Chapter 8
Output and User Interface Design

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Basic Principles of User-Centered Design

- Understand the *underlying business functions*
  - Use the *functional decomposition diagram* (FDD) as a *checklist* of *user tasks* that must be included in the interface design

- Maximize *graphical effectiveness*
  - People *learn better visually*

- Profile the *system’s users*
  - Should be *flexible enough* to accommodate *novices* as well as *experienced users*
Basic Principles of User-Centered Design cont.

- Think *like a user*
  - *See* the system *through* a user’s eyes
  - User *term* and *metaphors* that are familiar to users

- Use *prototyping*
  - Construct *models* and *prototypes* for user approval
  - Present *initial screen designs* to users in the form of a *storyboard*
    - A *sketch* showing the general screen layout and design
      - Can be done by *software* or *freehand*
Design a comprehensive interface

- Include *all* tasks, commands, and communications *between* users and the information systems
- Offer a *reasonable number* of choices that a user *can easily comprehend*
  - *Too many* options on one screen can *confuse* a user
  - *Too few* options *increase* the number and level of submenus
Basic Principles of User-Centered Design cont.

- Continue the *feedback process*
  - *Monitor* system usage and *solicit* user suggestions
    - Even *after* the system is operational

- *Document the interface design*
  - *Document all screen design for later use by programmers*
Guidelines for User Interface Design

Follow eight basic guidelines

1. Focus on basic objectives
2. Build an interface that is easy to learn and use
3. Provide features that promote efficiency
4. Make it easy for users to obtain help or correct errors
5. Minimize input data problems
6. Provide feedback to users
7. Create an attractive layout and design
8. Use familiar terms and images
Guidelines for User Interface Design cont.

- Good user interface design is based on a combination of
  - Ergonomics
  - Aesthetics
  - Interface technology
User Interface Controls

- Menu bar
- Toolbar
- Command button
- Dialog box
- Text box
- Toggle button
- List box
  - Use *scroll bar* if necessary
User Interface Controls cont.

- Drop-down list box
- Option button (radio button)
- Check box
- Calendar control
- Switchboard
User Interface Controls cont.
Add a Project Record

Project Number: 1785
Project Description: Develop Web site for Jones, Inc.
Project Manager: Susan Smith
Start Date: 07/20/2009
Completion Date: 10/16/2009
Status Code: A

Find Record  Add Record  Clear Fields
Exit to Main Menu
Input Design

- Input technology has *changed dramatically* in recent years
- The quality of the output is *only as good as* the quality of the input
  - Known as *garbage in garbage out* (GIGO)
Input Design cont.

- Data capture
  - Use *an automated and manual* device to *identify* source data and *convert* it into *computer-readable* form

- Data entry
  - *Manually entering* data into the information system
Input and Data Entry Methods

- **Batch input**
  - Performed on *a specified time schedule* to enter data as a *batch*

- **Online input**
  - Online data entry
  - Source data automation
    - Combine *online data entry* and *automated data capture*
    - Using input devices such as *RFID tags* or *magnetic data strips*
Tradeoffs

- Manual data entry
  - Slower and more expensive than batch input
  - Performed at the time the transaction occurs
    - When computer demand is at highest

- The decision to use batch or online input
  - Depend on business requirements
Input Volume

- Guidelines will help reduce input volume
  - Input necessary data only
  - *Do not* input data that the user can retrieve from system files or calculate from other data
  - *Do not* input constant data
  - Use *codes*
    - Codes are shorter than the data they represent
    - To reduce data entry time
Designing Data Entry Screens

- **Most effective method of online data entry is**
  - *Form filling*

- **Guidelines help the design of data entry screens**
  1. *Restrict user access* to screen locations where data is entered
  2. Provide *a descriptive caption* for every field, and show the user where to enter the data and the required or maximum *field size*
  3. Display a *sample format* if a user must enter values in a field in a *specific format*
4. Require an *ending keystroke* for every field

5. *Do not require* users to *type leading zeroes* for numeric fields

6. *Do not require* users to *type trailing zeroes* for numbers that include decimals

7. Display *default values* so operators can press the *ENTER* key to *accept* the suggested value

8. Use a *default value when* a field value will be *constant for successive records* or *throughout the data entry session*
9. Display a list of acceptable values for fields, and provide meaningful error messages.

10. Provide a way to leave the data entry screen at any time without entering the current record.

11. Provide users with an opportunity to confirm the accuracy of input data before entering it.

12. Provide a means for users to move among fields on the form.

13. Design the screen form layout to match the layout of the source document.
14. Allow users to *add*, *change*, *delete*, and *view* records.

15. Provide a method to *allow users to search* for specific information.
Input Errors

- At least *eight* types of data validation checks
  1. Sequence check
  2. Existence check
  3. Data type check
  4. Range check
  5. Reasonableness check
  6. Validity check
  7. Combination check
Input Errors cont.

8. Batch controls

- Totals used to verify batch input such as record counts and numeric field totals
- Batch control totals are called hash totals
  - They are not meaningful numbers but are useful for comparison purposes
Source Documents

- A form used to
  - Request and collect input data
  - Trigger or authorize and input action
  - Provide a record of the original transaction

- Design considerations
  - Form layout
  - Heading zone
  - Control zone
    - Contain codes, identification information, numbers, and dates
Source Documents cont.

- Instruction zone
- Body zone
- Totals zone
  - If totals are included on the form
- Authorization zone
  - For signatures
Source Documents cont.
Information should flow on a form from left to right and top to bottom

- To match the way users read documents naturally

A major challenge of Web-based form design

- Most people read and interact differently on-screen and on-paper
Input Control

- *Every piece of information should be* traceable *back to the input data*
- Provide an *audit trail*
  - Record the *source* of each data item and *when* it entered to system
- Data security
  - Policies and procedures *protect data from* loss or damage
Input Control cont.

- **Records retention policy**
  - *Store* data source in a *safe location* for some *specified length of time*

- **Encrypted**
  - *Sensitive data* can be encrypted
Summary

- The chapter began with a discussion of output design issues and a description of various types of output.

- User-centered design principles require an analyst to:
  - Understand the business functions, maximize graphical effectiveness, profile the system’s users, think like a user, use prototyping, design a comprehensive interface, continue the feedback process, and document the interface design.
Summary cont.

- An effective way to reduce input errors is to reduce input volume.
- You can also reduce errors by using well-designed data entry screens and by using data validation checks.