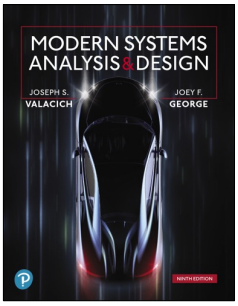
Modern Systems Analysis and Design

Ninth Edition



Chapter 10

Designing Firms and Reports

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Learning Objectives

10.1 Explain the process of designing forms and reports and the deliverables for their creation

10.2 Apply the general guidelines for formatting forms and reports

10.3 Use color and know when color improves the usability of information

10.4 Format text, tables, and lists effectively

10.5 Explain how to assess usability and describe how variations in users, tasks, technology, and environmental characteristics influence the usability of forms and reports

10.6 Discuss guidelines for the design of forms and reports for Internet-based electronic commerce systems

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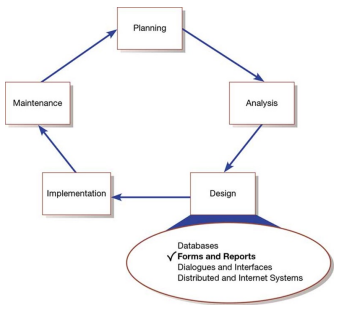
Figure 10-1: Systems Development Life Cycle with Logical Design Phase Highlighted



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Designing Forms and Reports

10.1 Explain the process of designing forms and reports and the deliverables for their creation

- **Form** – business document that contains some predefined data and may include some areas where additional data are to be filled in. An instance of a form is typically based on one database record.
  - Usually in a stylized format and not a simple row and column look
- **Report** – business document that contains only predefined data; it is a passive document used solely for reading or viewing. A report typically contains data from many unrelated records or transactions
  - Reports typically contain data from many unrelated records or transactions

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Table 10-1: Common Types of Business Reports

Report Name	Description
Scheduled Reports	Reports produced at predefined intervals—daily, weekly, or monthly—to support the routine informational needs of an organization.
Key-Indicator Reports	Reports that provide a summary of critical information on a recurring basis.
Exception Reports	Reports that highlight data that are out of the normal operating range.
Drill-Down Reports	Reports that provide details behind the summary values on a key-indicator or exception report.
Ad-hoc Reports	Unplanned information requests in which information is gathered to support a nonroutine decision.

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The Process of Designing Forms and Reports (1 of 3)

10.1 Explain the process of designing forms and reports and the deliverables for their creation

- A user-centered activity that follows a **prototyping** approach:
  - Understanding the target audience and their needs
  - Collect initial requirements
  - Structure and refine this information into an initial prototype
  - Users then evaluate the prototype
  - Make any needed refinements until users are satisfied and accept the prototype

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Table 10-2: Fundamental Questions When Designing Forms and Reports

1. Who will use the form or report?
2. What is the purpose of the form or report?
3. When is the form or report needed and used?
4. Where does the form or report need to be delivered and used?
5. How many people need to use or view the form or report?

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The Process of Designing Forms and Reports (2 of 3)

10.1 Explain the process of designing forms and reports and the deliverables for their creation

- **Paper prototype** – series of mock screens that can be used to test content, look, and feel, as well as the task flow and other usability factors
  - Focus is on the design (content, layout, flow)
- **Wireframe** – simple design to show the placement of information elements on a screen and the space needed for each element
  - Allows users to get a sense and feel of a design

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The Process of Designing Forms and Reports (3 of 3)

10.1 Explain the process of designing forms and reports and the deliverables for their creation

- A coding sheet is an "old" tool for designing forms and reports in text-based format (see figure 10-2)
- A wireframe is an input screen roughed out on a sheet of paper (see figure 10-3A)
- A data input screen designed in Visual Basic allows a variety of font sizes, colors, and highlighting (see figure 10-3B)

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Figure 10-2: The Layout of a Data Input Form Using a Coding Sheet

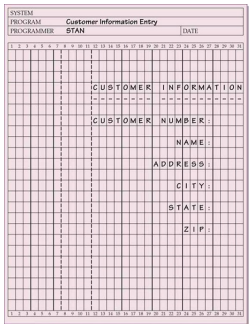

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Figure 10-3A: A Data Input Screen Designed as a Wireframe

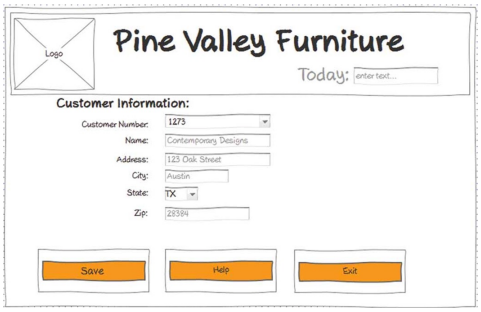

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Figure 10-3B: A Data Input Screen Designed in Microsoft's Visual Basic.NET

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Deliverables and Outcomes

10.1 Explain the process of designing forms and reports and the deliverables for their creation

- Design specifications are the major deliverables and contain three sections:
  1. Narrative overview
     - Characterizes, users, tasks, system, and environmental factors
  2. Sample design
     - Image of the form is more thoroughly tested and assessed
  3. Testing and usability assessment
     - Provides all testing and assessment information
     - Determine usability

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Table 10-3: General Guidelines for the Design of Forms and Reports (1 of 2)

- **Meaningful Titles:**
  - Clear and specific titles describing content and use of form or report
  - Revision date or code to distinguish a form or report from prior versions
  - Current date, which identifies when the form or report was generated
  - Valid date, which identifies on what date (or time) the data in the form or report were accurate
- **Meaningful Information:**
  - Only needed information should be displayed
  - Information should be provided in a manner that is usable without modification

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Table 10-3: General Guidelines for the Design of Forms and Reports (2 of 2)

- **Balance the Layout:**
  - Information should be balanced on the screen or page
  - Adequate spacing and margins should be used
  - All data and entry fields should be clearly labeled
- **Design an Easy Navigation System:**
  - Clearly show how to move forward and backward
  - Clearly show where you are (e.g., page 1 of 3)
  - Notify user when on the last page of a multipaged sequence

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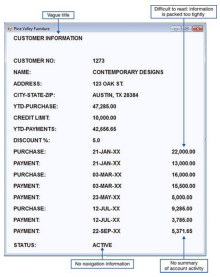
Figure 10-5: Contrasting Customer Information Forms (Pine Valley Furniture) (a) Poorly Designed Form



(**Source:** Microsoft Corporation)

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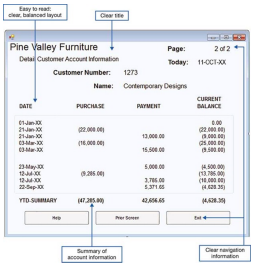
Figure 10-5: Contrasting Customer Information Forms (Pine Valley Furniture) (b) Improved Design for Form



(**Source:** Microsoft Corporation)

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Table 10-4: Methods of Highlighting

- Blinking and audible tones
- Color differences
- Intensity differences
- Size differences
- Font differences
- Reverse video
- Boxing
- Underlining
- All capital letters
- Offsetting the position of nonstandard information

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Highlighting Information

10.2 Apply the general guidelines for formatting forms and reports

- Several situations when highlighting can be a valuable technique for conveying special information include:
  - Notifying users of errors in data entry or processing
  - Providing warnings to users regarding possible problems such as unusual data values or an unavailable device
  - Drawing attention to keywords, commands, high-priority messages, and unusual data values

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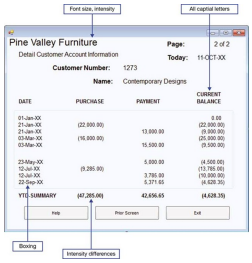
Figure 10-6: Customer Account Status Display Using Various Highlighting Techniques (Pine Valley Furniture)



(**Source:** Microsoft Corporation)

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Table 10-5: Benefits and Problems from Using Color

- **Benefits from Using Color:**
  - Soothes or strikes the eyes
  - Accents an uninteresting display
  - Facilitates subtle discriminations in complex displays
  - Emphasizes the logical organization of information
  - Draws attention to warnings
  - Evokes more emotional reactions
- **Problems with Using Color:**
  - Color pairings may wash out or cause problems for some users (e.g., color blindness)
  - Resolution may degrade with different displays
  - Printing or conversion to other media may not easily translate

(**Source:** Based on Shneiderman et al., 2016; Benbasat, Dexter, & Todd, 1986)

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Table 10-6: Guidelines for Displaying Text

Case	Display text in mixed uppercase and lowercase and use conventional punctuation.
Spacing	Use double spacing if space permits. If not, place a blank line between paragraphs.
Justification	Left-justify text and leave a ragged-right margin.
Hyphenation	Do not hyphenate words between lines.
Abbreviations	Use abbreviations and acronyms only when they are widely understood by users and are significantly shorter than the full text.

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Figure 10-7: Contrasting the Display of Textual Help Information (a) Poorly-Designed Help Screen with Many Violations of the General Guidelines for Displaying Text

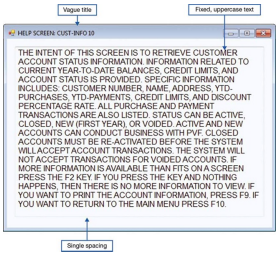

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Figure 10-7: Contrasting the Display of Textual Help Information (b) An Improved Design for a Help Screen

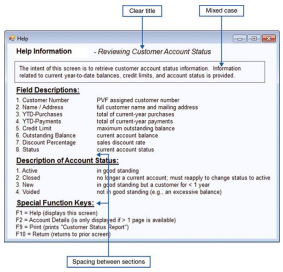

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Table 10-7: General Guidelines for Displaying Tables and Lists (1 of 2)

- **Use meaningful labels:**
  - All columns and rows should have meaningful labels
  - Labels should be separated from other information by using highlighting
  - Redisplay labels when the data extend beyond a single screen or page
- **Formatting columns, rows, text:**
  - Sort in a meaningful order (e.g., ascending, descending, or alphabetic)
  - Place a blank line between every five rows in long columns
  - Similar information displayed in multiple columns should be sorted vertically (i.e., read from top to bottom, not left to right)
  - Columns should have at least two spaces between them
  - Allow white space on printed reports for user to write notes

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Table 10-7: General Guidelines for Displaying Tables and Lists (2 of 2)

- **Formatting columns, rows, text: (cont.)**
  - Use a single typeface, except for emphasis
  - Use same family of typefaces within and across displays and reports
  - Avoid overly fancy fonts
- **Formatting numeric, textual, and alphanumeric date:**
  - **Right-justify numeric data** and align columns by decimal points or other delimiter
  - **Left-justify textual data**. Use short line length, usually 30–40 characters per line (this is what newspapers use, and it is easier to speed-read).
  - Break long sequences of **alphanumeric data** into small groups of three to four characters each

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Figure 10-8: Contrasting the Display of Tables and Lists (Pine Valley Furniture) (a) Poorly-Designed Form

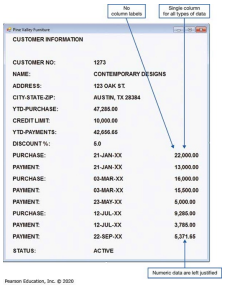

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Figure 10-8: Contrasting the Display of Tables and Lists (Pine Valley Furniture) (b) Improved Design for Form

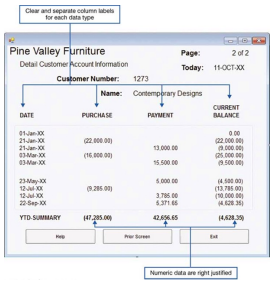

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Table 10-8: Guidelines for Selecting Tables Versus Graphs

- **Tables**
  - Reading individual data values
- **Graphs**
  - Providing a quick summary of data
  - Detecting trends over time
  - Comparing points and patterns of different variables
  - Forecasting activities
  - Reporting vast amounts of information when relatively simple impressions are to be drawn

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Figure 10-9: Tabular Report Illustrating Numerous Design Guidelines (Pine Valley Furniture)

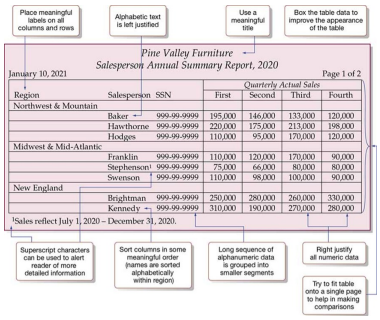

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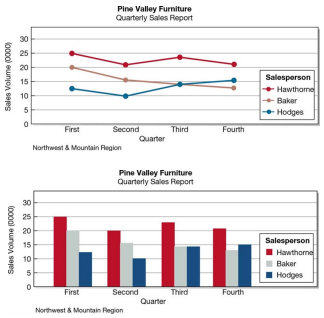
Figure 10-10: Graphs for Comparison (a) Line Graph (b) Bar Graph



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Paper vs Electronic Reports

10.4 Format text, tables, and lists effectively

- Laser and ink-jet printers can print reports that look like display screen
  - Same guidelines apply
- High-speed impact printers are faster, but less user-friendly in appearance
  - Good for large batch reports
  - The coding sheet from figure 10-2 may be useful for these types of reports

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Assessing Usability

10.5 Explain how to assess usability and describe how variations in users, tasks, technology, and environmental characteristics influence the usability of forms and reports

- **Usability** – overall evaluation of how a system performs in supporting a particular user for a particular task
- Three characteristics of usability:
  1. Speed – Can you complete a task efficiently?
  2. Accuracy – Does the system provide what you expect?
  3. Satisfaction – Do you like using the system?

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Table 10-9: General Design Guidelines for Usability of Forms and Reports

Usability Factor	Guidelines for Achievement of Usability
Consistency	Consistent use of terminology, abbreviations, formatting, titles, and navigation within and across outputs. Consistent response time each time a function is performed.
Organization	Formatting should be designed with an understanding of the task being performed and the intended user. Text and data should be aligned and sorted for efficient navigation and entry. Entry of data should be avoided where possible (e.g., computing rather than entering totals).
Clarity	Outputs should be self-explanatory and not require users to remember information from prior outputs in order to complete tasks. Labels should be extensively used, and all scales and units of measure should be clearly indicated.
Format	Information format should be consistent between entry and display. Format should distinguish each piece of data and highlight, not bury, important data. Special symbols, such as decimal places, dollar signs, and ± signs, should be used as appropriate.
Flexibility	Information should be viewed and retrieved in a manner most convenient to the user. For example, users should be given options for the sequence in which to enter or view data and for use of shortcut keystrokes, and the system should remember where the user stopped during the last use of the system.

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Table 10-10: Characteristics for Consideration When Designing Forms and Reports

Characteristic	Consideration for Form and Report Design
User	Issues related to experience, skills, motivation, education, and personality should be considered.
Task	Tasks differ in amount of information that must be obtained from or provided to the user. Task demands such as time pressure, cost of errors, and work duration (fatigue) will influence usability.
System	The platform on which the system is constructed will influence interaction styles and devices.
Environment	Social issues such as the users' status and role should be considered in addition to environmental concerns such as lighting, sound, task interruptions, temperature, and humidity. The creation of usable forms and reports may necessitate changes in the users' physical work facilities.

(**Source:** Based on Norman, 1991)

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Measures of Usability

10.5 Explain how to assess usability and describe how variations in users, tasks, technology, and environmental characteristics influence the usability of forms and reports

- Methods to assess usability:
  - **Learnability** – usability dimension concerned with how difficult it is for the user to perform a task for the first time
  - **Efficiency** – usability dimension concerned with how quickly users can perform tasks once they know how to perform them
  - **Error rate** – usability dimension concerned with how many errors a user might encounter and how easy it is to recover from those errors
  - **Memorability**—How easy is it to remember how to accomplish a task when revisiting the system after some period of time?
  - **Satisfaction and aesthetics**—How enjoyable is the system's visual appeal and how enjoyable is the system to use?

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Table 10-11: Common Errors When Designing the Layout of Web Pages (1 of 2)

Error	Recommendation
Nonstandard Use of GUI Widgets	Make sure that when using standard design items, they behave in accordance with major interface design standards. For example, the rules for radio buttons state that they are used to select one item among a set of items, that is, not confirmed until "OK'd" by a user. In many Web sites selecting radio buttons is used as both selection and action.
Anything That Looks Like Advertising	Because research on Web traffic has shown that many users have learned to stop paying attention to Web advertisements, make sure that you avoid designing any legitimate information in a manner that resembles advertising (e.g., banners, animations, pop-ups).
Bleeding-Edge Technology	Make sure that users don't need the latest browsers or plug-ins to view your site.
Scrolling Test and Looping Animations	Avoid scrolling text and animations because they are both hard to read and users often equate such content with advertising.
Nonstandard Link Colors	Avoid using nonstandard colors to show links and for showing links that users have already used; nonstandard colors will confuse the user and reduce ease of use.

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Table 10-11: Common Errors When Designing the Layout of Web Pages (2 of 2)

Error	Recommendation
Outdated Information	Make sure your site is continuously updated so that users "feel" that the site is regularly maintained and updated. Outdated content is a sure way to lose credibility.
Slow Download Times	Avoid using large images, lots of images, unnecessary animations, or other time-consuming content that will slow the downloading time of a page.
Fixed-Formatted Text	Avoid fixed-formatted text that requires users to scroll horizontally to view content or links.
Displaying Long Lists as Long Pages	Avoid requiring users to scroll down a page to view information, especially navigational controls. Manage information by showing only N items at a time, using multiple pages, or by using a scrolling container within the window.

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Designing Forms and Reports at PVF

10.6 Discuss guidelines for the design of forms and reports for Internet-based electronic commerce systems

- Guidelines established at Pine Valley Furniture (PVF) include:
  - Use lightweight graphics
  - Establish forms and data integrity rules
  - Use stylesheet-based HTML

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Lightweight Graphics

10.6 Discuss guidelines for the design of forms and reports for Internet-based electronic commerce systems

- **Lightweight graphics** – small, simple images that allow a Web page to be displayed more quickly
- Forms and data integrity rules:
  - All forms that request information should be clearly labeled and provide adequate room for input
  - Specific fields requiring specific information must provide a clear example
  - Forms must designate which fields are optional, required, and which have a range of values

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Stylesheet-Based HTML

10.6 Discuss guidelines for the design of forms and reports for Internet-based electronic commerce systems

- **Stylesheet-Based HTML** – Web design approach that separates content from the way in which it is formatted and presented, making ongoing maintenance easier and site-wide consistency much higher
  - Allows content of a Web page to remain separate from the way it is formatted
  - Facilitates site-wide consistency

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Summary (1 of 2)

- In this chapter you learned how to:
  - Explain the process of designing forms and reports and the deliverables for their creation
  - Apply the general guidelines for formatting forms and reports
  - Use color and know when color improves the usability of information
  - Format text, tables, and lists effectively

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Summary (2 of 2)

- In this chapter you learned how to:
  - Explain how to assess usability and describe how variations in users, tasks, technology, and environmental characteristics influence the usability of forms and reports
  - Discuss guidelines for the design of forms and reports for Internet-based electronic commerce systems

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