INTERACTION DESIGN

beyond human-computer interaction
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Welcome to Interaction Design: Beyond Human-Computer Interaction, and our interactive website at ID-Book.com

This textbook is for undergraduate and masters students from a range of backgrounds studying classes in human-computer interaction, interaction design, web design, etc. A broad range of professionals and technology users will also find this book useful, and so will graduate students who are moving into this area from related disciplines.

Our book is called Interaction Design: Beyond Human-Computer Interaction because it is concerned with a broader scope of issues, topics, and paradigms than has traditionally been the scope of human-computer interaction (HCI). This reflects the exciting times we are living in, when there has never been a greater need for interaction designers and usability engineers to develop current and next-generation interactive technologies. To be successful they will need a mixed set of skills from psychology, human-computer interaction, web design, computer science, information systems, marketing, entertainment, and business.

What exactly do we mean by interaction design? In essence, we define interaction design as:

"designing interactive products to support people in their everyday and working lives".

This entails creating user experiences that enhance and extend the way people work, communicate, and interact. Now that it is widely accepted that HCI has moved beyond designing computer systems for one user sitting in front of one machine to embrace new paradigms, we, likewise, have covered a wider range of issues. These include ubiquitous computing and pervasive computing that make use of wireless and collaborative technologies. We also have tried to make the book up-to-date with many examples from contemporary research.

The book has 15 chapters and includes discussion of how cognitive, social, and affective issues apply to interaction design. A central theme is that design and evaluation are interleaving, highly iterative processes, with some roots in theory but which rely strongly on good practice to create usable products. The book has a ‘hands-on’ orientation and explains how to carry out a variety of techniques. It also has a strong pedagogical design and includes many activities (with detailed comments), assignments, and the special pedagogic features discussed below.

The style of writing is intended to be accessible to students, as well as professionals and general readers, so it is conversational and includes anecdotes, cartoons, and case studies. Many of the examples are intended to relate to readers’ own experiences. The book and the associated website encourage readers to be active when reading and to think about seminal issues. For example, one feature we have included in the book is the “dilemma,” where a controversial topic is aired. The aim is for readers to understand that much of interaction design needs consid-
eration of the issues, and that they need to learn to weigh-up the pros and cons and be prepared to make trade-offs. We particularly want readers to realize that there is rarely a right or wrong answer although there are good designs and poor designs.

This book is accompanied by a website, which provides a variety of resources and interactivities. The website offers a place where readers can learn how to design websites and other kinds of multimedia interfaces. Rather than just provide a list of guidelines and design principles, we have developed various interactivities, including online tutorials and step-by-step exercises, intended to support learning by doing.

**Special features**

We use both the textbook and the web to teach about interaction design. To promote good pedagogical practice we include the following features:

**Chapter design**

Each chapter is designed to motivate and support learning:

- **Aims** are provided so that readers develop an accurate model of what to expect in the chapter.
- **Key points** at the end of the chapter summarize what is important.
- **Activities** are included throughout the book and are considered an essential ingredient for learning. They encourage readers to extend and apply their knowledge. Comments are offered directly after the activities, because pedagogic research suggests that turning to the back of the text annoys readers and discourages learning.
- **An assignment** is provided at the end of each chapter. This can be set as a group or individual project. The aim is for students to put into practice and consolidate knowledge and skills either from the chapter that they have just studied or from several chapters. Some of the assignments build on each other and involve developing and evaluating designs or actual products. Hints and guidance are provided on the website.
- **Boxes** provide additional and highlighted information for readers to reflect upon in more depth.
- **Dilemmas** offer honest and thought-provoking coverage of controversial or problematic issues.
- **Further reading** suggestions are provided at the end of each chapter. These refer to seminal work in the field, interesting additional material, or work that has been heavily drawn upon in the text.
- **Interviews** with nine practitioners and visionaries in the field enable readers to gain a personal perspective of the interviewees’ work, their philosophies, their ideas about what is important, and their contributions to the field.
- **Cartoons** are included to make the book enjoyable.
ID-Book.com website

The aim of the website is to provide you with an opportunity to learn about interaction design in ways that go “beyond the book.” Additional in-depth material, hands-on interactivities, a student’s corner and informal tutorials will be provided. Specific features planned include:

• Hands-on interactivities, including designing a questionnaire, customizing a set of heuristics, doing a usability analysis on ‘real’ data, and interactive tools to support physical design.
• Recent case studies.
• Student’s corner where you will be able to send in your designs, thoughts, written articles which, if suitable, will be posted on the site at specified times during the year.
• Hints and guidance on the assignments outlined in the book.
• Suggestions for additional material to be used in seminars, lab classes, and lectures.
• Key terms and concepts (with links to where to find out more about them).

Readership

This book will be useful to a wide range of readers with different needs and aspirations.

Students from Computer Science, Software Engineering, Information Systems, Psychology, Sociology, and related disciplines studying courses in Interaction Design and Human-Computer Interaction will learn the knowledge, skills, and techniques for designing and evaluating state-of-the-art products, and websites, as well as traditional computer systems.

Web and Interaction Designers, and Usability Professionals will find plenty to satisfy their need for immediate answers to problems as well as for building skills to satisfy the demands of today’s fast moving technical market.

Users, who want to understand why certain products can be used with ease while others are unpredictable and frustrating, will take pleasure in discovering that there is a discipline with practices that produce usable systems.

Researchers and developers who are interested in exploiting the potential of the web, wireless, and collaborative technologies will find that, as well as offering guidance, techniques, and much food for thought, a special effort has been made to include examples of state-of-the-art systems.

In the next section we recommend various routes through the text for different kinds of readers.

How to use this book

Interaction Design is not a linear design process but is essentially iterative and some readers and experienced instructors will want to find their own way through the chapters. Others, and particularly those with less experience, may prefer to
work through chapter by chapter. Readers will also have different needs. For example, students in Psychology will come with different background knowledge and needs from those in Computer Science. Similarly, professionals wanting to learn the fundamentals in a one-week course have different needs. This book and the website are designed for using in various ways. The following suggestions are provided to help you decide which way is best for you.

**From beginning to end**

There are fifteen chapters so students can study one chapter per week during a fifteen-week semester course. Chapter 15 contains design and evaluation case studies. Our intention is that these case studies help to draw together the contents of the rest of the book by showing how design and evaluation are done in the real world. However, some readers may prefer to dip into them along the way.

**Getting a quick overview**

For those who want to get a quick overview or just the essence of the book, we suggest you read Chapters 1, 6, and 10. *These chapters are recommended for everyone.*

**Suggestions for computer science students**

In addition to reading Chapters 1, 6, and 10, Chapters 7 and 8 contain the material that will feel most familiar to any students who have been introduced to software development. These chapters cover the process of interaction design and the activities it involves, including establishing requirements, conceptual design, and physical design. The book itself does not include any coding exercises, but the website will provide tools and widgets with which to interact.

For those following the ACM-IEEE Curriculum (2001)*, you will find that this text and website cover most of this curriculum. The topics listed under each of the following headings are discussed in the chapters shown:

- **HC1 Foundations of Human-Computer Interaction** (Chapters 1–5, 14, website).
- **HC2 Building a simple graphical user interface** (Chapters 1, 6, 8, 10 and the website).
- **HC3 Human-Centered Software Evaluation** (Chapters 1, 10–15, website).
- **HC4 Human-Centered Software Design** (Chapters 1, 6–9, 15).
- **HC5 Graphical User-Interface Design** (Chapters 2 and 8 and the website. Many relevant examples are discussed in Chapters 1–5 integrated with discussion of cognitive and social issues).

*ACM–IEEE Curriculum (2001) [computer.org/education/cc2001/] is under development at the time of writing this book.
Suggestions for information systems students

Information systems students will benefit from reading the whole text, but instructors may want to find additional examples of their own to illustrate how issues apply to business applications. Some students may be tempted to skip Chapters 3–5 but we recommend that they should read these chapters since they provide important foundational material. This book does not cover how to develop business cases or marketing.

Suggestions for psychology and cognitive science students

Chapters 3–5 cover how theory and research findings have been applied to interaction design. They discuss the relevant issues and provide a wide range of studies and systems that have been informed by cognitive, social, and affective issues. Chapters 1 and 2 also cover important conceptual knowledge, necessary for having a good grounding in interaction design.

Practitioner and short course route

Many people want the equivalent of a short intensive 2–5 day course. The best route for them is to read Chapters 1, 6, 10 and 11 and dip into the rest of the book for reference. For those who want practical skills, we recommend Chapter 8.

Plan your own path

For people who do not want to follow the “beginning-to-end” approach or the suggestions above, there are many ways to use the text. Chapters 1, 6, 10 and 11 provide a good overview of the topic. Chapter 1 is an introduction to key issues in the discipline and Chapters 6 and 10 offer introductions to design and evaluation. Then go to Chapters 2–5 for user issues, then on to the other design chapters, 2–9, dipping into the evaluation chapters 10–14 and the case studies in 15. Another approach is to start with one or two of the evaluation chapters after first reading Chapters 1, 6, 10 and 11, then move into the design section, drawing on Chapters 2–5 as necessary.

Web designer route

Web designers who have a background in technology and want to learn how to design usable and effective websites are advised to read Chapters 1, 7, 8, 13 and 14.
These chapters cover key issues that are important when designing and evaluating the usability of websites. A worked assignment runs through these chapters.

**Usability professionals’ route**

Usability professionals who want to extend their knowledge of evaluation techniques and read about the social and psychological issues that underpin design of the web, wireless, and collaborative systems are advised to read Chapter 1 for an overview, then select from Chapters 10–14 on usability testing. Chapters 3, 4, and 5 provide discussion of seminal user issues (cognitive, social, and affective aspects). There is new material throughout the rest of the book, which will also be of interest for dipping into as needed. This group may also be particularly interested in Chapter 8 which, together with material on the book website, provides practical design examples.

**Acknowledgements**

Many people have helped to make this book a reality. We have benefited from the advice and support of our many professional colleagues across the world, our students, friends, and families and we thank you all. We also warmly thank the following people for reviewing the manuscript and making many helpful suggestions for improvements: Liam Bannon, Sara Bly, Penny Collings, Paul Dourish, Jean Gasen, Peter Gregor, Stella Mills, Rory O’Connor, Scott Toolson, Terry Winograd, Richard Furuta, Robert J.K. Jacob, Blair Nonnecke, William Buxton, Carol Traynor, Blaise Liflich, Jan Scott, Sten Hendrickson, Ping Zhang, Lyndsay Marshall, Gary Perlman, Andrew Dillon, Michael Harrison, Mark Crenshaw, Laurie Dingers, David Carr, Steve Howard, David Squires, George Weir, Marilyn Tremaine, Bob Fields, Frances Slack, Ian O’Callaghan, Sylvia Wilbur, and several anonymous reviewers. We also thank Geraldine Fitzpatrick, Tim and Dirk from DSTC (Australia) for their feedback on Chapters 1 and 4, Mike Scaife, Harry Brignull, Matt Davies, the HCCS Masters students at Sussex University (2000–2001), Stephanie Wilson and the students from the School of Informatics at City University and Information Systems Department at UMBC for their comments.

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About the authors

The authors are all senior academics with a background in teaching, researching, and consulting in the UK, USA, Canada, Australia, and Europe. Having worked together on two other successful text books, they bring considerable experience in curriculum development, using a variety of media for distance learning as well as face-to-face teaching. They have considerable knowledge of creating learning texts and websites that motivate and support learning for a range of students.

All three authors are specialists in interaction design and human-computer interaction (HCI). In addition they bring skills from other disciplines. Yvonne Rogers is a cognitive scientist, Helen Sharp is a software engineer, and Jenny Preece works in information systems. Their complementary knowledge and skills enable them to cover the breadth of concepts in interaction design and HCI to produce an interdisciplinary text and website. They have collaborated closely, supporting and commenting upon each other's work to produce a high degree of integration of ideas with one voice. They have shared everything from initial concepts, through writing, design and production.
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Foreword

by Gary Perlman

As predicted by many visionaries, devices everywhere are getting “smarter.” My camera has a multi-modal hierarchical menu and form interface. Even my toaster has a microprocessor. Computing is not just for computers anymore. So when the authors wrote the subtitle “beyond human-computer interaction,” they wanted to convey that the book generalizes the human side to people, both individuals and groups, and the computer side to desktop computers, handheld computers, phones, cameras . . . maybe even toasters.

My own interest in this book is motivated by having been a software developer for 20 years, during which time I was a professor and consultant for 12. Would the book serve as a textbook for students? Would it help bring software development practice into a new age of human-centered interaction design?

A textbook for students . . .

More than anything, I think students need to be motivated, inspired, challenged, and I think this book, particularly Chapters 1–5, will do that. Many students will not have the motivating experience of seeing projects and products fail because of a lack of attention, understanding, and zeal for the user, but as I read the opening chapters, I imagined students thinking, “This is what I’ve been looking for!” The interviews will provide students with the wisdom of well-chosen experts: what’s important, what worked (or didn’t), and why. I see students making career choices based on this motivating material.

The rest of the book covers the art and some of the science of interaction design, the basic knowledge needed by practitioners and future innovators. Chapters 6–9 give a current view of analysis, design, and prototyping, and the book’s website should add motivating examples. Chapters 10–14 cover evaluation in enough depth to facilitate understanding, not just rote application. Chapter 15 brings it all together, adding more depth. For each topic, there are ample pointers to further reading, which is important because interaction design is not a one-book discipline.

Finally, the book itself is pedagogically well designed. Each chapter describes its aims, contains examples and subtopics, and ends with key points, assignments, and an annotated bibliography for more detail.

A guide for development teams . . .

When I lead or consult on software projects, I face the same problem over and over: many people in marketing and software development—these are the people who have the most input into design, but it applies to any members of multidisciplinary teams—have little knowledge or experience building systems with a user-centered
focus. A user-centered focus requires close work with users (not just customer-buyers), from analysis through design, evaluation, and maintenance. A lack of user-centered focus results in products and services that often do not meet the needs of their intended users. Don Norman’s design books have convinced many that these problems are not unique to software, so this book’s focus on interaction design feels right.

To help software teams adopt a user-centered focus, I’ve searched for books with end-to-end coverage from analysis, to design, to implementation (possibly of prototypes), to evaluation (with iteration). Some books have tried to please all audiences and have become encyclopedias of user interface development, covering topics worth knowing, but not in enough detail for readers to understand them. Some books have tried to cover theory in depth and tried to appeal to developers who have little interest in theory. Whatever the reasons for these choices, the results have been lacking. This book has chosen fewer topics and covered them in more depth; enough depth, I think, to put the ideas into practice. I think the material is presented in a way that is understandable by a wide audience, which is important in order for the book to be useful to whole multidisciplinary teams.

A recommended book . . .

I’ve been waiting for this book for many years. I think it’s been worth the wait.

As the director of the HCI Bibliography project (www.hcibib.org), a free-access HCI portal receiving a half-million hits per year, I receive many requests for suggestions for books, particularly from students and software development managers. To answer that question, I maintain a list of recommended readings in ten categories (with 20,000 hits per year). Until now, it’s been hard to recommend just one book from that list. I point people to some books for motivation, other books for process, and books for specific topics (e.g., task analysis, ergonomics, usability testing). This book fits well into half the categories in my list and makes it easier to recommend one book to get started and to have on hand for development.

I welcome the commitment of the authors to building a website for the book. It’s a practice that has been adopted by other books in the field to offer additional information and keep the book current. The site also presents interactive content to aid in tasks like conducting surveys and heuristic evaluations. I look forward to seeing the book’s site present new materials, but as director of www.hcibib.org, I hope they use links to instead of re-inventing existing resources.

Gary Perlman
Columbus
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About Gary Perlman

Gary Perlman is a consulting research scientist at the OCLC–Online Computer Library Center (www.oclc.org) where he works on user interfaces for bibliographic and full-text retrieval. His research interests are in making information technology more useful and usable for people.

He has also held research and academic positions at Bell Labs in Murray Hill, New Jersey; Wang Institute of Graduate Studies; Massachusetts Institute of Technology; Carnegie-Mellon University; and The Ohio State University. Dr. Perlman’s Ph.D. is in experimental psychology from the University of California, San Diego. He is the author of over 75 publications in the areas of mathematics education, statistical computing, hypertext, and user interface development. He has lectured and consulted internationally since 1980.

He is best known in the HCI community as the director of the HCI Bibliography (www.hcibib.org), a free-access online resource of over 20,000 records searched hundreds of thousands of times each year.

A native of Montreal, Canada, Gary now lives in Columbus, Ohio with his wife and two sons.