



**The Essential Guide to
User Interface Design
An Introduction to GUI Design
Principles and Techniques**

Third Edition

Wilbert O. Galitz



Wiley Publishing, Inc.



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To my wife and business partner, Sharon, for many years of love and support in our home and office.

To our grandchildren, Mitchell, Barry, Deirdra, and Spencer Galitz, Lauren and Scott Roepel, and Shane and Emily Watters. May one or more of them pick up the writing torch.



About the Author

Wilbert (Bill) O. Galitz is an internationally respected consultant, author, and instructor with a long and illustrious career in Human Factors and user-interface design. For many years he has consulted, lectured, written about, and conducted seminars and workshops on these topics worldwide. He is now the author of eleven books, and his first book, *Human Factors in Office Automation* (1980), was critically acclaimed internationally. This book was the first to address the entire range of human factors issues involved in business information systems. As a result, he was awarded the Administrative Management Society's Olsten Award. Other books have included *User-Interface Screen Design* and *It's Time to Clean Your Windows*. He has long been recognized as a world authority on the topic of screen design.

Bill's career now spans more than 45 years in information systems, and he has been witness to the amazing transformation of technology over this time span. His career began in 1961 with the System Development Corporation, where he was a Training Consultant for the SAGE North American Air Defense System. SAGE was the world's first large-scale display-based system. Before forming his own consulting company in 1981, he worked for CNA Insurance and the Insurance Company of North America (now CIGNA), where he designed the user-interfaces and developed screen and interface design standards for a variety of business information systems. His work experience also includes an appointment at South Africa's National Institute for Personnel Research and a number of years with UNIVAC (now UNISYS). At UNIVAC he performed the human engineering of the company's first commercial display terminal and completed a pioneering study on the operational aspects of large-scale computer systems.

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Preface

This third edition of *The Essential Guide to User Interface Design* is about designing clear, easy-to-understand-and-use interfaces and screens for graphical and Web systems. It is the eighth in a long series of books by the author addressing screen and interface design. Over the past two decades these books have evolved and expanded as interface technology has changed and research knowledge has expanded.

The first book in the series, called *The Handbook of Screen Format Design*, was published in 1981. It presented a series of screen design guidelines for the text-based technology of that era. Through the 1980s and early 1990s the book's content was regularly updated to reflect current technology and published under different, but similar, titles. In 1994, graphical user interface, or GUI, systems having assumed interface dominance, the newest version of the book, which focused exclusively on graphical system interface design, was released. It was titled *It's Time to Clean Your Windows*. The follow-on and updated version of *It's Time to Clean Your Windows* was the first edition of this book, *The Essential Guide to User Interface Design*. The impetus for these newer editions of *The Essential Guide to User Interface Design* has been the impact of the World Wide Web on interface and screen design. This new edition incorporates an extensive compilation of Web interface design guidelines, and updates significant general interface findings over the past several years.

Is Good Design Important?

Is good design important? It certainly is! Ask the users whose productivity improved 25 to 40 percent as a result of well-designed screens, or the company that saved \$20,000 in operational costs simply by redesigning one window. (These studies are described in Chapter 1.)

What comprises good design? To be truly effective, good screen design requires an understanding of many things. Included are the characteristics of people: how we see,

understand, and think. It also includes how information must be visually presented to enhance human acceptance and comprehension, and how eye and hand movements must flow to minimize the potential for fatigue and injury. Good design must also consider the capabilities and limitations of the hardware and software of the human-computer interface.

What does this book do? This book addresses interface and screen design from the user's perspective, spelling out hundreds of guidelines for good design in a clear and concise manner. It blends the results of screen design research, knowledge concerning people, knowledge about the hardware and software capabilities of the interface, and my practical experience, which now spans 45 years in display-based systems.

Looking ahead, an example of what this book will accomplish for you is illustrated in Figures P.1 through P.4. Figure P.1 is an actual interface screen. It looks bad but you do not realize how really horrible it is until you look at Figure P.2, a redesigned version. The same goes for Figure P.3, an original screen, and Figure P.4, a redesigned version. This book will present the rules for the redesigned screens, and the rationale and reasoning that explains why they are much friendlier. We'll fully analyze these screens later in this text. Sprinkled throughout the pages will also be many other examples of good and bad design.

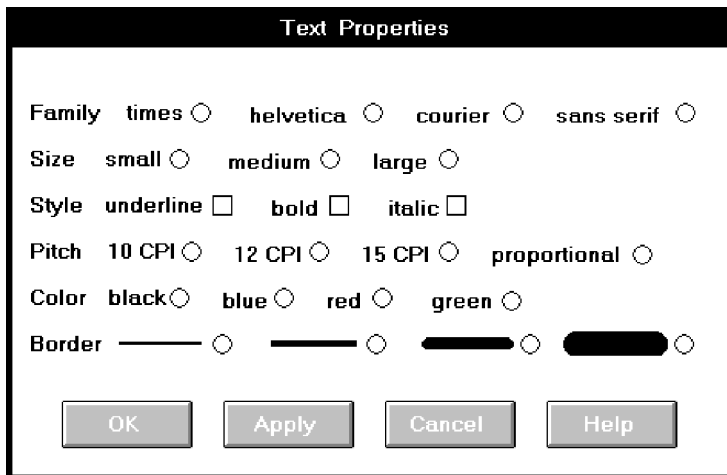


Figure P.1 An existing screen.

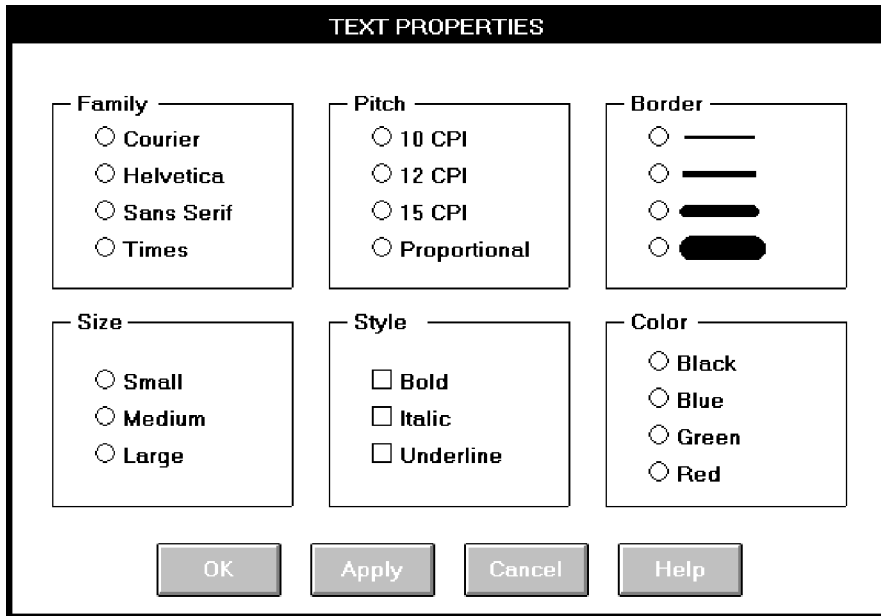


Figure P.2 A redesigned screen.

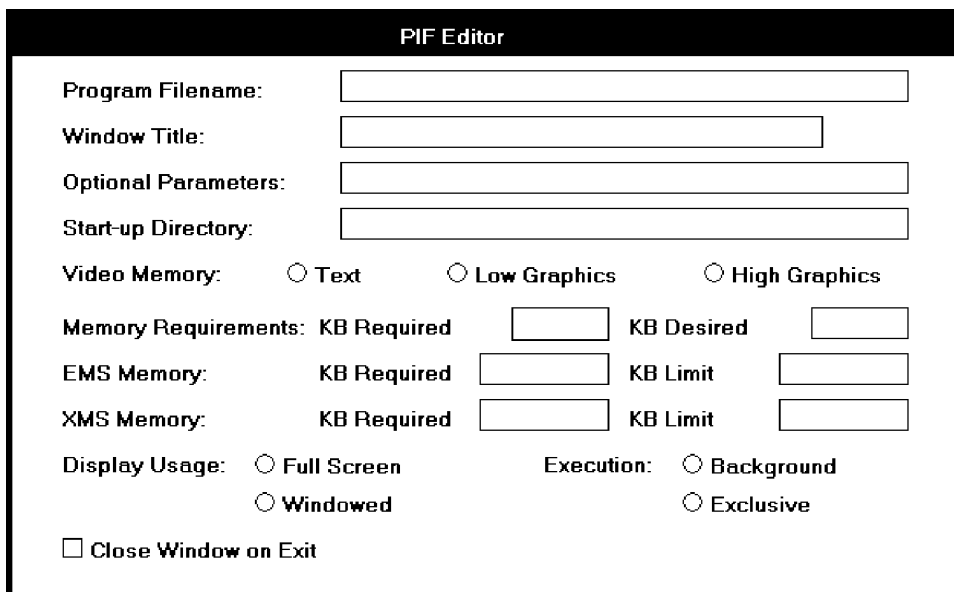


Figure P.3 An existing screen.

The Purpose of This Book

This book's first objective is to present the important practical guidelines for good interface and screen design. It is intended as a ready reference source for all graphical and Web systems. The guidelines reflect a mix of human behavior, science, and art, and are organized within the context of the GUI design process. The specific objectives are to enable the reader to do the following:

- Understand the many considerations that must be applied to the interface and screen design process.
- Understand the rationale and rules for an effective interface design methodology.
- Identify the components of graphical and Web interfaces and screens, including windows, menus, and controls.
- Design and organize graphical screens and Web pages to encourage the fastest and most accurate comprehension and execution of screen features.
- Choose screen colors and design screen icons and graphics.
- Perform the user interface design process, including interface development and testing.

The book's other objective is to provide materials that, when applied, will allow our users to become more productive—and more satisfied—using the interfaces we produce. A satisfied user also means, of course, a satisfied designer.

How This Book Is Organized

This book is composed of two parts. Part 1 provides an introduction to the human-computer interface. Chapter 1 examines what an interface is, its importance, and its history. Chapter 2 reviews the two dominant user interfaces today: the graphical user interface (GUI) and the World Wide Web (WWW or Web). GUI interfaces are looked at in terms of their components, characteristics, and advantages over the older text-based systems. Web interfaces are compared to both GUI interfaces and conventional printed documents. The differing characteristics of three distinct Web environments—the Internet, intranet, and extranet—are also summarized. The second chapter concludes with a statement of the basic underlying principles for interface design.

Part 2 presents an extensive series of guidelines for the interface design process. It is organized in the order of the development steps typically followed in creating a graphical system's or Web site's screens and pages. The 14 steps presented are:

The image shows a window titled "PIF EDITOR" with three main sections:

- APPLICATION:** Contains four text input fields for "Program Filename:", "Window Title:", "Optional Parameters:", and "Start-up Directory:".
- MEMORY:** Contains three rows of memory settings:
 - REAL > Required: [] KB, Desired: [] KB
 - EMS > Required: [] KB, Limit: [] KB
 - XMS > Required: [] KB, Limit: [] KB
- VIDEO > Type:** Contains three radio button options: "Text", "Low Graphics", and "High Graphics" (which is selected).
- Display Usage:** Contains two radio button options: "Full Screen" and "Windowed" (which is selected).
- Execution:** Contains two radio button options: "Background" (which is selected) and "Exclusive".
- Window:** Contains one checkbox option: "Close on Exit".

Figure P.4 A redesigned screen.

Step 1: Know Your User or Client. To begin, an understanding of the most important system or Web site component, the user or client, must be obtained. Understanding people and what they do is a critical and often difficult and undervalued process. The first step in the design process involves identifying people's innate and learned characteristics, and understanding how they affect design.

Step 2: Understand the Business Function. A system or Web site must achieve the business objectives for which it is designed. To do so requires an understanding of the goals of the system and the functions and tasks performed. Determining basic business functions, describing user activities through task analysis, understanding the user's mental model, and developing a conceptual model of the system accomplish this. The system's conceptual model must fit the user's view of the tasks to be performed. Step 2 also addresses the establishment of design standards or style guides, and the definition of training and documentation needs.

Step 3: Understand the Principles of Good Interface and Screen Design. A well-designed screen must reflect the needs and capabilities of its users, be developed within the physical constraints imposed by the hardware on which it is displayed, and effectively utilize the capabilities of its controlling software. Step 3 involves understanding the capabilities of, and limitations imposed by, people, hardware, and software in designing screens and Web pages. It presents an enormous number of general design guidelines for organizing and presenting information to people.

Step 4: Develop System Menus and Navigation Schemes. Graphical systems and Websites are heavily menu-oriented. Menus are used to designate commands, properties that apply to an object, documents, and windows. To accomplish these goals, a variety of menu styles are available to choose from. Step 4 involves understanding how menus are used, and selecting the proper kinds for specific tasks. The principles of menu design are described, and the purpose and proper usage of various menu types are detailed. In this step guidelines for Web site navigation are also presented. Topics addressed include the elements of Web navigation such as links, navigation aids, and search facilities.

Step 5: Select the Proper Kinds of Windows. Graphical screen design consists of a series of windows. Step 5 involves understanding how windows are used and selecting the proper kinds for the tasks. The elements of windows are described, and the purpose and proper usage of various types of windows are detailed. The step concludes with a discussion of Web browsers.

Step 6: Select the Proper Interaction Devices. In addition to the keyboard, a system or Web site might offer the user a mouse, trackball, joystick, graphic tablet, touch screen, light pen, or some other similar device. Step 6 consists of identifying the characteristics and capabilities of these various control mechanisms and providing the proper ones for users and their tasks.

Step 7: Choose the Proper Screen-Based Controls. The designer is presented with an array of controls to choose from. Selecting the right one for the user and the task is often difficult. But, as with interaction devices, making the right choice is critical to system success. A proper fit between user and control will lead to fast, accurate performance. A poor fit will result in lower productivity, more errors, and often user dissatisfaction. Step 7 consists of identifying the characteristics and capabilities of these various screen-based controls and guidelines for providing the proper ones for users and their tasks.

Step 8: Write Clear Text and Messages. Creating text and messages in a form the user wants and understands is absolutely necessary for system acceptance and success. Rules for writing text and messages for systems and Web sites are presented.

Step 9: Provide Effective Feedback and Guidance and Assistance. Effective feedback and guidance and assistance are also necessary elements of good design. This step presents the guidelines for presenting to the user feedback concerning the system and its processing status. It also describes the system response times necessary to meet user needs. Step 9 also describes the kinds of guidance and assistance that should be included in a system, and presents important design guidelines for the various kinds.

Step 10: Provide Effective Internationalization and Accessibility. People from different cultures, and people who speak different languages may use graphical systems and Websites. Guidelines for accommodating different cultures and languages in a design are presented. People with disabilities may also be users. Design considerations for these kinds of users are also described.

Step 11: Create Meaningful Graphics, Icons, and Images. Graphics, including icons and images, are an integral part of design. Design guidelines for various types of graphics are presented. Icons are described, including a discussion of

what kinds of icons exist, what influences their usability, and how they should be designed so they are meaningful and recognizable. The elements of multimedia presentation are also reviewed. Guidelines presented include those for images, photographs, videos, drawings, animation, and audition.

Step 12: Choose the Proper Colors. Color, if used properly, can emphasize the logical organization of a screen, facilitate the discrimination of screen components, accentuate differences, and make displays more interesting. If used improperly, color can be distracting and cause visual fatigue, impairing a system's usability. Step 12 involves understanding color and how to use it effectively on textual and statistical graphics screens, and in Web sites.

Step 13: Organize and Layout Windows and Pages. After determining all the components of a screen or page, the screen or page must be organized and its elements presented clearly and meaningfully. Proper presentation and organization will encourage the quick and accurate comprehension of information and the fastest possible execution of user tasks. Step 13 addresses the rules for laying out all screen elements and controls in the most effective manner possible.

Step 14: Test, Test, and Retest. A host of factors must be considered in design and numerous trade-offs will have been made. Indeed, the design of some parts of the system may be based on skimpy data and simply reflect the most educated guess possible. Also, the implications for some design decisions may not be fully appreciated until the results can be seen. Waiting until after a system has been implemented to uncover any deficiencies and make any design changes can be aggravating, costly, and time-consuming. To minimize these kinds of problems, interfaces and screens must be continually tested and refined as development proceeds. Step 14 reviews the kinds of tests that can be performed, and discusses creating, evaluating, and modifying prototypes in an iterative manner. It also reviews final system testing and ongoing evaluations of working systems.

Because Part 2 is organized into what appear to be nonoverlapping linear tasks, this does not mean to imply, however, that the actual design process will fall into such neat categories—one step finishing and only then the next step starting. In reality, some steps will run concurrently or overlap, and design iterations will cause occasional movements backward as well as forward. If any of these steps are omitted, or carelessly performed, a product's foundation will be flawed. A flawed foundation is difficult to correct afterward.

The readers of the first edition of this book will note that the order in which the steps are presented has been slightly modified in subsequent editions and the number of design steps was increased from 12 to 14. The most notable reordering change is the repositioning of the step "Organize and Layout Windows and Pages" to near the end of the development process. This was done to accommodate the much greater importance of graphical components in Web site design. The increase in the number of steps resulted from material previously covered in one step being separated into three steps. "Write Clear Text and Messages," "Provide Effective Feedback and Guidance and Assistance," and "Provide Effective Internationalization and Accessibility" are addressed separately to emphasize the importance of each of these activities.

This book is both a reference book and a textbook. A set of related bulleted listings of guidelines, many with illustrative examples, are first presented in checklist form.

Each checklist is then followed by more detailed explanatory text providing necessary rationale and any research upon which they are based. The reader can use the narrative to gain an understanding of the reasoning behind the guidelines and use the bulleted listings as a checklist for design.

Scattered throughout the book are many illustrations of design, both good and bad. These illustrations have been made as generic as possible, without intending to reflect any one graphical product or system. In view of the ever-changing interface landscape, this seems the most practical approach. The screen examples, however, were created using Microsoft's Visual Basic, so an illustrative bias will exist in this direction.

Research citations are confined to those in the last decade or so. Older citations have been included, however, when they are extremely relevant to a guideline or a guideline's discussion. Finally, also sprinkled throughout the book are a collection of design myths to be discounted and maximums to be adhered to.

Companion Website

A companion Website for this book exists at www.wiley.com/college/galitz. Exercises for Part 1 and for each Step in Part 2 can be found at this Website. Answers and solutions for these exercises will also be found there.

In addition, the companion Website includes additional screen examples for Steps 4 and 13.

Who Should Read This Book

This book, while essentially an introduction to interface design, will be useful for any GUI system or Web page developer. For the developer with limited experience, a reading of its entire contents is appropriate. For the more experienced developer a perusal of its extensive contents will undoubtedly identify topics of further interest. The experienced developer will also find a review of the bulleted guidelines useful in identifying topics to be read more thoroughly. All readers will also find the bulleted checklists a handy reference guide in their development efforts.

From Here

Thank you for your interest in interface and screen design. The reader with any thoughts or comments is invited to contact me.

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