

# Systems Development Case Studies



M. Gordon Hunter

**Mc  
Graw  
Hill**

**Irwin  
McGraw-Hill**

# *SYSTEMS DEVELOPMENT CASE STUDIES*

---

**M. Gordon Hunter**

*St. Francis Xavier University*



Boston, Massachusetts Burr Ridge, Illinois Dubuque, Iowa  
Madison, Wisconsin New York, New York San Francisco, California St. Louis, Missouri

# Irwin/McGraw-Hill

A Division of The McGraw-Hill Companies

## SYSTEMS DEVELOPMENT CASE STUDIES

Copyright © 1998 by The McGraw-Hill Companies, Inc. All rights reserved. Printed in the United States of America. Except as permitted under the United States Copyright Act of 1976, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of the publisher.

This book is printed on acid-free paper.

1 2 3 4 5 6 7 8 9 0 DOC/DOC 9 0 9 8 7

ISBN 0-256-27056-2

Vice president and editorial director: *Michael W. Junior*

Senior sponsoring editor: *Rick Williamson*

Editorial coordinator: *Carrie Berkshire*

Marketing manager: *Jim Rogers*

Project manager: *Christina Thornton-Villagomez*

Production supervisor: *Scott Hamilton*

Senior designer: *Kiera Cunningham*

Compositor: *Shepherd, Inc.*

Typeface: *10/12 New Century SchoolBook*

Printer: *R. R. Donnelley & Sons Company*

### Library of Congress Cataloging-in-Publication Data

Hunter, M. Gordon.

Systems development case studies/M. Gordon Hunter.

p. cm.

ISBN 0-256-27056-2

Includes bibliographical references.

1. System design—Case studies. I. Title.

QA76.9.S88H86 1998

004.2—dc21

97-17864

<http://www.mhhe.com>

---

To my sons, Robb and Jeff,  
and  
to my wife and best friend, Shirley

# *Introduction*

---

An information system is an integrated arrangement of personnel with hardware and software to support the daily operations of a business. The information system should address the information needs of decision makers as they carry out their managerial responsibilities.

The management process consists of planning, organizing, staffing, directing, and controlling. All of these processes require decisions to be made. The quality of a manager's decision making often depends on the quality of the available information. Thus the goal of the systems analyst is to supply an information system that will provide the required quality of information relative to the decision being made within the specific management process.

This casebook is meant to be used in conjunction with a textbook. The casebook is organized by systems development life cycle (SDLC) stages. The sequence of the stages and the description of the activities included in each stage have been left as generic as possible. This should support the use of the casebook with a wide variety of textbooks. The SDLC stages that served to direct the organization of this casebook follow:

1. **Initial Investigation** The initial investigation stage is conducted in order to gather information about the problem or opportunity and to decide if the current situation warrants the development of a solution that would require the development of an information system.
2. **Requirements Analysis** Using various fact-finding techniques, information is gathered about what the new information system should do. A requirement represents a feature that must be included in the new information system.
3. **System Specification and Design** In the specification component of this stage a statement is developed to describe what the new information system will do. The design component describes how the new information system will operate.
4. **Construction** The construction stage deals with the actual building of the new information system and ensures that the system performs as required.

5. **Installation** In this stage the new information system is transferred into a working environment.
6. **Operation Maintenance** This stage relates to that period of time when the information system is considered to be in production. The user is responsible for the daily operation of the system. Any changes to the system during this time will be conducted as maintenance.
7. **Review** In this stage evaluations are conducted of the information system and the project that produced the system. Recommendations are usually produced regarding improving the information system and/or the method of conducting the project.

The casebook contains 27 cases. Each stage has more than one case, thus offering variability of subject matter. This variability allows the instructor to more appropriately tailor the use of the cases in the course to the students and the specific delivery method (i.e., lecture, student submission, class discussion, or group presentation). Each case contains a series of questions based on the facts of the case and the teaching objectives of each case author. Assignment questions are included in the casebook and are directed toward the development of a document by students for submission to the instructor. Discussion questions are included in the instructor's manual and are designed to guide in-class discussion of the case. The instructor's manual contains teaching notes and answer guides to the questions. Also, for the assistance of the instructor, Appendix A of the instructors' manual contains a brief article that suggests an interesting case analysis method.

**M. Gordon Hunter**

# *Acknowledgments*

---

I am indebted to many individuals who contributed to the development of this casebook.

Without the work of the case authors this book would not have been possible. I thank each one of you for your quality contribution. The case authors are:

Yolande E. Chan, Queen's University  
Ron Craig, Wilfrid Laurier University  
David Erbach, University of Winnipeg  
Gordon C. Everest, University of Minnesota  
Len Fertuck, University of Toronto  
Barry A. Frew, Navy Postgraduate School, Monterey, CA  
Rick Gibson, American University  
Susan Page Hocevar, Navy Postgraduate School, Monterey, CA  
Sherry L. Jack, Calgary, Alberta  
Bruce Johnson, Xavier University, Cincinnati, OH  
Nancy J. Johnson, Metropolitan State University  
Ernest A. Kallman, Bentley College  
William K. McHenry, Georgetown University  
Kathy Moffitt, California State University, Fresno  
Doug Morgan, CFO, Duncan Enterprises  
Karen S. Nantz, Eastern Illinois University  
R. Ryan Nelson, University of Virginia  
Laurie Schatzberg, University of New Mexico  
Susan F. Schwab, Bentley College  
Richard J. Simm, Deloitte and Touche  
Bruce White, Dakota State University  
Ellen Whitener, University of Virginia  
Matt Zamary, American University

I would also like to thank the reviewers for their valuable comments, which certainly improved this book.

Carol Clark  
Middle Tennessee State University

Jane M. Carey  
Arizona State University West

Charles M. Lutz  
Utah State University

Vincent Yen  
Wright State University

Roberta M. Roth  
The University of Northern Iowa

Robert L. Ashenhurst  
The University of Chicago

Ronald Kizior  
Loyola University of Chicago

Milton Jenkins  
University of Baltimore

Finally, the staff at Irwin/McGraw-Hill provided its usual impeccable assistance in taking the manuscript and transforming it into a high-quality book.

I would especially like to thank Rick Williamson and Carrie Berkshire for their help and guidance throughout this project.

# *Contents*

---

## **1. Initial Investigation 1**

### The Cases

Genesis Process at Duncan Enterprises 5

Kathy Moffitt and Doug Morgan

The Southwest University for Pursuing Exceptional Rigor (SUPER)  
School of Management Undergraduate Advising Center 14

Laurie Schatzberg

The Ashworth Group 35

David Erbach

The Application of Groupware at Coast Guard Headquarters 43  
Matt Zamary and Rick Gibson

## **2. Requirements Analysis 47**

### The Cases

Canada Construction Services Payroll Software 52

Ron Craig

Systems Analysis and Design at Stratford General Hospital 61

Yolande E. Chan and Richard J. Simm

Stakeholder Analysis and Diffusion of Innovation as Requirements  
Determination Tools 79

Barry A. Frew and Susan Page Hocevar

Billboard Corporate Accounting System 88

Bruce Johnson

Billboard Charts 91

Bruce Johnson

### **3. System Specification and Design    95**

#### The Cases

- Cincinnati Health Department    102  
    Bruce Johnson
- Laurier Phone System A    106  
    Ron Craig
- Laurier Phone System B    114  
    Ron Craig
- South Dakota Worker's Compensation    123  
    Bruce White
- Holly Hotel    131  
    Gordon C. Everest
- Systems Analysis and Design at Trundles    135  
    Len Fertuck, Yolande E. Chan, and Richard J. Simm
- Ms. Ehree Hospital    141  
    Len Fertuck, Yolande E. Chan, and Sherry L. Jack

### **4. Construction    157**

#### The Cases

- EMC Accounting Software    160  
    Ron Craig
- When the Software Selection Process Doesn't Go by the Book    165  
    Susan F. Schwab and Ernest A. Kallman
- Party Hardy    178  
    Karen S. Nantz
- Systems Development in the Federal Judiciary    183  
    R. Ryan Nelson

### **5. Installation    188**

#### The Cases

- Training End Users at the Internal Revenue Service    191  
    R. Ryan Nelson and Ellen Whitener
- Apparelmaster    197  
    Bruce Johnson
- GCSC/Raymond Bag    201  
    Bruce Johnson

### **6. Operation/Maintenance    203**

#### The Case

- Billboard Cost Accounting System    204  
    Bruce Johnson

**7. Review 206**

## The Cases

SAGA: The System for Andre's Great Advantage 208

William K. McHenry

InterTech Refocusing 226

Nancy J. Johnson

Federal Government Internet Applications: Effectiveness

Review 243

Rick Gibson

# *Initial Investigation*

---

This chapter presents the activities related to the first stage of the systems development life cycle (SDLC).

## **REASONS FOR INITIATING INFORMATION SYSTEMS DEVELOPMENT PROJECTS**

Information systems development projects may be initiated for a number of reasons, which may be categorized as either problems or opportunities.

### **Identifying Problems**

1. **User Complaints:** Users of information systems may communicate their displeasure with the functionality of their information systems directly to the systems analyst.
2. **Top Management Concerns:** Users may communicate their dissatisfaction to their senior management who, in turn, may pass the concern to the senior management or the systems analyst.
3. **Scouting:** Systems analysts, through their involvement with users may encourage the user to initiate a project request in order to officially commence work on an information system that may resolve a business problem.
4. **User Surveys:** Information systems departments may distribute questionnaires among users in order to determine if any general or specific problems can be identified within the user community.
5. **Audits:** Internal audit departments or external auditors may identify a situation with an information system that should be rectified.
6. **Analyzing Performance Trends:** Early detection of information performance problems may be identified by continually monitoring the performance of the information system. Typical problems are identified by an increase in the relative effort required of the user to operate the information system effectively. Potential problems may be identified

through symptoms, such as a bottleneck in processing transactions or a decrease in throughput.

## Identifying Opportunities

Information systems development projects may be initiated because of an opportunity to apply a new idea or technology.

### **Idea.**

1. **Integration of Business Areas:** Separate areas of the organization may be coordinated because of a revised approach to conducting business.
2. **Strategic Advantage:** The application of a new or revised information system may provide the organization with an advantage over its competitors.
3. **New Regulation:** A new requirement may be imposed upon an organization by the implementation of a new law or the adoption of a new accounting practice.

**Technology.** These days technology is changing rapidly. New technology permits greater processing speed, faster information retrieval, reduced cost per item of data, and improved security. All of these advantages may lead to the initiation of an information systems development project.

## THE PROJECT REQUEST

The project request, submitted by the user or the systems analyst to the steering committee (see below), is a critical element in launching the information development project. The request is a formal way of stating the problem or opportunity to be addressed.

## INITIAL INVESTIGATION

The initial investigation is conducted in order to gather more information about the problem or opportunity and to decide if the current situation warrants a solution that would require the development of an information system. The two major areas for investigation are the environment and the direct problem.

**The Environment.** There are a number of aspects that will affect whether and how the project will be conducted.

1. **Information System Policy Alternatives:** The systems analyst must be aware of policies such as centralization versus decentralization, charge back, vendor selection, outsourcing, and information systems development standards. All of these policies may indirectly affect a project.
2. **The Steering Committee:** This ongoing committee consists of top management who make business-type decisions about which information systems development projects to initiate and whether or not a project should proceed from one stage to another. Also this committee may give direction to the project team.
3. **The Project Team:** This ad hoc team will consist of representatives from the user area, systems analyst(s), and any necessary technical resources that may be required as the information systems project proceeds through the SDLC stages.

**Investigation of the Problem.** When conducting investigations into this initial problem, systems analysts must be aware that they are outsiders and may be treated with distrust. It is important to be able to deal with people and to develop trust and commitment to the task at this early stage of interaction with the user.

The systems analyst may conduct a direct investigation through interviews, questionnaires, or observation. A thorough knowledge of these fact-finding techniques will help the systems analyst obtain a detailed understanding of the problem situation.

The systems analyst may also carry out indirect investigation. The systems analyst may refer to existing documentation such as procedural flowcharts in order to trace information flows. Also records may be reviewed to determine what data are captured and used throughout the information system.

The information gathered in this initial investigation will be used now to determine the likelihood that solving the problem will be beneficial to the organization. Project feasibility will be tested in four ways.

*Operational feasibility* investigates whether there will be sufficient support for the project from management and users.

*Technical feasibility* determines if the necessary technology exists and is capable of providing adequate service.

*Economic feasibility* represents a general determination of whether the resulting benefits will exceed the anticipated costs of the solution.

*Schedule feasibility* determines if the resulting solution can be implemented within a time frame that will prove beneficial to the organization.

An initial investigation report is prepared at the end of this stage to document the specific problem and what has been determined through the initial investigation. This report represents closure to a reported problem

and allows management, through the steering committee, to make a decision about the allocation of scarce resources to the resolution of a business problem.

The result of this initial investigation will be a recommendation to either take no action, resolve the problem through personnel changes (either reassignment or training), or continue with a subsequent stage of the SDLC.

## **THE CASES**

### **Genesis Process at Duncan Enterprises**

Kathy Moffitt and Doug Morgan

The primary goal of this case is to demonstrate the power of end user teams when they are properly formulated, trained, and supported. In the case, a radical approach is taken to resolve the rather negative situation that exists between end users and the information systems department. The approach contributes to the successful implementation of a new integrated information system. The primary benefit of this case is the demonstration of the importance of the behavioral issues that make for successful information systems development and implementation.

### **The Southwest University for Pursuing Exceptional Rigor (SUPER) School of Management Undergraduate Advising Center**

Laurie Schatzberg

A new director of a university undergraduate advising center has just been appointed. The Undergraduate Advising Center exchanges information with a variety of constituencies, both on the SUPER campus (e.g., students, faculty, and administration) and off-campus (e.g., other academic institutions, current high school students, and potential transfer students). The case requires that students analyze the current organization and systems, propose alternatives for managing the advising center, and design and prototype parts of the chosen alternative.

### **The Ashworth Group**

David Erbach

This case is based on an organization known as The Ashworth Group, a regional stock brokerage company founded almost 100 years ago by two wealthy entrepreneurs who foresaw that the economic development of western Canada would need a mechanism of capital formation. The thrust of the

case relates to the development of the annual information systems plan. The major points made concern addressing current technology and attempting to respond to dissatisfied end users.

## **The Application of Groupware at Coast Guard Headquarters**

Rick Gibson

This case presents a situation involving the Coast Guard and the necessity to decide about the adoption of groupware to support group activities and improve the Coast Guard's level of readiness.

## **GENESIS PROCESS AT DUNCAN ENTERPRISES**

Kathy Moffitt and Doug Morgan

One morning in February 1996 Doug Morgan, CFO of Duncan Enterprises, sat in his office and stared at the thick fog just outside his window. Morgan was pondering the accomplishments of the last 5 years and contemplating the key issues and directions for the future. A lot had changed since Morgan joined the company in late 1990 as its CFO and to whom information systems reports.

Duncan Enterprises is the world's leading manufacturer of hobby ceramic supplies, including molds, kilns, and a complete line of fired and nonfired paints and glazes. The company operates from a single location on 38 acres in Fresno, California, and distributes its ceramic products worldwide through a network of approximately 200 distribu-

tors, which in turn distribute through a network of approximately 50,000 dealers.

In 1989 Duncan Enterprises diversified into the "crafts" industry. While the manufacturing process is similar to that of the ceramics industry, the markets are significantly different. The existing information systems were incapable of responding to the demands of the new market. Distribution for crafts products is typically through large retail craft or discount store outlets. The effect of this different distribution was the need for different pricing structures, shipping and invoicing routines, and the demand for use of EDI and bar code applications. The corporate culture, along with the information systems, struggled to satisfy a new and very demanding customer.

### **The Need for Change**

Morgan was brought into the company because of the talents he had in addressing consolidated financial issues. Although relatively unsophisticated in information systems issues, he quickly became aware that

---

This case was prepared by Kathy Moffitt, California State University, Fresno, and Doug Morgan, CFO, Duncan Enterprises, as the basis for class presentation and discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

there were problems demanding attention. What he found was not unusual for organizations dealing with outdated legacy systems, rapid industry and competitive environment changes, frustrated end users, and an information systems staff that was extremely overburdened.

The continuous fire fighting required of the programming staff created a significant backlog of new system requirements and modifications. The size of the invisible backlog was enormous, as end users had given up all hope of getting anything out of the IS department. End users began developing their own applications and alternative procedures, both manual and automated. Some of these processes were valuable and endured the reengineering process that was, by chance, about to commence. End user conflict and demands were so extensive that in an attempt to satisfy users, many program “fixes” were achieved by changing the database information so that the users got the numbers they expected. Additionally, in an effort to expedite program modifications, many changes were being performed directly on production files without the benefit of a test environment. This created a vicious cycle in which programs became so complex after multiple undocumented and/or untested modifications, that people just started fixing the data. It is no wonder no one trusted the output of the information systems.

The outcome of the prior year’s failed efforts to make an old system address new needs was evident—some screen refresh rates exceeded 15 minutes and the LAN (installed in 1988) had over 85 workstations of various models of IBM clones and was experiencing four to eight hours of downtime per week. As the problems and frustrations increased, teamwork by those impacted by the IS systems began to give way to increased accusations and responsibility avoidance. The end users wanted IS to “fix

their problems.” When IS personnel attempted to create a team to address the issues, many end users said they did not have time to attend meetings. They would, however, send a memo setting forth the things they absolutely had to have because “that is how we do it now”—and could we please have it in the next 60 days.

The information systems present in the late 1980s included order entry, MRP II, and a nonintegrated internally developed financial package running on an IBM 4381-13. These programs had been extensively modified over a period of years to address the needs of various departments. The subsequent changes frequently caused problems for other departments. The outcome was a continuous mode of maintenance and “fire fighting.” This resulted in the significant backlog of unmet user requests and finally in end users developing their own applications and alternative procedures, all without an overall view of the direction of Duncan Enterprises.

The first thing Morgan did was quite unusual and absolutely dumbfounded the IS staff. He told them to go home; they were not being fired, he just wanted them to go home, get some sleep, and let the system run itself. They did not want to go home; they were needed. What they did not realize was that Morgan was trying to find out just how “needed” they were. How long would the system function without them? It took just over a day before the entire system crashed to its knees. The programmers and a systems analyst were brought in to get the system back up. With a longevity of about 10 hours, the system was definitely broken!

Morgan recognized that the situation needed to be addressed immediately and fully understood that an implemented solution would be some time off. He needed to move quickly but effectively because the crafts market was rapidly changing and the