivity and influence, particularly when the two are opposing positions. The ability to deftly pick a consultant role and play it well can be seen in the qualities of the four possible roles.

### Four possible consultant roles

**Prescriber.** The consultant gathers information and ideas from clients to define training needs and solutions; recommends actions assuming client will take responsibility for implementing those recommendations; is seen as having an important role as expert.

**Provider.** Consultant is principle source of ideas, opinions, information on methodology and designs; recommends specific actions; is objective, detached, and task-oriented; may or may not stay past the front-end phase to assist during implementation of training.

**Collaborator.** Consultant and client jointly define needs and review solutions. Consultant offers technical expertise and provides ideas and suggestions, but defers to client.

**Mediator.** Consultant helps client identify problems and solutions. Rather than provide expertise, consultant assists clients in creating their own plan of action and contributes to problem solving process on a long-term basis.

### Filters of experience

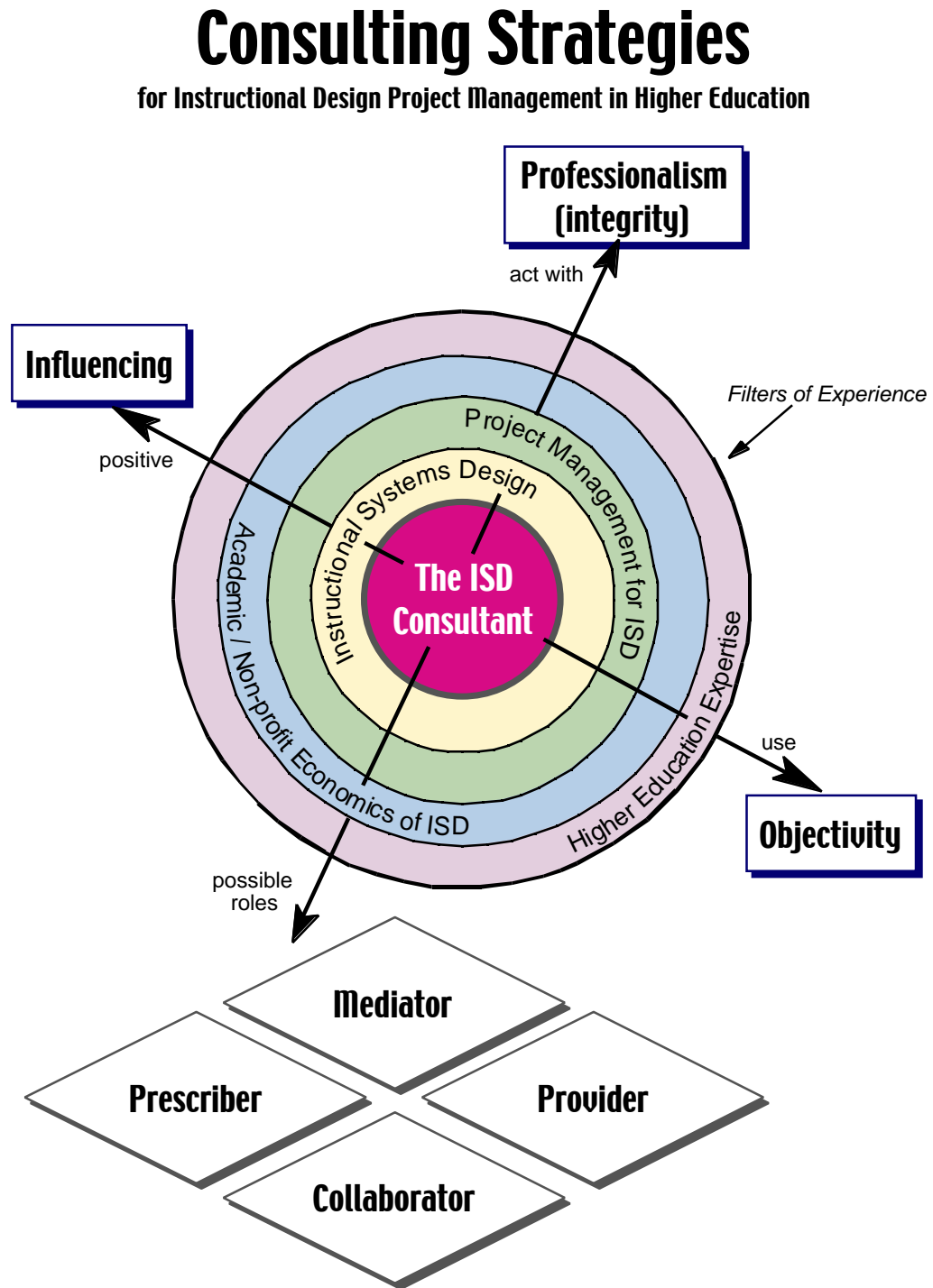
The four characteristics of an ISD project management consultant are further defined, shaped and influenced by four filters through which the consultant sends and

receives communication. The consultant sees and perceives the world through their professional experience in instructional systems design and project management. As shown in the concept map, the filters closest to the consultant are core experiences, the ones that have predominantly defined their professional experience. For that reason, the ISD filter is near the heart of the consultant's approach and the primary basis for their consulting expertise. The next filter is project management through which the consultant organizes the ISD related project. These two innermost filters are generally applicable for projects in any setting. The last two filters help the consultant manage the project within an environment that is not corporate.

### **The challenge of consulting in higher education**

Academic institutions operate within their own cultural setting, somewhat apart from the practices and behaviors of the typical for-profit organization. For example, budget tracking and time accountability in higher education are often overlooked or handled in a laissez faire manner. Also, the nature of instructional design in higher education meets a challenge when faculty are project team members, client, or target audience. One of those three scenarios is highly likely to occur with every consulting project in higher education. The consultant must understand the nuances of the faculty influence on the outcomes of an ISD project. In particular, the consultant should approach long-time faculty (i.e., 20-plus years of experience) with care that they show respect for all the years of classroom teaching while influencing them to see another, potentially valuable and effective, point of view. The innovative methods and concepts of instructional systems design often meet the resistance of educators who have developed a heuristic approach to teaching and have been successful using it again and again.

Figure 1. A concept map of consulting in higher education



# Introduction to Project Management for Instructional Design

## Definition of Project Management

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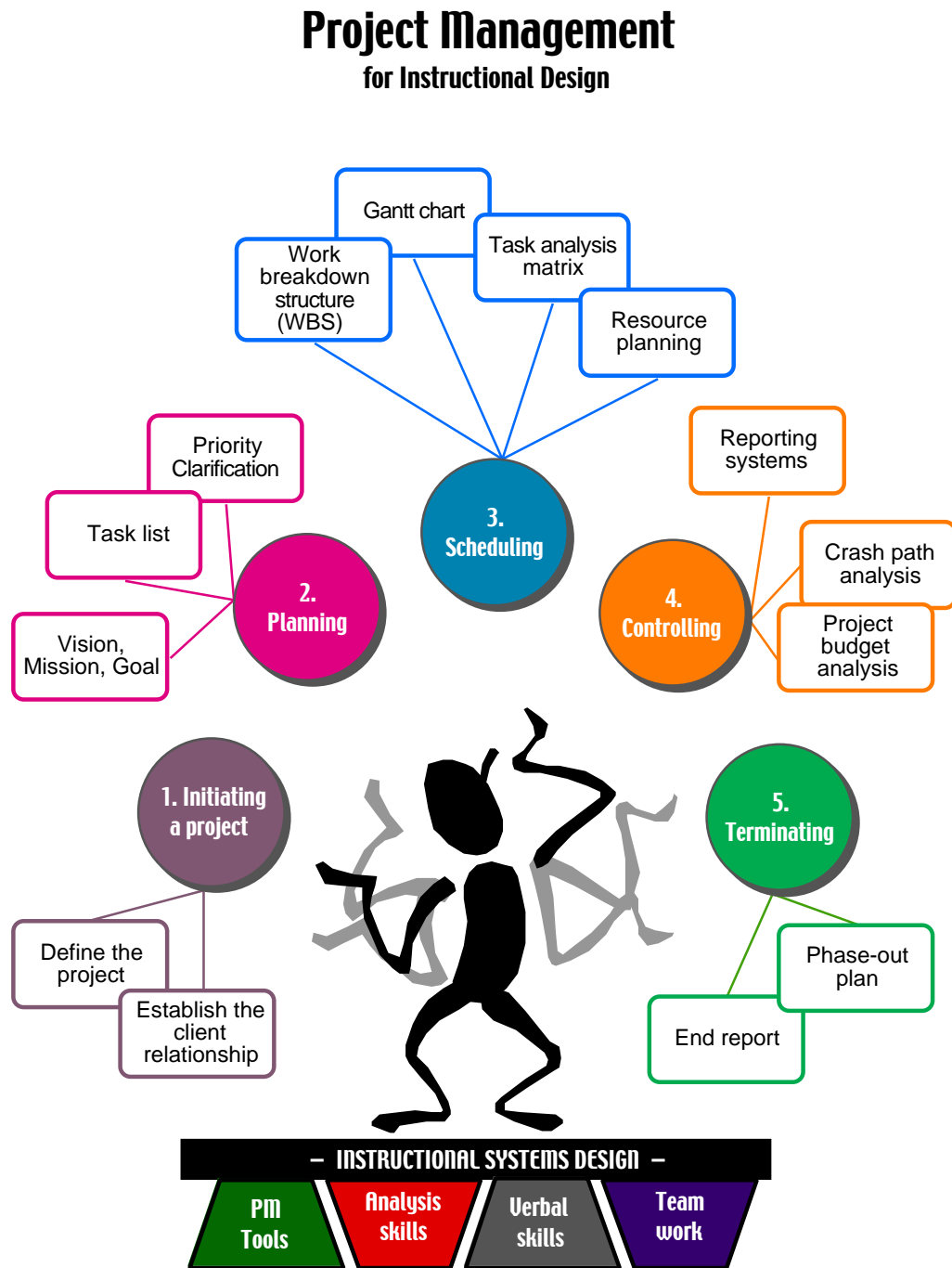
Project management is a term that is frequently used and at times, misunderstood. By definition, project management is the planning, organizing, directing, and controlling of resources for a finite period of time to complete specific goals and objectives. Larry Johnson (1990) succinctly defines project management as, "...coordinating, facilitating and taking responsibility for the successful completion of a project."

The facilitation, responsibility, and control of a project are usually handled by a designated project manager and a project team. The difference between a project and other activities within an organization is that they are temporary. As soon as the project objectives are met, it is dissolved.

Project management is comprised of many models with varying methodologies. It is conceivable that each organization that uses project management implements the process in differently. The instructional design project manager needs to use a model that reflects the dual purpose of their roles. Since project management is, at the core, a problem-solving process, it is natural that an ID project manager must be a skilled in problem solving.

The project manager for instructional design projects must be adept at the art and mastery of juggling multiple responsibilities. (See Figure 2, *Project Management for Instructional Design*). The foundation of the project managers skills support and influence their effort to effectively lead the project team through the process, in effect, keeping the balls in the air at the same time.

Figure 2. Concept map for project management for instructional design



## Benefits of Project Management

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In brief, the goal and ultimate benefit of project management is to effectively bring a project to successful completion. The summary of key points below makes the benefits of project management clear and tangible for the project manager and team.

Four C's of an effective project management plan

- **Clarifies objectives**  
—everyone on the project teams knows where to go and assists in getting there
- **Codifies requirements**  
—everyone on the project team knows what is required of them
- **Contingencies**  
—the project plan and therefore the success of the project, are secured with a backup plan in case of emergencies
- **Commit to paper**  
—the project plan, once committed to paper, becomes the verifiable baseline for marking progress towards to the goal

Six reasons to plan

- Increases probability of achieving goal
- Avoids false starts
- Enables multiple activities to be linked
- Provides a means for project team to share the vision
- Forces consideration of all aspects of the project
- Provides a map of the project

## The challenges of project management in higher education

Initiating project management techniques in higher education is often perceived by both sides of issue as mixing the proverbial oil and water. Initiating instructional design in higher education is similarly perceived. When the two processes are combined and introduced in the higher education culture, challenges to a smooth relationship quickly become very evident. The issues emanate from the clash of two cultures.

Project management is primarily a tool for fiscal responsibility. Higher education is a typically a bastion of freedom to pursue knowledge through scholarly research. Adding fiscal constraints or project control to a process that wants the freedom is challenging for both participants on both sides. Generally, the culture of higher education wants to minimize the exacting fiscal and performance accountability standards that business organizations follow.

Instructional design, by its nature, seeks innovative approaches to improving learning outcomes. Faculty in higher education, who have served long tenures as respected teachers are often hesitant to change their approach to instruction for the benefit of trying a new instructional model.

The ISD consultant in higher education must deftly find the balance of introducing innovative instructional models with respect for faculty expertise in teaching. The two are not incongruous. However, both sides may perceive the same objective with completely different vocabulary and methodology. Similarly, the project manager in higher education must seek balance of fiscal and project control while balancing the faculty's need for academic freedom and desire to "do things the way they have always worked."

## Generalized Project Management Process

There are a few key project management processes and models used in this report. To begin, the project manager must answer a key questions in order to initiate and define a project. A critical part of getting a project off the ground is building the project team. The team's first task is to develop a good project plan, which becomes the foundation for a successful outcome. An extensive process for planning is outlined in the report along with specific techniques for project planning. Change is an inevitable factor that will alter every project plan. There are some typical changes to expect in project baseline schedules, resource allocation, and budgets. Effectively handling change requires the efficient use of project control methods. There is a five-step model for controlling the project. Throughout the process, it is very important to communicate about the project status through reports and reviews. Finally, the project must come to an end.

In summary, the project management process:

- 1. Initiating a Project**
- 2. Building the Project Team**
- 3. Project Planning**
- 4. Project Control**
- 5. Project Termination**

### **Laws of Project Management**

No major project is ever installed on time, within budget, and with the same staff that started it. Yours will not be the first.

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# Schreyer Institute's Problem-based Learning Faculty Development Workshop

The problem-based learning workshop was undertaken by the Schreyer Institute for Innovation in Learning in response to an expressed need from the School of Information Sciences and Technology.

## The Schreyer Institute for Innovation in Learning

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The following information about the Schreyer Institute for Innovation in Learning was derived from published materials and the organization website at <http://www.inov8.engr.psu.edu/>.

### **Background**

Established in 1994 and sponsored by a gift from William A. and Joan L. Schreyer, the Schreyer Institute for Innovation in Learning is an applied research laboratory that seeks more effective ways for students to learn and for instructors to teach. The institute helps faculty and students develop new ideas in instructional design, learning evaluation, classroom configuration, and learning communities.

Approximately 60 percent of the annual budget is available to fund projects and to provide training and consultation services to faculty. The Institute has supported innovation projects by more than 120 Penn State faculty. These faculty represent every academic college and 13 Commonwealth Colleges throughout Pennsylvania. Innovation projects sponsored by the Schreyer Institute have had an impact on the education of more than 10,000 Penn State students, or 20 percent of the student body.

### **Vision Statement**

An academic culture of active and collaborative learning which develops Penn State graduates who are extraordinary problem solvers, problem seekers and life-long learners; prepared to regenerate and sustain their families, communities, businesses and the nation.

### **Mission Statement**

To promote a partnership between students and faculty to design, conduct and engage in problem-focused, problem-framing learning experiences that foster inquiry, initiative and team work.

### **The Role of the Schreyer Institute in Developing New Ways to Learn at Penn State**

A competitive world of speed and novelty requires organizations and people who can anticipate and create the future. In such a world mere adaptation means losing ground. Already the organizations of commerce, manufacturing, health care, and government are re-designing themselves to create the future. Educational institutions too have to re-think and re-design their operations. Penn State must continuously develop new ways to prepare our graduates and maintain our alumni as leaders in this world where the only constant is change.

The Schreyer Institute is a laboratory for experiments that create new classroom environments, new instructional designs, and new motivations to inquire. We promote high risk ventures in learning and teaching. We invent exacting assessment tools to cull promising methods and perspectives. We strive to answer questions like: How can our students learn better, faster, and more efficiently? How can we marry the subject expertise of the faculty with a spirit of innovation and improvement in the classroom? As Penn State's educational research and development agency we engage faculty and students in action research that produces the teaching and learning of the 21st Century.

Designed both to preserve the traditions of the past and foster revolutionary breakthroughs in knowledge, the modern research university has little experience with doing research on its own practices. The Schreyer Institute strives to make such research part of the daily work of Penn State.

### Client Profile: School of Information Sciences and Technology (IST)

The Penn State School of Information Sciences and Technology was founded in 1999 to develop leaders for the emerging eWorld—professionals who put technology to work in any setting, be it business or social service, government or leisure. The school also will deliver information solutions to organizations and individuals through research generated by its students and faculty.

#### **IST Vision**

Penn State's School of Information Sciences and Technology will, through its programs and faculty, help our students and the broader society meet the critical challenges of the Information Age. To do that, the school will:

Be the focal point for offering and coordinating University-wide information sciences and technology activities. It will strengthen programs and collaborative efforts in existing academic units, and help infuse information sciences and technology throughout Penn State.

Open new educational opportunities at all degree levels, as well as minors and certificates. Foster interdisciplinary approaches that will capitalize on the University's strengths at all of its locations. Provide an academic core that stresses analytical and problem-solving abilities, and helps build strong communication, teamwork, and project management skills. Engage in leading-edge research. Conduct outreach programs including distance education and the World Campus. Form strategic partnerships with

industry and government. Work to enhance the economy and the workforce of the Commonwealth.

**IST Faculty Profile**

Penn State's School of Information Sciences and Technology (IST) faculty members participate actively and contribute significantly to the development of this exciting new School and its program. The cross disciplinary IST faculty either hold joint appointments with another academic department or transferred into IST from another program. The disciplines represented by current faculty include: Geography, Management Science, Psychology, Management Sciences and Information Systems, Library Science, and Speech Communication.

## Comparative Analysis of a Project Management Process and the Schreyer Institute Workshop Development Process

This comparative analysis examined the process used by the Schreyer Institute for Innovation in Learning (Schreyer Institute) to develop a problem-based learning (PBL) workshop with a standard project management process endorsed by the American Management Association (AMACOM). Schreyer Institute is an organizational unit at the Pennsylvania State University, University Park, PA.

At a higher level, the analysis compared the management process for instructional design projects in higher education with the methods recommended by AMACOM and described in the book, *Project Management: How to Plan and Manage Successful Projects* (Bitz & Knutson, 1991)

The purpose of a comparative analysis report was to develop a blueprint of project management for Schreyer Institute that presented the organization's work style and process in the context of a widely accepted standard. With this analysis as a guide, Schreyer Institute could assess their own project management practices and make any adoptions or modifications as needed.

The comparative analysis follows the five-step project planning model (initiate the project, build the team, prepare the plan, control the process, terminate the project) described previously in this report.

Data gathered by the author in a consulting role was obtained approximately four weeks after the project initiation and development phases had begun from approximately mid-February to April 21, 2000.

## Step 1: Initiating the Project

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### Create the Project Initiation Documentation

The goal of this first phase of project management, called initiating a project, is to develop a project plan, proposal, or business case. The project plan documents the answers to a set of questions. This process requires a sustained and concentrated effort in order to have a hope of successfully completing the project.

What are the criteria for initiating a project?

B • A • N • C

#### **BUDGET AUTHORITY NEED CYCLE**

Before you spend too much effort working on a project, start by asking the key questions that guard your bottomline and your company's.

- Does the client have the funding (budget) to pay for the job? If not, when?
- Does the client contact person have the authority to approve the project? If not, who does?
- Is there an identifiable need that everyone who matters agrees upon? If not, does the project manager have to help them define one? Can the need be met with the organization's current expertise? If not, let it go until a more opportune time.
- When does the project need to happen? If not now, when...and will the organization be ready at that time?

Who is the project client?

Ideally,

- have one person or a small group led by one person be the project client and be accountable for the project, and
- have that one person be strong enough and dedicated enough to invest the time and energy to fulfill the role successfully.

#### **Profile or characteristics of the client may include:**

- Represents the area that has the greatest vested interest in the outcome
- Funds the project
- Has successfully demonstrated on-time, on-budget project completions
- Politically connected to get all areas in the company to work together
- Highest level decision maker who has the clout to make things happen

- Desires the outcome badly enough to put energy into the project and make it successful
- All of the above

**Run away from:**

- The entire department is the client
- Multiple clients
- Nobody wants to be the client

Questions to ask the client

The remainder of the work to produce the project plan is derived from the answers to a number of questions. Interview the client or designated experts before you continue to develop the project plan.

**Determining the client's objectives:**

- What do you really want?
- When do you need it? Why this timeframe?
- What exclusions are there?
- What's the standard you will use to measure the success of the end product?
- What will be the use(s) of the end product?

**Creating a context for the project:**

- Why do you want the project done?
- Why now?
- What have you tried before? The results?
- What are the risks?
- What do you foresee as the impact of the product on your organization and in the marketplace?
- What will it cost? How much are you willing to spend?
- What are the tangible and intangible benefits to be realized?

Is it really a project?

Three parameters must be met for any work effort to be considered a project:

- A statement describing the end-of-work item to be produced as a result of completing the project (TECHNICAL OBJECTIVE)
- A stated period of performance (TIMELINE WITH DEADLINE)
- A budget (BUDGET)

## What are the overall objectives?

The client must work with the project manager to establish the objectives for the project. Objectives are also loosely known as, scope, technical objectives, statement of work, and/or specifications. Refer to the client's answers to questions asked in the interview.

### Project objectives

The broadest, most inclusive of the terms; it includes the characteristics of the deliverable(s), the target costs at completion, the target due date, and the target resource and asset utilization at completion.

### Technical objectives (scope)

Refers to the subset of the project objectives that addresses the characteristics of the deliverable(s). They contain two parts:

- Specifications—describe the characteristics of the product or service
- Standards—enumerate the governmental, organizational, and institutional norms that must be met

### **WARNING! Why some projects fail**

Unclear project goals.

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## What are the deliverables?

Clearly and concisely define the project requirements and place parameters around the project before the plans are developed. Now that the goal, or technical objectives are agreed upon, you and the client must define the requirements for describing and measuring the deliverable. The requirements serve as the foundation upon which the plan is built.

Requirements for describing and measuring a deliverable

- Quality, performance, and quantity
- Reliability and maintainability
- Capability to survive
- Operability
- Manufacturability
- Flexibility
- Regulatory compliance
- Materials use
- Community relations and corporate image

The project team needs to make sure that all the requirements have been identified prior to submitting a project plan. The result is a better plan that can be more easily implemented and has a better chance at successful completion.

## Preparing the project plan

The goal of the project initiation phase is to produce a project plan or proposal. Here are some suggested topics that are usually included and some that are optional. Your choice for what to include depends on the size of the project, its visibility, and the requirements of the client or management.

### **REQUIRED**

- Problem/opportunity statement
- Scope definition
- Completion criteria

### **OPTIONAL**

- Assumptions
- Impact statement and interfaces
- Risks
- Resource requirements
- Constraints

## Determining the economics of an instructional design project

Another parameter to explore when initiating a project is the determine if the benefits of developing and implementing an instructional design project is worth the costs. The answer may help the client change the scope, choose an alternative, or abandon the project altogether. An effective tool for the project manager to use is cost/benefit analysis. In this early phase of project management, cost/benefit analysis can be considered a type of needs assessment. When cost/benefit analysis is used in the controlling phase of project management, it becomes a tool for assessing and controlling costs.

See Figure 1-1, “*Economics of Instructional Design*” concept map

The project manager for an instructional design project is accountable for the outcomes of projects. Once the project is well-defined, it is time to answer a few questions.

- What are the objectives? Who is the target audience? What is the defined need?
- How will I know if my design process is on target? How will I evaluate the success of the project?
- *How much will it cost? What alternatives do I have? Which is the most cost effective?*

It is the last line of questions that the concept map (Figure 1-1) follows. The answers are found in a methodology called cost/benefit analysis.

### **Laws of Project Management**

One advantage of fuzzy project objectives is they let you avoid the embarrassment of estimating the corresponding costs.

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## Cost/benefit analysis

Cost/benefit analysis allows the project manager to:

- justify current training programs or systems
- gain a better understanding (control) over a training system
- determine ways to reduce training expense and therefore increase efficiency
- improve effectiveness by improving training results evaluate alternative payoffs of training to meet specified objectives

Cost/benefit analysis is the heart of an economic assessment of training choices. The five-step process assesses the relationship between results (outcomes) and the costs required producing them. Ultimately, you want to balance the training costs with training results. The final product of the cost/benefit analysis is data that can be used for analysis of tasks, goals, and needs, as well as feeding into the formative and summative evaluations.

### **Step 1. Formulate questions and define the problem**

Begin the cost/benefit analysis with general questions that focus on the important dimensions and variables. Determine the financial objective of the training. If improved efficiency, then it is necessary to lower costs and obtain the same results. If improved effectiveness, then it is necessary to get better results with the same costs. If improved productivity, then it is necessary to meet the challenge of achieving better results and lowered costs. (Improved productivity = doing more with less). When step 1 is completed the definitive parameters that will guide further analysis are set.

### **Step 2. Develop a model and assumptions**

There are four common models to choose. Each will help represent relationships between concepts of various costs and their results. The model helps explain to others how the chosen process will lead to successful results. Communication is the key to successful project management. Models guide project managers through an often-complex process of completing a project. In simple form, a model is a graphical or mathematical representation of the relationship of the variables for relevant costs and outcomes. An important phenomena to recognize when working with models is the *law of diminishing returns*, which states that at some point, all efforts to improve training will take too many resources to produce even a small improvement. Once a model is chosen (four are described here) collect the relevant data to plug into it.

— The **resource requirement model** provides a framework for analyzing the training costs associated with different tactics or delivery options. It lets you systematically identify costs related to each aspect of the training process (ADDIE) by four major categories of resources: personnel, equipment, facilities, and materials. This model only involves training costs and can only be used to make comparisons about efficiency—not effectiveness.

— The **life cycle model** takes into account the entire life cycle of a training system. Represented by a curve that depicts training costs (y-axis) related to the phases of training cycle (x-axis) over time (R&D, startup, operational period, and

transition period). The good thing about the life cycle model is that it can be used to evaluate the costs associated with each of the four phases to determine if a particular training program design will result in a net cost savings.

— The **benefits model** is useful for determining the effectiveness of the training. A benefits analysis must link the attributes of a training program with the major goals of the program. Training outcomes lead to operational outcomes, which if they are positive, are considered benefits. The model identifies the relative importance of each training option in terms of its payoff in outcomes.

— The **productivity model** measures both effectiveness and efficiency because it allows examination of the different cost/benefit functions for a particular training situation. It takes a macroscopic view of improving results by allowing assessment of the summative effective of a set of parameters.

Of course, if none of these models is adequate for the organization or project needs, make up an ad hoc model.

### **Step 3. Collect data**

Cost/benefit analysis is dependent on the data to use with the model. The data may be quantitative or qualitative. Ways to collect data: questionnaires, interview, observation, financial documents, government, literature. Consider this step to be ongoing and continual for the duration of the project.

### **Step 4. Compute the costs and benefits**

With data and a model, the real work begins. In this step, try to get a result that shows a cost reduction, cost avoidance or value-added benefit. Another concept that emerges in this step is *Return on Investment (ROI)*, which is the ratio of what something returns (value) to what it costs.

- A **value-added benefit** indicates how to get more out of the current system
- A **cost reduction** is a means of reducing costs
- A **cost avoidance** is a way of not incurring certain future costs

### **Step 5. Use the results**

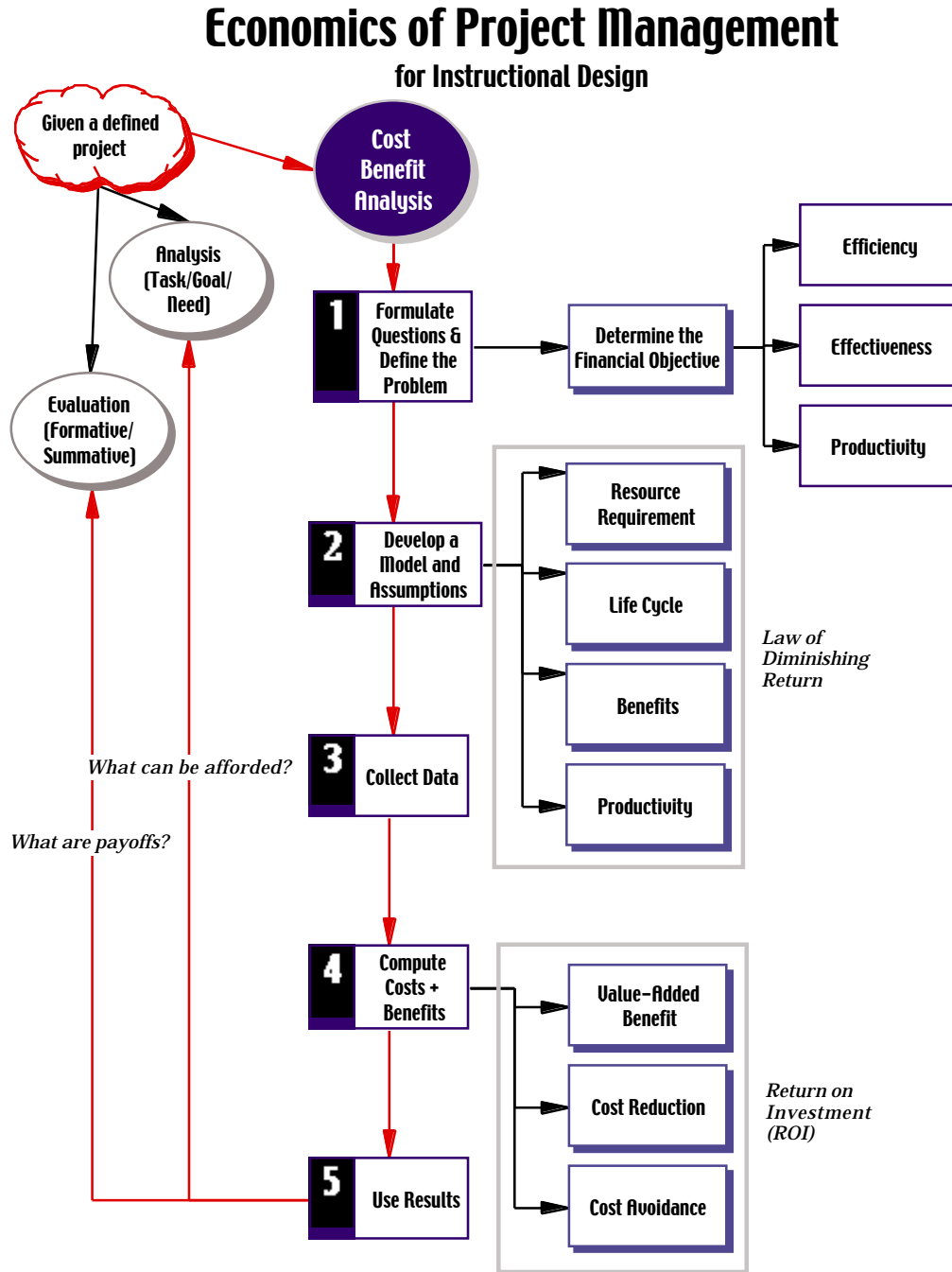
Put these hard-earned computational analysis results to good work by using them to persuade someone or to justify something in support of a program. Prepare a report that explains:

- what can be afforded in preparing a training system or
- what the payoffs are in terms of expected results for the training system.

The report may include background, model of assumptions, methodology, results, conclusions, and recommendations.

*Note:* This concept map and corresponding explanation are simplified for the purpose of illustrating the key attributes of an analysis of the economics of instructional design. Use it as a basis for developing a more comprehensive analysis method.

Figure 1-1. Economics of project management for instructional design



### Efficiency, Effectiveness, Productivity

Under normal circumstances, the project manager wants to get the most results for the least costs. Unfortunately, in the real world, everything costs something. In order to get better results in project development, the related costs must increase. The table below graphically shows the relationship of efficiency, effectiveness, and productivity and describes how to balance costs and results:

<i>To get...</i>		
<b>improved efficiency</b>	<b>improved effectiveness</b>	<b>improved productivity</b>
Achieve the same results with fewer costs	Achieve better results with the same costs	Achieve better results with fewer costs [doing more with less = the promise of technology]
<i>Do this...</i>		
Reduce training expense or trim budget	Improve training results	Cut training costs and produce better results

The difference between cost effectiveness and cost efficiency is that for cost effectiveness the outcomes must improve, however to demonstrate cost efficiency the expenditures must be reduced.

***Improved productivity = doing more with less***

### Laws of Project Management

A carelessly planned project will take three times longer to complete than expected. A carefully planned project will only take twice as long.

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## ■ ANALYSIS OF SCHREYER INSTITUTE

### Step 1: Initiating the Project

The author began this consulting analysis project mid-February 2000, after the Schreyer Institute PBL workshop development team had initiated the project. The analysis for this step is written from interviews conducted with project team members.

#### Create the project initiation document

A formal project initiation document was not produced. The client, IST, approached Schreyer Institute to develop a workshop in December 1999. (A working relationship between the two groups had been established since the inception of the IST department, about two years ago.) Through a sequence of meetings and e-mail exchanges, the project's basic goal had been established: create a workshop for Penn State faculty in Information Sciences and Technology (IST) about how to develop course projects (or curriculum) using the problem-based learning model.

Three criteria for initiating the project (authority, need, cycle) were met to a satisfactory degree, that is, IST the client, had a need for a workshop to happen by a set date. The fourth criteria, budget, was not addressed, and all financial responsibility for developing the workshop was assumed by Schreyer Institute in accordance with their mission statement and operating procedure.

The project was accepted by Schreyer Institute in accordance with the organization's goal which, in summary, is to develop greater meaning in learning environments by moving instruction and assessment towards higher order thinking skills, having students take more responsibility for their learning, and assisting faculty with adjusting to a problem-based learning model.

#### ■ Outcome analysis

The project was appropriately defined by a deadline, the workshop presentation date, which helped to establish the other milestone dates on the planning schedule. A budget or other cost considerations were not an integral part of defining this project, which is not unusual for Schreyer Institute or many other organizations or business units in higher education. The benefit of no budgetary constraints meant the project team could devote human resources to crafting a quality end-product.

#### ■ Recommendations

- Make a project initiation document to begin each project and distribute it to all project team members and the client. It will become the measure of the project's success at the end.

- Review the project initiation document periodically to update the technical objectives, scope, or client profile to better reflect new insights gained from the development process.

### Establish client profile

Through the evolution of an established working relationship the project was requested by IST and accepted by Schreyer Institute, in accordance with both organizations' mission statements. IST, the organization was the established client. The dean of IST felt there was a need to train IST faculty in problem-based learning theory. An IST faculty member, Dr. Steve Sawyer, was appointed as consultant to the Schreyer Institute project team. His role was to review materials and workshop activity ideas, as well as monitor content for IST relevant subject matter.

### ■ Outcome analysis

A detailed audience analysis which included faculty profiles, academic and professional background experience, and teaching styles would have improved the development process. The project team relied upon their own heuristic understanding of the client and a needs assessment survey which was sent to the IST faculty in the early development phase. Heuristic profiling methodology is best used in conjunction with and in support of a more formal needs assessment. As described, the dean of IST *felt* there was a need for the IST faculty to learn and then use problem-based learning theory. It would have been significantly more helpful for developing specific learning targets if the real needs of the faculty had been assessed.

As stated in the business standards, an organization as the client was not as helpful to the project team as an actively participant client would have been, particularly in determining parameters for the workshop agenda and activities. Nevertheless, the selected client contact was helpful for reviewing activities, suggesting other colleagues for feedback, and providing recommendations.

A key point to consider is that the project manager must be in close contact and communication with the client regarding everything that occurs with project management. Responsibility *with* authority to make decisions increases the chances for successful outcomes for the project. A problem arose in the early planning phases, when this principle was not closely followed. The self-designated project manager (not the staff member assigned to be PM) did not have the necessary information or lacked the broad perspective to understand the complete concept for managing the PBL workshop project. As a result, that person eventually realized this problem and then appropriately released control to the person that was originally assigned to be the project manager. Until the time the assigned PM gained a more complete handle on communicating with the client and making project management decisions, the PM's authority had been undermined by the well-meaning, but harmful intervention of the self-designated PM.

### ■ Recommendations

- Conduct a needs analysis of the client in order to tailor the workshop tone, style, and learning objectives to meet the real client's needs.
- Write an objective client profile rather than rely only on an informal understanding of their style and learning characteristics.

- Give control of client communications to the project manager along with responsibility for keeping all team members informed and authority for making decisions on behalf of the team with the client.

### Establish project goals and objectives

The project had been defined according to two of three parameters that define a project; a technical objective had been developed and a timeline with a deadline had been established. A budget was not developed.

The project objectives were originally stated in general terms, for example, a two day workshop to assist IST faculty with incorporating problem-based learning in all IST courses. One objective that had been discussed in the initial phases of project design was to model PBL objectives in the workshop activities. Another objective, in summary, was to encourage IST faculty to adopt problem-based learning in order to meet the IST dean's goals.

A more specific set of project objectives and technical (scope) objectives may exist in historical files, however this author did not see them nor perceive that anyone on the project team was working from them.

### ■ Outcome analysis

The major drawback of starting the planning without a well-defined project plan was that a *clear* technical objective and *scope* describing the workshop had not been developed. Often the project team would struggle to understand the purpose of proposed workshop activities and the rationale for choosing a certain sequence of activities. The result was the development of an inordinate number of preliminary ideas that needed to be either revised or abandoned. This type of uncertainty in development led to misdirected work effort and, seemingly, frustration for the staff.

A clearly defined technical objective and scope should have been the measure for all proposed learning targets and activities and would have better guided the process of development. The majority of the meetings the author attended would have profited from having a copy of the technical objectives posted on the wall. Much of the wrangling-style discussion would have been unnecessary or minimized by regularly reviewing the established objectives, thus leading to more productive meetings.

Evolving project goals are confusing to team members, like boundary lines that shift during a basketball game. During meetings, the author observed that team members were often searching for the parameters that defined the proposed activities or were frustrated in their efforts to understand which objectives were being addressed.

### ■ Recommendations

- Define clear technical objectives and scope at the beginning of the project initiation phase to provide a guiding light for developing activities and determining if activities meet the established requirements.
- Get approval from the client for the technical objectives (and the whole project initiation document).
- Post the technical objectives in a place where staff can frequently review them and make the objectives a regular part of all project team meetings.

## Establish deliverables

It was clearly established that a workshop on problem-based learning would be the deliverable product and service. However, the parameters for describing and measuring the workshop were not firmly established at the onset of project planning, rather they evolved and changed as the planning process went along. The assessment coordinator was assigned responsibility for measuring the workshop outcomes.

The problem-based learning workshop format was originally designed to be a two-day event scheduled for July. This workshop was intended to be the introductory workshop of a four-part series about PBL. The following three would cover topics such as, writing, facilitation, faculty role, and assessment techniques for problem-based learning. By the beginning of March, the second month of project planning, the workshop had become a one day event scheduled for May 11, 2000. Development progressed on the introductory workshop without strong consideration for how the design of the first workshop would meld with or match the objectives of any future PBL workshops.

### ■ Outcome analysis

A well written project initiation document would have explicitly stated what the workshop would look like when complete. These specifications of quality, character, tone, format, and schedule could have been a strong guide for focusing the team's energy on the development tasks. As it was, the project team was regularly altering format and schedule, and seemed to the author, to be unfocused about the level of quality or tone the workshop should adopt. The most significant impact was that the team shifted back and forth on the design of certain activities.

A complete project initiation document would have become a guide for assessing the overall outcomes of the project plan and the workshop, particularly quality of the deliverable, client satisfaction, and project team performance. Assessing the outcomes was considered a valuable effort from reading the Schreyer Institute vision and mission statements.

### ■ Recommendations

- Define the end product that will be delivered to the client.
- Seek client approval and sign-off before developing content.
- Use the description of the deliverable as a measure for assessing the final workshop.
- Follow the adopted guidelines in the vision and mission statements for how Schreyer Institute should conduct itself and the project team will have no problem justifying the time it takes to properly initiate a project.

### ***Why projects succeed!***

*Project manager, management, team, and client all agree on specific, realistic project goals.*

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## Step 2: Building the Project Team

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Building the project team is a primary and critical task. If team members cannot be chosen, such is the case with most small organizations, then the role of the project manager focuses on obtaining their commitment and supporting their performance. If choices can be made, then there are a variety of objective or technical criteria to use selecting team members: Perceived technical ability, estimating proficiency, project management skills, experience as a task leader on other projects, and attitude toward this project.

What to look for in prospective team members:

- Would I want this person working for me?
- Would I want this person as one of my peers?
- Would I want to work for this person?

Two tools can help organize the project team and guide task assignments: the skills inventory matrix and the responsibility matrix.

### Skills Inventory Matrix

Every project requires a plethora of skills that need to be matched to appropriate tasks. At the start of the project, it is important that the project manager fit people, skills, and tasks together. As the project progresses, it may be necessary to split assignments, add staff, or trade assignments.

### Responsibility Matrix

Now that the project team's skill set are listed in the skills inventory matrix, consider who on the team is most qualified to perform each task. Develop a responsibility matrix as shown in Appendix F. The matrix is a means for obtaining individual commitment, or buy-in, and for graphically depicting that responsibility. It is helpful to designate the person with prime responsibility (P) and those having supporting responsibility (S). Each task only requires one prime, but several supporting team members may be assigned. See Figure 2-2.

**Tips for preparing a responsibility matrix:**

- Assign staff because they have the correct skills, not the most time.
- Do not assign too many people to one task.
- Ask team members for buy-in: don't "tell".
- Consider who is good at what, who wants to do what, who can or cannot work together, and who likes to create versus maintain.
- From the perspective of the project, consider what skills are needed, what skills are available, and, if someone could not complete a task, whether that responsibility could be redistributed.

## Build a Strong Project Team

A strong, cooperative team is the nucleus of a successful project. The project manager gives the team technical guidance, management expertise, and a significant intangible—enthusiasm and support.

### **Establish a formal leader**

One person, the project manager, must be the only person running the project. *Formal* means that person has been officially designated the captain with responsibility and authority to execute the duties of the position.

### **Build and maintain team spirit**

As the project manager goes, so goes the team. If the project manager becomes apathetic, the team will follow. Part of team leadership is maintaining a balance of emotion and professionalism. Encourage and build the morale of other team members. Communicate clearly and appropriately, don't sabotage anyone's ego or embarrass them publicly. Negative developments do not need to be shared with the team, if it does not affect a team member's ability to perform the job successfully. On the other side, if you can play the role of cheerleader, do it, but don't pretend.

Develop a team focused attitude, where thinking of the concerns of the team is foremost and becomes a natural way to approach issues. Trust in the team's collective effectiveness. Seek consensus, but be prepared to make a final decision if no agreement can be met. Place value on the team by building team cohesion, speak in the sense of the collective "we", show and encourage mutual trust and confidence in the team members' integrity, loyalty, and character.

### **Build a team communication plan**

The project manager should define the goals for team communication during the early stage of the team's formation and determine the forms of communication that will be used with each person on the team: meetings (group and/or individual), telephone calls, written status reports, electronic mail, or some combination of these. When using written communication, define the content, level of detail, and format for the reports. If using meetings, devise a strategy that identifies who will attend, how often meetings will be held and where, when they will be scheduled, and who will be responsible for agendas, minutes, and other logistics. Whether formal or informal, consider the frequency of communication.

The key communication skill for the project manager (and everyone else) is listening. The power of not speaking and paying attention to what someone else says cannot be overestimated. Proper listening leads to a few important outcomes for the project: increased productivity and quality of work, improved job satisfaction, and a clearer sense of roles and expectations.

### **WARNING! Why some projects fail**

Inadequate project manager administrative skills.

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Active listening is:

**Verbal behaviors**

- Ask questions
- Paraphrase
- Summarize at certain intervals
- Ask the speaker for examples
- Ascertain the speaker's feelings

**Non-verbal behaviors**

- Make eye contact
- Be expressive
- Move closer to the speaker
- Listen for the intent of the speaker

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***Teamwork is vital for success.***

*Marion T. Haynes*  
Project Management From  
Idea to Implementation

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### **The Project Manager's Authority**

It is a major concern of anyone with a high-degree of responsibility to manage the project management process and deliver a high-quality end product or service, particularly with a limited authority to manage team members and other resources. How does the project manager acquire authority?

#### INFORMAL

- experience/knowledge authority
- personality-based authority
- authority by association
- credibility authority

#### FORMAL

- direct line authority
- financial authority
- performance appraisal review authority
- job title or position
- mandated authority

### **WARNING! Why some projects fail**

Inadequate project manager authority.

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## ■ ANALYSIS OF SCHREYER

### Step 2: Building the Project Team

The Schreyer Institute is a small organization of seven full- and part-time staff. It is a flat organization in which little overlap of job responsibility occurs. Like in every project at Schreyer Institute, the project team for the problem-based learning workshop was a default selection of the staff, which comprised a director, assistant director, instructional designer, assessment coordinator, and administrative assistant.

Perhaps due to the high profile nature of this particular workshop, the team had expanded beyond the normal contingent to include active participation by the director.

In the early project planning phase the Schreyer Institute project team formed because of their normal job responsibilities. As stated in the previous section, the project had not been properly initiated and now in step 2, the responsibilities had also not been officially established.

#### ■ Recommendations

- It would have served the project team better to have established clear roles and responsibilities before actual work began.
- “Build” (or renew) the project team for each new project, perhaps with a kickoff event that helps set the tone and tempo.
- Give opportunities for staff members to assume new roles and responsibilities on projects, which may help boost morale.

Establish a formal leader

#### ■ Outcome analysis

At times, it appeared to the author, that the project team was not “rowing in the same direction and disagreed on a course of navigation.” A few weeks after the author’s observation period began, the team began to perform in more coordinated fashion and with a noticeable boost in morale. The increase in morale was then evident over a period of one month through activities such as:

- improved team member’s participation in meetings
- defined meeting agendas with objectives
- increased level of comfort with discussion on points of disagreement

#### ■ Recommendations

- Develop a skills inventory and responsibility matrix, include any new skills learned since the previous project or skills that will be developed with the next project.

- Make the designation of project manager a formal step before designating or assuming roles and responsibilities. Seek buy-in from all team members.
- Introduce project manager to client (step 1) if that has not already been completed.

Build and maintain team spirit and build a team communication plan

The communication plan seemed, for the most part, to be the standard operation mode for Schreyer Institute; e-mail, stand-up meetings, and formal team meetings. Because of the complex nature of the PBL workshop planning, additional elements of communication were introduced, such as establishing a meeting schedule for weeks at a time, setting agendas, and assigning responsibilities for agenda items. Each team member's behavior affects how well the overall team communication works. For example, during meetings, proper active listening behaviors were not consistently used by everyone and at times, not used at all by different team members. The most missed behaviors were making eye contact, listening for the intent of the speaker, and paraphrasing. The most used behaviors were asking questions, asking for examples, and summarizing.

#### ■ Outcome analysis

Team members comprise the majority of the staff at Schreyer Institute. Therefore, the team spirit cannot be differentiated from the overall spirit of the Schreyer Institute itself or from previously established working relationships. What ever team spirit prevailed in the workplace, in general, transferred to the project team. Looking at three overlapping segments of the Schreyer Institute workforce, it seems to the author, that team spirit was higher for members who were within one reporting level of each other. One possible reason is because of already established working relationships and effective collaboration between those members. For example, workforce segments include, director and assistant director; assistant director and staff, and between staff members.

The communication plan worked well enough to move the project through the phases of planning and to keep the staff informed adequately enough to function. Team meetings were scheduled in advance on a regular basis. Despite the reduced level of active listening behaviors displayed, the meetings were productive; agenda items were presented, discussed, and decisions made. Appropriate time was allotted for each meeting and as well as accommodations made for schedule conflicts.

#### ■ Recommendations

- Once the project manager is assigned, the team communication plan should be developed with specific emphasis on establishing expectations for team member participation in the communication process and for team meetings.
- Project manager should continue to set the standard for team conduct, in tone, communication, and collaborative behaviors.
- To raise the level of team spirit, increase the quality of collaboration between segments of the Schreyer Institute staff that are more than one reporting level apart.
- Increase active listening behaviors to a consistent and higher level.

## Project manager's authority

### ■ Outcome analysis

A project manager's authority should be balanced between formal (mandated or assigned and by position) and the informal criteria, credibility. Credibility and its counterpart, respect are attributes assigned to the project manager by the project team members.

### ■ Recommendations

- Authority must be formally assigned by a senior manager to the project manager, if not mandated by the person's title, or established by their job function.
- The project manager should not assume authority by position or title alone, rather authority must be formally given and informally earned.
- At the beginning of each project, establish the project manager's authority and rationale for it, if the authority is not already accepted by all the team members.
- Authority given to the project manager must be complete and respected by all members of the project team in order to facilitate the project manager's ability to effectively execute the responsibilities of the position.

### **WARNING! Why some projects fail**

Inadequate project manager human skills.

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## Step 3: Project Planning

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An integrated project plan facilitates communication between the project manager, the project team, senior managers, and any coordinators. It is a primary tool for effective coordination of project work. The objectives of the project plan are to:

- Determine and portray the scope of effort required to fulfill the project objectives
- Identify all personnel responsible for performance of work on the project
- Schedule the required work (tasks) and establish a timetable
- Indicate the human resources and capital assets necessary for each task
- Determine the budget for each component of the work task or group of tasks.

Project planning is a disciplined process supporting the coordination and direction of resources such as time, people, and dollars to achieve product and project parameters established by management. (Knutson & Bitz, p. 37)

### Questions to ask during project planning

- What (technical objectives): What is to be accomplished? Examine the technical objectives with the project team and clarify priorities. What are the most important elements? Time? Target? Budget?
- How (work breakdown structure): How is the project to be accomplished? Use the work breakdown structure or task list as a checklist of tasks that must be performed.
- Who (resource commitment and utilization plan): Who will perform the work? Using the responsibility matrix, integrate personnel committed to the project into the work breakdown structure.
- When (schedule): When will the tasks be completed? As the project manager progresses into the planning process, the questions of how long each element of work will take, when it will be performed, and what resources and assets will be used in its performance are addressed. Create a rough outline of major milestone dates.
- How much (budget): How much will it cost to perform the project?

## Benefits of an integrated project plan

- Effective communication
- A final check for ensuring project objectives are attainable
- Establishes the scope and a level of responsibility for all team members
- Serves as a basis (baseline) for analyzing, negotiating, and recording scope changes and commitments of time, personnel, and dollars to the project.
- Minimizes need for narrative reporting. Comparisons of the plan against actuals can be made graphically.
- Becomes a useful record of critical project data that can be used in planning future projects.

## The Five-Step Planning Model

An integrated project plan maximizes the probability of achieving project objectives through five major work steps:

1. Define the project
2. Model the project
3. Estimate and schedule the project
4. Balance the plan
5. Approve and publish the plan

### 1. Define the Project

There is some overlap between the start of planning and the process of developing and approving the project objectives. Early in the planning process, the project goals and objectives will have been thoroughly reviewed and approved by management.

Remember, **a project is a planned work activity, with an objective(s), to be accomplished to specifications, within a stated time frame, which will consume resources.**

The key outcome of this step is the goal statement and statement of work or technical objectives. To complete this step, the project manager should answer the following questions:

- What is the goal of the project?
- What does my customer/client want and need?

## 2. Model the Project

Modeling focuses on developing a simulation of the effort required to achieve the project objectives. The model produces two deliverables: the work breakdown structure (WBS), which determines all the work efforts required to bring the project to a successful completion, and the network chart, which shows the sequence in which the tasks should be performed.

### **Work breakdown structure**

The work breakdown structure (WBS) is a checklist of every activity that must be performed to create the end product. The WBS checklist becomes the foundation for the schedule, resource allocation, and budget plans.

An effective method for creating a WBS is a group session with the project team. It is also possible to obtain the data for a WBS using questionnaires or one-to-one personal interviews. The key question the project team needs to answer is:

### ***What major work assignments must be accomplished to complete this project?***

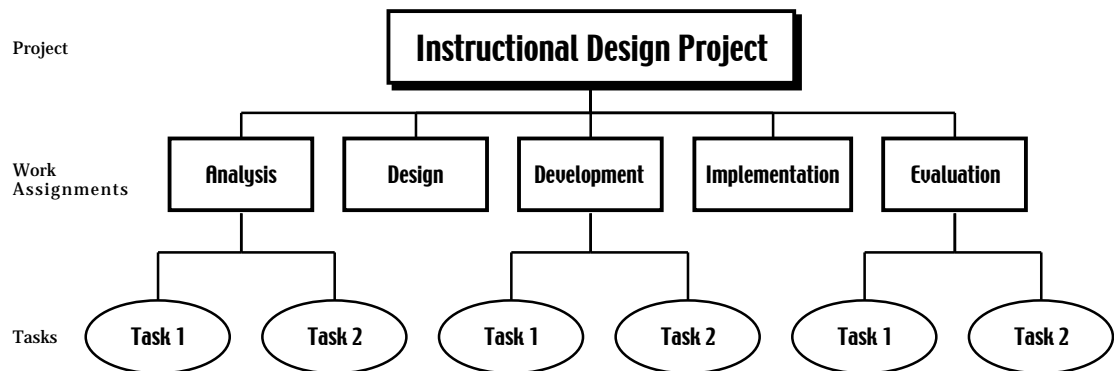
The major work assignments should be the significant chunks of work necessary to see the project through from start to finish. For example, in an instructional design project, the major work assignments would evolve from the particular ISD model used (ADDIE). Figure 3-1 shows the basic framework for a WBS using the ADDIE model for instructional systems design. The framework illustrated is a conceptual representation of the relationships of major work assignments to their corresponding tasks and subtasks. The WBS in its simplest form is a list of all these elements. Project management software, like Microsoft Project, make it easy to build a task list and then edit the hierarchy as the WBS takes shape. See Appendix F for a sample work breakdown structure task list.

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***The project WBS is the heart...the framework on which the project is built.***

*S.E. Stephanou, M.M. Obradovitch*  
Project Management, System  
Development, and Productivity

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**Figure 3-1.** Work breakdown structure tree chart for a sample ADDIE project**Sample categories for major work assignments**

- *Components of the product:* internal, external, peripherals
- *Functions:* word processing, calculations, filing
- *Organizational units:* units, departments, branches
- *Geographical areas:* states, regions, cities
- *Cost accounts:* accounts assigned to parts of the project
- *Time phases:* initiation, design, development (ADDIE)
- *Phases:* marketing, design, construction, training, financing

Break down the work efforts until the person responsible for the area can make reliable effort estimates (the amount of effort time needed to accomplish the work task). The lowest level of detail that can be defined for a work task produces a deliverable (an end product of the effort). This deliverable can be measured and quality assured.

How does the project manager know when the WBS is complete and accurate? By giving a yes answer to the following questions:

- Is it broken down to the level of detail that guarantees control to the project manager?
- Do the work efforts at the lowest level begin with an active verb?
- Does each activity result in a deliverable and have some accountable for completing the activity on time, within budget, and of the quality acceptable?

**Project network chart**

The WBS defines the tasks logically; then the network organizes them sequentially and gives a method for displaying the flow of the project, determining the relationships among the many tasks, and identifying the critical path. A network chart, also called a

PERT (Program Evaluation and Review Technique) chart, is a network of nodes (tasks) connected by arrows (representing dependencies). Project management software, like Microsoft Project, will automatically make a PERT chart from the WBS (task list) data. Figure 3-2 shows a sample network chart.

The arrangement of nodes and arrows illustrates:

- flow of work toward project completion
- dependent relationships between tasks
- parallel tasks

Dependent relationships are established when one or more tasks must be completed before another begins. A task that must be completed first is called a predecessor to the task that follows. Some tasks must be done in sequential order while others can be going on simultaneously (parallel tasks).

Once all tasks in a project have been charted in the network, it is easier to calculate:

- realistic time estimates for milestones and project end date
- critical path route
- amount and location of slack time
- impact of schedule slippage
- impact of planning changes

### ***Why projects succeed!***

*The project manager is committed to established schedules.*

---

### 3. Estimate and Schedule the Project

- What resources do I have to accomplish my goal and how can I best use them?
- When will the performance of these tasks occur? How much extra time will I have between tasks?
- How will I know if I'm on schedule?
- What milestones or markers can I use to make sure progress is steady?
- How do I monitor the progress of the work being done?

Estimating and scheduling focus on determining the duration, required level of funding, and required level of resources for the project. Approaches to estimating are the “art” of project management and involve personal preferences. In essence, it is about making an educated guess of the amount of effort required to perform a task and how long it will take.

Although there is a seven-step process for estimating (see Knutson & Bitz, p. 41), the most relevant aspect is developing the task estimates. One approach is to ask the project team members who are responsible for performing the work. Team member's estimates should include the amount of time necessary to perform the task; the amount of calendar time or elapsed workdays necessary to complete the work tasks; capital assets by unit of measure to perform the task; and direct costs by category to perform the task.

#### **Estimating time allocations**

To establish reasonable time frames and raise the accuracy for each task estimate, follow these guidelines:

- Keep detailed records on each project so that experience becomes a teacher.
- Consult with an expert in the field, project team members, and cooperating departments.
- Use the weighted average technique

#### **The weighted average technique**

$T_e$  = Estimated time.

a = Most optimistic time to complete a task. (No Murphy's Law effect; everything will go exactly as planned, which happens about 5% of the time.

b = Most pessimistic time to complete a task. (Assume Murphy was an optimist: Nothing will go as planned and disaster is the watchword for the project. This happens about 5% of the time.

m = Most likely time to complete task. Time after time experience has shown that this is how long one can expect the task to take.

$$\mathbf{T_e = (a + (4m) + b) / 6}$$

**Gantt chart**

A Gantt chart is another visual display of the flow of the project, most notably, the sequence of tasks over time (scheduling). The Gantt chart is drawn on a matrix with the duration along the top horizontal axis and the tasks listed down the left vertical axis. Bars represent blocks of time scheduled for tasks to occur. Arrows indicate dependencies between tasks. Project management software, like Microsoft Project, automatically create Gantt charts from the WBS (task list). Figure 3-3, shows a typical Gantt chart developed by Microsoft Project. See Appendix F, for a complete Gantt chart sample.

**Critical path analysis**

The critical path is the longest sequential series of tasks leading from the start to the end of the project. To ensure ontime completion of the project, special attention must be paid to the resources and efforts on those tasks that will have the greatest impact on the end date of the project. Locating the critical path is necessary to identify these “critical” tasks.

When tasks are displayed sequentially in a network chart (PERT), the various sequences of tasks from pathways through the network. The longest path (that is the one that would take the most time to complete) is the critical path. This path is critical because each subsequent task depends on its predecessors being completed on time. In brief, the critical path contains no slack time. For that reason, if any task on this path slips and the lost time is not regained, the end date for the project will slip by an equal amount of time.

Software packages, like Microsoft Project, will calculate the critical path based on the tasks list and can be seen automatically in PERT Chart view or in Gantt Chart view, if the display critical path feature is selected. To locate the critical path without the aide of a project management software:

1. calculate the lengths of all pathways through the network by adding up their respective cumulative estimated times.
2. trace the longest path with a dark pen or pencil. This is the critical path.

**Laws of Project Management**

Projects progress quickly until they become 90 percent complete, then they remain 90 percent complete forever.

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#### 4. Balance the Plan

Balancing is the most challenging stage in developing the plan. Balancing limited resources of the plan should occur within the project and against other project and nonproject efforts. Naturally, projects compete with each other and with nonproject work for two scarce commodities: human resources and funding. It is not uncommon that the typical organization lacks sufficient staff to perform all project and nonproject work. Balancing the plan ensures that human resources do not exceed the organization's capacity. Balance is critical.

- Balance one project at a time
- Balance projects with respect to each other

##### **Resource Loading**

It is in the best interest of the project team to make sure no members are overloaded. Resource loading is used to determine how resources will be allocated over the duration of the project and how to verify that they are being allocated correctly. Project management software can be effective for determining all team member's time commitment to the project, but first, each task must have personnel resources allocated to it. This technique will work for determining resource allocation for this one project. To effectively determine a team member's total work allocation using project management software, every project on which the team member works must be managed with the software. Alternatively, a team member's total workload can be estimated by asking them for their average weekly time allocations for the duration of the project.

##### **Resource Leveling**

If some resources have been overloaded after they have been allocated, how are they leveled (smoothed) out? This is similar to solving a short-supply, high-demand situation, which uses the following techniques:

- tasks can be shifted or extended within their float (slack time)
- use overtime to meet the demand during the period of forecasted overutilization
- ask team members to exert an extra effort
- augment the resource pool through use of temporary help
- contract out a portion of the workload
- increase the size of the resource pool permanently

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***Planning must not be left to chance.***

*Harold Koontz, Cyril O'Donnell*  
Essentials of Project Management

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Alternatively, when supply exceeds demand, some of these approaches can be used to level demand:

- tasks can be moved within their float to take advantage of the resource pool's available time
- overtime can be eliminated, and temporary help released
- move up low priority work in the schedule

### **Project Budget**

The purpose of a project budget is to allocate one-time developmental expenses for each category across the duration of the project, showing when the dollars are committed to be spent.

The project manager is responsible for asking, "How much will this cost?" The project budget is the key to answering the question and keeping the project costs under control.

Reasons to use a budget:

- control expenditures
- identify tasks which require close attention
- eliminate costly, nonproductive work steps
- set standards to measure performance
- plan for the future
- communicate individual team-member responsibility
- recognize when change is needed

Be aware of budget dangers:

- overly restrictive budgets eliminate creativity, empowerment and discretion
- project manager evaluation based on budgets alone leads to poor results
- "We have to spend it all" syndrome

Costs to consider:

- Fixed labor: # of permanently assigned personnel x loaded daily wage x project duration
- Fixed overhead: fixed amount assigned for rent, utilities and administration x # of personnel permanently assigned to the project x project duration
- Variable materials: cost of materials consumed by the project
- Variable labor: cost of temporary labor usage directly applied to project
- Capital investment usage: amortized cost of capital equipment charged for the period of the project

**Helpful budgeting tip:**

- **Avoid scheduling people at maximum capacity. Efficiency and production suffer when team members are loaded at maximum levels for long periods. Consider loading at 90%. A simple way to do this is to calculate the estimated hours it will take to get the job done and multiply by 1.1. For example, if it takes 10 hours for one person to do a job when loaded at 100% capacity, allow 11 hours for completion of the work (10 hours x 1.1 = 11 hours)**

**Laws of Project Management**

Murphy's Law applies to budgets as well as time estimates. Things usually cost more than expected, so expect it.

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## Risk assessment and contingency planning

Risk is a certainty in project planning; managing risk by preparing for it in advance can be the pivotal factor in successful project management. Risk analysis is a what-if exercise to identify areas of concern.

### **A few areas of concern:**

- What if a key team member resigns?
- What if a major milestone is missed?
- What if the speaker/presenter backs out or unexpectedly doesn't show up?
- What if the maintenance staff union strikes?
- What if the budget is cut back?
- What if a team member with sole responsibility for a task gets sick?
- What if the client requests a major change late in the development phase?

Rather than lay awake at night worrying about the possibilities, create a strategy (contingency plan) for dealing with the most likely "what-ifs."

### **What if analysis:**

- identify the critical, crucial tasks of the project
- select those tasks that will have the greatest likelihood of occurrence and the severest impact on your project
- analyze the effect on the PERT and Gantt charts
- develop a prevention plan for each of the most critical risk

## ***Why projects succeed!***

*The project manager is committed to established budgets.*

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## 5. Approve and Publish the Plan

Prepare a document with key information:

- Plan targets (target completion date, target cost, target resource utilization, and target asset utilization)
- Objective maxima (latest completion date, maximum cost, maximum resource utilization, and maximum asset utilization)

The plan is an agreement among the project manager, the project client, and senior management and serves as a basis for negotiating changes in scope during the project, as well as measuring the team's performance. Include commitments for funding and personnel should be a pro forma exercise since senior management and the finance people have already reviewed the plan and provided input during its formative stages. The plan should be signed by the appropriate parties and distributed to the team and other interested parties. Include graphic representations of schedule, resource, asset, cost, and achievement plans for effective communication. Once the plan is complete, the team begins working from it rather than on an ad hoc basis.

### **Laws of Project Management**

When things are going well, something will go wrong. When things can't get any worse, they will. When things appear to be going better, you have overlooked something. Murphy was an optimist.

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## Strategies for Planning

A five-step planning model is almost useless without a strategy for managing the conceptual versus the detailed planning. Conceptual planning is usually referred to as top-down planning, whereas detailed planning is referred to as bottom-up planning. Most organizations do both.

### Top-down and bottom-up planning

A combination of top-down and bottom-up planning will produce better result than either strategy used alone. Begin with the top-down (conceptual) planning which includes the technical objectives and the development of a preliminary work breakdown structure. Next, focus on bottom-up planning, where the details for the technical objectives are filled-in. The WBS is completed down to the level of detail for each task that must be performed in order to achieve the project objectives. Then estimates are assembled, from the bottom up, by the members of the project team. Finally, the detailed project plan is assembled from the estimates.

### Rolling wave approach

It can be challenging to use top-down/bottom-up planning because it depends on estimates of the duration and cost of a project before thoroughly understanding the scope and objectives. The real trouble can occur when the estimates are regarded as concrete numbers and the project is now locked into unrealistic constraints. The rolling wave approach uses the project manager's expertise combined with historical data gathered from other people who have tried to handle a similar project in order to *approximate*, not estimate. An approximation should be presented so that it provides the most flexibility. For example: It will take nine to twelve weeks to complete the project, require four to seven people, and cost about \$35,000, plus or minus 15 percent. There is now room to alter the approximations over the life cycle of the project. At the start, this approach "rolls out" detailed plans for the foreseeable future and, as the project gets underway, regularly reevaluates the schedule and budget developed in the top-down planning process.

### Saving time (and budget) with historical files

The planning process described so far is made "from scratch" without the benefit of historical data from prior projects. When relevant historical data exist, planning can be done more quickly, efficiently, and cost effective. Begin collecting data from any current project management exercise and store it in a central location. When it is time to use the historical data, approach with an understand that it will help, but can also hinder the planning process. If history is used too extensively and the members of the team do not participate in the review and modification of the historical data being used, the team may lose a sense of ownership, commitment, and motivation.

## Facilitating the project planning process

Project managers facilitate the project planning process; they “make it easier” for the team to accomplish the objectives of the project. In the planning process, project managers:

- use project management tools in building a project team
- lead others through a process that ends with the development of concrete deliverables
- assist project team members in working through the planning process
- put the team members at ease in order to elicit information from them
- inform and clarify who is on the team and why
- specify what will be expected of them in meetings
- guide team members through the process
- meet with each team member privately before the first meeting
- conduct project communication meetings

The following agenda and sequence of team meetings can be adapted to meet the project and team requirements.

### **Meeting 1: Orient and prepare the project team**

- reach agreement on the objectives of the planning process
- demonstrate project manager’s capacity and willingness to help
- define the roles of team members
- describe the project goals
- describe purpose of communication meetings
- discuss how project team will accomplish achieve these goals
- involve team members in process of making agenda for future meetings

### **Meeting 2: Develop objectives, scope, and work breakdown structure**

Prior to second meeting—

- provide agenda with clear statement of goals for the meeting, handouts, and assignments prior to this second meeting
- provide statement of work and proposed first level of WBS
- request team members to review materials; document their role in meeting the objectives and develop a second level of the WBS for the areas of their responsibility (prior to meeting)

During second meeting—

- address the project objectives and goals as first agenda item
- discuss a strategy for meeting project objectives

- discuss any restrictions or risks associated with the project
- discuss quality assurance, financial philosophy, priority of this project, and change control

**Meeting 3: Develop final work breakdown structure and team organization**

- address the scope definition and reconfirm agreement on the end product
- address any areas of disagreement immediately
- explain the top levels of the WBS and then work to agreement on level 2, which are the detailed tasks
- generate level 3 subtasks (in meeting or outside assignment)
- agree on level 3 subtasks and assign responsibility

**Meeting 4: Develop dependencies and durations**

- sequence tasks from WBS and determine dependencies; use sticky notes on a wall / one task per note / move notes around to determine paths of sequential and concurrent order from start to finish
- estimate the time for each task (in meeting or outside assignment)
- discuss next steps, assign action items and timetable for completion

**Meeting 5: Produce a schedule**

- develop a schedule showing when tasks need to begin and end in relation to one another on a calendar (use project management software to make this easier)
- identify any problems
- develop contingency plans for areas of high risk with respect to activities on the critical path
- facilitate understanding of each deliverable with the team
- list any open items that must be resolved prior to next meeting and assign responsibility
- discuss next steps in the planning process

**WARNING! Why some projects fail**

Lack of project team participation in planning.

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## Requirements for Effective Planning

The process of plan development is designed to produce documents that represent the true expectations of the team. There are seven requirements for effective planning:

1. **Parameters:** Establish parameters of quality, time, resource allocations, and cost for every project. Ensure the parameters are realistic.
2. **Plan:** Develop a plan that will accommodate the parameters committed to.
3. **Simplicity:** Keep project plans, procedures, and reports direct, clear and concise
4. **Approvals:** Secure formal and informal approval of project plans.
5. **Accuracy:** Confirm that everything you disseminate is accurate.
6. **Authority and responsibility:** Place authority and responsibility in parity with what your expectations are from the project team members.
7. **Project team members:** Remember that human factors are of overriding importance.

### ***Why projects succeed!***

*The project team participates in planning.*

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## ■ ANALYSIS OF SCHREYER

### Step 3: Project Planning

For the Schreyer Institute PBL workshop, planning and instructional design occurred simultaneously throughout the project life cycle, rather than sequential, separate steps. Without a formally established, integrated project plan, the planning phases were facilitated by the normal routines followed in most business organizations; e-mail, project team meetings, and informal follow-up conversations between team members. The purpose of a project plan is to *maximize* the probability of achieving project objectives.

#### Define the project

As discussed in step 1, *Initiating a Project*, the PBL workshop project was generally defined by the outcome (a workshop), its content (problem-based learning), the target audience (Penn State IST faculty), and a loose design process for developing the workshop activities. An overlooked, yet important question about project definition that was not appropriately answered is “What does the client want and need?”

#### ■ Outcome analysis

The answer to that question would have better guided the development process rather than the assumptions of knowledge and insight. As stated in step 1, the project definition effectively guides the development process.

#### ■ Recommendations

- Ask the client the key question for defining the project, “What do you want and need?” (project manager role)
- Check the project definition established in step 1 to further clarify goals and objectives. Make final adjustments as needed.
- Post the project definition, as stated in step 1.

#### Work breakdown structure (WBS)

The first work breakdown structure (task list) was created by the instructional designer to simply model the first four hours of the workshop. It was not originally made to establish a project management process. At the time the original task list was made, the project team did not have a standard method for preparing a WBS, whether with pencil and paper or utilizing project management software. Microsoft Project was eventually selected as the project management tool following the March 3 meeting, in which software tools were discussed. See Appendix F for a sample of a WBS created by Schreyer Institute and last printed on March 27.

As the WBS evolved into a project management document, more tasks were included and milestones were established to mark the pilot-test dates. Slack time (lag time) was built into the final two weeks of the project (10 days), but not evenly distributed through the project planning cycle.

The project Gantt chart and associated WBS were regularly used at project team meetings to coordinate task responsibilities and due dates. Changes were regularly made by the project manager and the document redistributed to staff.

### ■ Outcome analysis

The instructional designer had realized in the earliest stages that the scope of the PBL workshop would require a more sophisticated task list than normally used for project planning in Schreyer Institute. The project management software proved to be helpful to the project manager for keeping track of the details of planning. The project team responded favorably to this method of tracking progress. Efficiency was improved.

The original nature of the WBS did not incorporate enough details of either instructional design processes or project management stages. Therefore, it had limited usefulness in terms of anticipating the upcoming tasks or monitoring the phases that were completed.

### ■ Recommendations

- Continue to utilize project management software.
- Consider further training for the project management software in order to better utilize its power and functionality.
- Consider using the expanded WBS in Appendix F. This modified version of the Schreyer Institute WBS integrates the instructional design process (ADDIE) with the five-step project management process.

## Estimate and schedule the project

Time estimates were generally established in order to meet the milestone dates and not by a more in depth analysis of estimating staff time to complete tasks. Since funding (staff salaries and overhead) was not a significant parameter to this project, it was not considered for planning purposes. A Gantt chart, the primary tool for reporting, estimating and tracking a project's resource allocation, was developed from the task list in Microsoft Project and somewhat effectively used by the project manager.

### ■ Outcome analysis

The project team worked hard, devoting many hours to completing the tasks in a timely manner. Progress was plainly made, but at what cost? Anecdotal information emerged after a few meetings about the amount of work on other projects that was backing up and not being accomplished in a timely manner. The information about workload and estimating the amount of time to complete a task had not been properly completed. Since project management was not utilized for all projects in Schreyer Institute, only a limited amount of time estimates and task scheduling could have been accomplished for the PBL workshop project.

**■ Recommendations**

- Ask the questions posed in step 3 of the five-step planning model to help estimate and schedule the project.
- Use the formulas for estimating time allocations.
- Factor the amount of staff time devoted to other projects to better schedule limited human resources.
- Consider using a project management methodology (and software) for all projects in order to more effectively facilitate scheduling.
- Consider monitoring cost factors to improve efficiency.

**Balance the plan**

The critical elements that need balance in most project plans, human resources and funding, were handled by other means that were already in place for this project. The project team was comprised of the available staff at Schreyer Institute, there were no backups or extra staff to consider. Fortunately, no one left the project team, so staffing was constant. Funding, as stated earlier, was not a major concern for the workshop development process and therefore did not need balancing. Considering the Schreyer Institute work outside the PBL workshop project, it may have been beneficial to analyze methods for balancing the plan with respect to other work requirements (resource loading).

**■ Outcome analysis**

It seems the high profile nature of the PBL workshop naturally demanded a significant amount of time from project team members, while other projects were given a lower priority. During the project planning phases, it was not evident to the author whether other work assignments were suffering because of lack of attention. It may not always remain true that Schreyer Institute will have enough staff time to devote a majority to one major project.

**■ Recommendations**

- Anticipate more simultaneous projects to manage in the future and determine a methodology for balancing them.
- Consider an evaluation of Schreyer Institute resource loading methodology to ensure that team members are not overloaded.
- Consider a scheme to conduct resource leveling when and if, overloading should occur.

**Approve and publish the plan**

The project plan evolved as the planning process progressed. Team members became fairly well acquainted with the requirements and parameters of this project, which although not insignificant, were not overwhelming in either number or scope. Various documents that contained the type of information found in a project plan (Gantt chart, WBS, target dates) were constantly updated and distributed to team members for the express purpose of communication about the project status.

### ■ Outcome analysis

The documents generated by the project team to track the work in progress served as a type of project plan. The downside is the collection of papers were not created primarily at the beginning of the project to serve the needs of the development phase. Similar to the project initiation document, the project plan's purpose is to establish working guidelines for project development that are agreed upon by all stakeholders, the project team, senior management and client. As a type of contract, the project plan could have served to galvanize commitments for producing a quality deliverable, the PBL workshop.

### ■ Recommendations

- Write a plan that minimally includes project definition, WBS, time estimates for tasks, a budget, and signature approval from stakeholders, namely the client.

### **WARNING! Why some projects fail**

Lack of project team participation in problem solving.

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## Step 4: Project Control

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### ***“Plan the work—now work the plan.”***

Now that the project has been properly defined, carefully worded in a scope document, and detailed according to a plan, the project manager enters into the project management control cycle. Key questions to answer in this phase are:

- Where is the project?
- How did it get here?
- How are the changes needed to keep the project on track managed?
- Where should it be?
- Is it progressing to completion?
- How much will all this cost?

How the project plan benefits the project control cycle

- The plan ensures that no major tasks have been forgotten.
- The plan indicates clearly the assignment of responsibility, accountability, and authority.
- The plan predefines the interdependencies of tasks one to another, and thus functional interdependencies as well.
- The plan becomes a yardstick against which to measure status and, ultimately, to judge the success or failure of the project, the project manager, and the project team members
- The plan, which will now be used as a monitoring, tracking, and controlling tool, becomes a vehicle for communication and control.

### **Create a project notebook**

An important step before the controlling process begins is to organize the project notebook, which becomes the all important historical record of project work. Include sections for:

- project definition
- estimates of each task and rationale
- baseline changes
- communication plan
- ongoing list of assumptions
- status reports
- WBS
- ongoing history log of change control
- project summary (for the end)

## Formal vs. informal control

Informal control exercised daily is the most effective means for a project manager to keep a project on track. Formal control, like status reporting, is best done at regular time intervals and serves other purposes.

### **Informal control**

Informal control is often referred to as “management by walking around.” Tom Peters and Bob Waterman, who popularized the concept in their 1982 book, *In Search of Excellence*, write that informal control has a number of benefits for the project manager and the project team:

- You can learn a lot more that you do by sitting at your desk.
- You meet people in their habitat, where they may be more open and honest than they are in your office or a conference room.
- You are highly visible to all project staff, not just your direct subordinates. You are more of a team member.
- Your team will be delighted to explain their latest successful efforts. Nothing begets success like success. The more you make them feel good about their accomplishments, the more they will try to accomplish.
- You learn of brewing problems faster than waiting for them to appear on a status report or in a meeting.
- You develop a sixth sense for what is normal within the team and then can discern potential problems.

**CAUTION!** The project manager must resist the urge to micro-manage by giving direction on the spot or skipping a level of management by making decisions that the responsibility of someone else on the project team. The key to informal control is accessibility to the project manager.

### **Formal control**

Formal project control is a paper exercise performed on a regular basis, weekly, bi-monthly, monthly, or by accounting period. The project manager gathers data about the progress of the project and compiles a status report, which may include Gantt charts, completed task list items, or budget analysis data.

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***Management means getting things done through the active support of other people.***

*Harold Kerzner*  
Project Management,  
A Systems Approach to Planning,  
Scheduling, and Controlling

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## Managing project change

Change is a constant factor and should be anticipated in project planning. Changes will inevitably occur in the baseline of the schedule, resource allocation, and budget, as well as in the scope of the end product. These changes must be analyzed, their impact determined, and corrective action taken when necessary.

### Scope changes

Changes in the scope of the project refer to additions, modifications, or deletions made to the end product or service. In most organizations, changes in scope occur within the following areas:

- requirements changes
- business changes
- personnel changes
- design changes
- technological changes

To handle the process of change control for change that has large potential ramifications, the project manager consults with the project team and the person requesting the change, if not a member of the team. Describe the change (what) and its benefits (why). Next study the potential ramifications to the project's target completion date, use of additional resources, or whether the organization is at risk. If the team approves the change, make a note of it in the project notebook and distribute a status report detailing the change and its implications to the project.

### **Laws of Project Management**

If project content is allowed to change freely, the rate of change will exceed the rate of progress.

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## Baseline changes

Project baseline specifically refers to the project plan and specifications, applicable standards, schedule target, cost target, and resource and asset utilization targets. Baseline changes are usually easier to anticipate and handle than scope changes because they can be tracked against actual performance. Four sources of baseline changes are: client driven, regulatory driven, externally driven, and internally driven.

### **Client driven**

The client is the owner, or future owner, of the product being developed. A few interrelated issues for client driven baseline changes are scope, cost, schedule.

### **Externally driven**

Externally driven change emanates from the environment in which the project team's organization operates and may include three types: economic, political, and social.

### **Internally driven**

Internally driven changes are typically forces on the project team because of altered conditions or problems within the organization. General types include:

1. change necessitated by scope or technical problems
2. change necessitated by problems in meeting the schedule
3. change because of cost problems
4. change because of resource demands

### **Typical sources of baseline changes**

- Time targets will not be met.
- Tasks will slip their deadlines.
- Milestones will be missed.
- Jobs won't always get started on time.
- Resources will not be available as planned.
- Equipment capacity will be overestimated.
- People will not produce at peak performance.
- Budgets will be either overspent or underspent (depending on the degree of adherence to the schedule and resource allocations).
- Work accomplishment will exceed or not meet with the plan.

## Crash path analysis

Handling change or problems as the project progresses sometimes require the deadline for the project or task to be moved up. At these times, it is helpful to have an accurate understanding of the ratio between adding resources to the project to accelerate its completion and the cost of those resources. Such an understanding can help to:

- Identify those tasks that can and should be crashed (accelerated) to accomplish the best outcome.
- Select the best ratio of normal time tasks and crash time tasks to get the biggest return on investment.
- Clearly present the trade-offs to the boss or client who is demanding that changes be made or that unreasonable deadlines be met.

### **Six steps for conducting a crash path analysis (CPA)**

1. From the network chart, identify the section or pathways to be considered for CPA.
2. Consider the feasibility of adding resources to each task.
3. Calculate the costs associated with such additions.
4. Estimate the time savings associated with crashing each task under consideration.
5. Create network charts for normal time, all crash time (where all tasks in the network are crashed), and various combinations of normal and crash times. **TIP:** Crash the tasks on the critical path first, since this is the path where savings in time will most dramatically affect total project duration.
6. Select the combination that gives the most savings at the least cost.

### ***Why projects succeed!***

*The project manager works with  
bureaucracy and office politics, not against  
them*

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## Five-step Model for Project Control

Tracking and managing the project means taking steps to ensure that actual performance conforms to the project plan. The basic tools for controlling the project are the project definition (think of it as a contract for measuring the success of the project); the project plan, schedule, resource plan, and budget; and status reports, which indicate work in progress and problems. The project plan is a road map to guide the project team's efforts and therefore sets expectations. The five stages of the project control process are:

1. update the status
2. analyze the impact
3. act on the variances
4. publish the revisions
5. inform management

### 1. Update the status

Updating the status focuses on collecting the information necessary to assess performance on the project and posting the information for comparison with the plan. Data requirements vary, but usually include completed tasks, tasks in process, and future tasks. Writing the status report will produce new schedules, resource utilization, cost and achievement status reports. See Appendix F, Sample Status Report.

A status report should answer some key questions, which in turn, will determine the format and length.

- Who will be on the distribution list?
- How frequently will the reports be issued?
- What will the reports be used for?
- What image should be portrayed?
- How easy is it to update the reports? (the easier, the better)

Keep this in mind: Team members at a lower level of detail require data more frequently and usually prefer a list format. Management prefers graphs presented to them on a less frequent basis with a short executive summary and at a higher level of detail.

### **Laws of Project Management**

Project teams detest progress reporting because it so vividly manifests the lack of progress.

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**Information for project team members on status reports**

- What they are expected to do
- What authority is delegated to them
- What results are expected
- What help they will have
- What rewards (consequences) they will be given

**Information for management on status reports**

- Where the project is
- Where it should be
- Where it is going next
- How it will get there
- What resources are needed
- When is it going to get there

## 2. Analyze the impact

First, compare planned to actual results in order to reveal variance. Second, determine the cause, that is, when problems appear, look carefully to find the cause. Analyze the impact on the project schedule and budget, the project team's morale, and the quality of the project deliverables. Third, prepare analysis forecast reports in which prior progress, or lack of progress, is extrapolated to the future. Analysis reports indicate the forecasted completion date, the forecasted resource utilization date, and the forecasted final cost.

## 3. Act on the variances

Three courses of action can be taken as a result of comparing the plan to the actual:

1. Do nothing
2. Look at the plans that exist and make modifications within the schedule, resource, cost, and scope baselines to accommodate the problem
3. Start negotiating trade-offs

## 4. Publish the revisions

Since the plan is a working document that the project team relies on for guidance, it should be updated constantly. It may be better in some situations to publish only an exception report. Exception reports describe key extracts of the plan, not the entire overview.

## 5. Inform management

During the controlling process, management must be given an overall picture of the condition of the project, the problems that have been encountered, and the actions that have been taken in response to the problems. Different information dissemination processes can be used:

- informal discussions
- formal presentations
- written single-project status reports
- tabular multiproject status reports

### **WARNING! Why some projects fail**

Use of superficial status and progress reports.

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## ■ ANALYSIS OF SCHREYER

### Step 4: Project Control

The project management control cycle includes the majority of work to be completed on a project. See updated WBS in Appendix F, for the items in the task list under the project control heading. It was in this phase that the author entered the consulting role on the PBL workshop. A primary means of success in project control is determined by the degree of project planning that preceded it.

#### Formal vs. informal control

Informal control was the primary control mechanism used by the project manager for monitoring the project, although it is unclear to the author the degree to which the various informal techniques were used. Evidence from project team meetings and interviews indicated that the project manager's style was highly interpersonal and engaging. It seemed that formal control was completed at a frequency equal to the number of times the control documents were changed.

#### ■ Outcome analysis

The project manager's formal control method was helpful for keeping team members informed, however there was concern that the frequency of reporting would become too tiresome to complete. The project team was well informed about the tasks for which the project manager had either authority or updated information.

#### ■ Recommendations

- Continue management by wandering around to maximize control.
- Set formal control frequency and easily managed intervals and include the client in the distribution.

#### Managing project change

As a result of a poor project initiation process and an inadequate project plan, internally driven change had become a routine occurrence and managing it was an ad hoc process of altering project objectives. A crisis did not ensue at any time, however confusion was often apparent in team members or in the worst occurrences, resignation to another inevitable change.

#### ■ Outcome analysis

Changes that happened because of poor project planning or inappropriate application of the instructional design model seemed to lower team morale, whereas changes that were necessitated by an unintentional mistake were taken without repercussion.

**■ Recommendations**

- Anticipate changes by reviewing the typical sources of baseline changes in this section.
- Establish mechanisms for handling project changes from the book, *Project Management*, chapter 6 (Knutson & Bitz, 1991).
- Control the negative impact by minimizing the frequency of changes, which is most effectively done by creating the project initiation document and project plan.

## Five-step model for project control

Schreyer Institute satisfactorily implemented three project control steps: update the status, act on variances, and publish the revisions. Typically following each project team meeting, a new Gantt chart and WBS was distributed with an additional e-mail message about new task assignments. The project manager may not have systematically analyzed the impact or deliberately chosen one course of action to take, but she did make the necessary modifications to the schedule to handle the change.

**■ Outcome analysis**

The ability of the project manager to handle the frequent changes and build them into the schedule helped to keep the project team on track.

**■ Recommendations**

- Continue to implement the three key steps of project control: update the status, act on variances, and publish the revisions.

## Step 5: Terminating a Project

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Every project has an end. The goal of project management is to complete an effort and receive the client's acceptance. This last phase is facilitated by a phase-out plan, which answers the question, *"How do I stop the work on the project and determine its level of success?"* Elements that are described in the work breakdown structure and project plan to control the finished instructional design project include:

- Phase-out plan
- Formative evaluations
- Delivery of the instructional workshop or course
- Summative evaluation

### Phase-out plan

1. Checklist of phase-out activities including responsibility assignments
2. Phase-out timeline
3. Disposition of team members
4. Written steps which will be followed for actual turnover to the client
5. Special implementation or training instructions which the client will need.
6. Acceptance process whereby the client indicates satisfaction with what has been delivered
7. List of project documents to be maintained by the team as well as a list of documents to be given to the client
8. Clearance of final bills and charges received after the project changes hands
9. List of support items such as supplies and spares which need to be transferred to the client
10. Schedule for writing of end-of-project report
11. Schedule for writing "lessons learned" report
12. Set date for closure of project books

The project team and project manager should be aware throughout the project of the final goals that must be attained. By meeting these goals, the team has collectively completed the project. When the product has been delivered to the client's satisfaction, the job is still not done. The end report and lessons learned report should be considered and performed after the physical completion of the project.

### End report

The end report is created for primarily for management and includes a review of the work that has been accomplished. Items to include in the summary: completion of goals and objectives, summary of schedule and budget targets, and recommendations for future projects.

### Lessons learned report

Conduct a pluses and wishes analysis with the project team and finalize the history files. The project team should bring their ideas together that reflect the lessons learned from interactions with the client, professional assistants, and subcontractors; feedback on the performance of team members; recommendations for improvements for specific stages of development; and overall summary of the success or failure of techniques, strategies, or processes utilized. Publish the project report in order to give visibility to the project team for a job well done. Give credit to the project team in the project report and send each one a thank-you letter for their contributions. Finally, celebrate success.

## ■ ANALYSIS OF SCHREYER

### Step 5: Terminating a Project

The author's role as consultant ended before the PBL workshop was delivered. The following analysis focuses on the termination events that should be planned for a successful project conclusion.

#### **Outcome analysis**

The original WBS did not show any phase-out plan items, although a summative assessment of the workshop could be assumed within the project development phase. The phase-out plan's purpose is to establish tasks related to formally ending the project, such as organizing the historical documentation and writing an end report. The phase-out plan could be beneficial to Schreyer Institute for establishing a record of project management to make the initiation phase for the next one easier. The benefit of a lessons learned report cannot be over emphasized for helping to develop the project team. A successful project conclusion is worth celebrating as a boost to team morale.

#### **Recommendations**

- Create a phase-out plan according to the criteria listed in this section of the report.
- Assign each team member to write a lessons learned report.
- Celebrate the successful conclusion to the project.

## ■ SUMMATIVE ANALYSIS OF SCHREYER

### Holistic analysis of Schreyer Institute project management

Overall, it can be anticipated that the hard work and dedication of the Schreyer Institute PBL workshop project team will have succeeded in developing and delivering a very good workshop that fulfills the project requirements. It is evident that the project team functioned and performed in a professional manner and handled the challenges that are the consequences of an incomplete project management process. While no project management process is complete or perfect during any implementation, the benefits the process provide would greatly improve the opportunity for a successful project outcome.

The author's strongest recommendations are to:

Continue...

- Developing project team morale and collaboration
- Building a team communication plan

Consider...

- Formally assigning the project manager to each project
- Integrating the ideals of the Schreyer Institute vision and mission statements into the project management and instructional design processes
- Full implementation of Step 1, particularly for creating the project initiation document
- Establishing the client profile to improve understanding of target audience for workshop development
- Determining the project goals and objectives
- Consistently giving responsibility with authority
- Concentrating the required staff resources on completing two critical steps of the project management cycle—initiating the project and project planning
- Developing a more robust work breakdown structure and use it to track and monitor project progress
- Managing all Schreyer Institute projects through a project management process
- Managing change with an understanding that change is inevitable, but more manageable with a good, solid project management process

- Terminating every project with the purpose of creating historic files to improve the project management of the next project

## Report Conclusion

The dimensions of project management for instructional design in higher education are significantly complex that even a half dozen books could not contain the breadth of information to adequately describe it and all the practical applications. Within this context, instructional designers who are also project managers must juggle multiple roles and responsibilities. This project report attempted to introduce the concept for the staff of the Schreyer Institute for Innovation in Learning and provide helpful suggestions that could be easily implemented.

## Recommendations

To further the applicability of this report and make it a more useful working document, the following recommendations are suggested:

- Write the outcomes and analyses with greater understanding of the nuances and techniques of corporate critique. It would be immensely helpful to write with strong, constructive language that would be understood as a helpful assessment.
- Integrate the ISD model, ADDIE, more tightly into the project management process.
- Write a section on the challenges of instructional design consulting in higher education to bolster the rationale for modifying the standard business model to account for faculty and the culture of higher education.
- Analyze the fiscal and personnel policies of higher education institutions and integrate salient points into the rationale for managing projects in the higher education environment.

## References

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- Johnson, L. (1990). *The art of project managing a project*. (Videotape). Boulder, CO: CareerTrack Publications.
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## APPENDIX A: Definition of Terms

<b>budget</b>	<b>project management</b>
<b>contingency plan</b>	<b>resource</b>
<b>crash path analysis</b>	<b>responsibility matrix</b>
<b>critical path</b>	<b>ROI</b>
<b>dependent task</b>	<b>slack time</b>
<b>dependent task</b>	<b>slippage</b>
<b>earned value</b>	<b>statement of work</b>
<b>end report</b>	<b>task list</b>
<b>executive summary</b>	<b>WBS</b>
<b>flow chart</b>	<b>“What-if” analysis</b>
<b>Gantt chart</b>	
<b>goal statement</b>	
<b>instructional systems design</b>	
<b>lag time</b>	
<b>milestones</b>	
<b>network charts</b>	
<b>PERT chart</b>	
<b>phase out plan</b>	
<b>phase-out plan</b>	
<b>project</b>	

## APPENDIX B: Workshop Materials

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Promotional announcements, survey, collateral, handouts, developmental materials

## APPENDIX C: Consultant Contract

### The Schreyer Institute's Problem-based Learning Faculty Development Workshop

#### **A Project Management Perspective**

Steven J. McGriff, Project Management Consultant

INSYS 553: Project Management for Instructional Development (Dr. Frank Dwyer)

E-mail: sjm256@psu.edu Home phone:

March 6, 2000

**Summary:** *This document explains my role within the context of the Schreyer Institute's project to design, develop, and implement a workshop on problem-based learning for faculty. This project management perspective is a course assignment and collaborative effort with the Schreyer Institute for Innovation. The finished document could become a blueprint for other Schreyer Institute workshop development projects. Completion date: April 28, 2000.*

Since this workshop project is underway and has an established workgroup, my role is to observe, document, organize, and assist (as needed), the workgroup's project management process. As a project management consultant, I will utilize various project management and consulting tools and skills to:

- Provide assistance, advice, or consulting to the workgroup regarding handling the process of managing this workshop project.
- Develop a document that the Schreyer Institute can use for future project planning, including elements such as:
  - Vision, mission, goal statements
  - Benefits of project management for developing workshops
  - Economics of project management
  - Process of project management, highlighting efficiency, effectiveness, and utility
  - Tools of project management
  - Crash path analysis
  - Budget
  - Effective planning
  - Work break down structure
  - Task analysis worksheet
  - Flow charts
  - Gantt charts
  - 'What if' analysis

It is worth noting that this project management perspective is not focusing on the process of the instructional design of the workshop, except in the general terms of the workshop being the final product or outcome of the project.

The process of creating the project management perspective will include attendance at project planning meetings, interviews with workgroup members, and access to workgroup documents.

Steven J. McGriff

The Pennsylvania State University, College of Education, Instructional Systems

## APPENDIX D: Supporting Project Management: Software, Training, and Administration

## APPENDIX F: Samples

### Sample Skills Inventory Matrix

	Instructional Designer	Assessment Analyst	Logistical Coordinator	Graphic Designer	Trainer	Subject Matter Expert	Project Manager
Lupita			■				■
Don		■					
Joyce	■	■			■		
Luke					■	■	
Wendy			■	■			
Peter			■			■	

## Sample Status Report

A standard form makes it easier to read and includes key items.

<b>TASK/PROJECT</b>	Conduct Needs Assessment	
<b>REPORT DATE</b>	March 3	
<b>PERIOD COVERED</b>	February 1 — February 29	
<b>PROJECT MANAGER</b>	Lupita Lewis	
<b>PROJECT PHASE</b>	4. Project Control	
<b>ACTIVITY</b>	Develop needs assessment instrument	
<b>COMPLETION STATUS</b>	33% complete	67% to complete
	<ul style="list-style-type: none"> <li>• First draft complete</li> <li>• First review in process</li> <li>• Second draft pending review</li> </ul>	
<b>SCHEDULE</b>	Scheduled completion — March 10	
<b>BUDGET</b>	<ul style="list-style-type: none"> <li>• On target</li> <li>• \$ 2,200 budgeted for creating instrument</li> <li>• \$ 975 expended</li> <li>• Expected cost overruns on mailing because of rising postage rate, effective March 13</li> </ul>	
<b>ITEMS FOR RESOLUTION</b>	<p>Client wants to review instrument</p> <p>Let's discuss at team meeting Tuesday</p>	