FOURTH EDITION

SPACE PLANNING BASICS

MARK KARLEN · ROB FLEMING

WILEY

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Preface

There are two major new elements to this fourth edition of *Space Planning Basics*. The first is its digital content (available at www.wiley.com/go/KarlenSpace4e). All of the illustrations, design programs, and building shell drawings can be brought up on your computer screen, so that you can copy illustrations and floor plans and manipulate and work with matrixes and floor plans in completing the many programming and space planning exercises.

The second new element is the integration of sustainable design concepts and information. Sustainability has become a significant, if not essential, factor in the space planning process. For many, sustainable design is associated primarily with green roofs, solar panels and rainwater collection. The creation of high-quality interior spaces includes concerns for human comfort, social interaction, and productive and aesthetically appealing work spaces, all of which are necessary for sustaining a strong and vibrant quality of life. These issues are not new to those who design interior spaces, but they are not generally associated with the broad concepts of sustainability. The integration of sustainability and space planning demands a collaborative and multidisciplinary approach to the space planning process. The revised text in this edition directs the reader to focus on sustainable design concepts and techniques—such as energy and water conservation, improved daylighting, indoor air quality, integrating active mechanical systems, and engagement with the building envelope—as part of the space planning process. This is clearly the necessary direction for those involved in creating the buildings and spaces of our future.

For the past two years I've had the opportunity to team teach a collaborative design studio course at Philadelphia University. This past year the studio consisted of 25 students; 14 of them in Professor Rob Fleming's Master of Science Sustainable Design Program and 11 of them, in my charge, students in the Master of Science

Interior Architecture Program. In addition to Rob and me, adjunct faculty in mechanical engineering, landscape architecture, and construction management were also involved. The students in both programs came from a great variety of undergraduate disciplines. They were grouped in teams of four or five students; each team was charged with solving a large and complex adaptive reuse urban project over the course of one semester. In a truly collaborative effort, the interior architects on each team space planned and designed the interior elements, while the others worked with all of the sustainable design concerns of the project. It was a successful and rewarding experience for all involved.

The extra benefit for me was working with Rob Fleming in planning the course and teaching in the studio together. Rob is a particularly devoted and energetic teacher and program manager from whom I've learned a great deal. The students in the collaborative studio made use of the previous edition of this book, but I realized that *Space Planning Basics* needed an infusion of the sustainable design concepts that they had integrated into their problem-solving techniques. I was pleased when Rob agreed to join me as a coauthor in this fourth edition, so that some of his depth of knowledge and experience in sustainable design could become an integral part of students' experiences with this book.

In addition to my appreciation for Rob Fleming providing new and critical content for this educational tool, I want to acknowledge the collaborative help of two young architects, Madhura Dhayagude and Pratiksha Patel, who have been invaluable in reconfiguring and digitizing much of the book's graphic material, from diagrams and matrixes to floor plans and sections. I'm indebted to the designer/architect team of Kate Lyons and Peter Elsbeck, who provided the perspective sketches in Chapters 3 and 6. As always, special thanks to Paul Drougas and Seth Schwartz, my editors at Wiley, who have been consistent supporters throughout the entire process. My hope is that the resulting book is of significant value to students in mastering space planning and stair design skills.

MARK KARLEN

Introduction

This book is an instructional tool designed to develop interior space planning skills for typical building uses in spaces up to 4,000 square feet in size. Although this book may be used by an individual learner, it is geared for use in a conventional studio classroom setting. It contents are threefold:

1. Explanatory text
2. Descriptive graphic examples
3. Recommended practice exercises

Space planning is an inherently complex process. For this reason, a series of planning exercises, starting with very small spaces and building to larger spaces with more complex program requirements, is provided as the primary technique in the development of space planning skills. In addition, basic information about space planning, the use of planning rules of thumb, guidelines for appropriate drawing techniques, and recommended reading and reference sources are included.

As an introduction to space planning, this book is directed primarily to intermediate-level (sophomore and junior levels in a baccalaureate or first professional-degree program) interior architecture and design students. To be more specific, it is assumed that its users possess adequate drafting skills (defined here as basic experience with architectural drafting tools and architectural scales or experience in creating floor plans with software such as AutoCAD) and ease in understanding and preparing orthographic projections (plans and elevations). In addition, users are expected to be competent in planning conventional furniture arrangements within fixed rooms, not including large-scale arrangements of office systems furniture, which is a basic space planning process in itself. Ideally, users have some background in design program development, but that is not necessary for a successful learning experience.

Background in the planning of undivided or "raw" space is not required. Although specific direction to prepare for the space planning elements of the National Council for Interior Design Qualification (NCIDQ) examination is not an intended purpose here, the basic programming and space planning skills learned are applicable to the practicum portions of that exam.

Space planning is not a simple process involving a single category of information. Rather, it is a complex dovetailing of several processes involving many categories of information related to the organization and construction of buildings. Such processes range from program analysis and use of building code principles to sustainable design principles and the development of desired spatial qualities. Even with space planning problems of relatively small size (a few thousand square feet) and relatively simple programmatic requirements, it is impossible to avoid these complexities of process and information completely. For this reason, such issues will be dealt with in enough depth to provide a realistic context for design problems, while maintaining focus on the central issue of space planning. Over a long period of professional practice, the experienced space planner will gain in-depth knowledge of all these complexities, but it would be counterproductive to attempt to deal with them here except in the simplest manner.

The great majority of professional space planning work lies within existing structures rather than in the interior planning of new buildings still in their planning and design phases. For this reason, the greatest emphasis in this book is on spaces within existing structures. Interior space planning for buildings still on the drawing board requires some experience in the design of structures and building envelopes and therefore demands additional knowledge and skill on the part of the space planner. Those additional areas of professional involvement lie beyond the intent of this text and are discussed in a general manner in Chapter 4, 5, and 8.

Finally, this textbook is meant not only to be read but also to be worked with as a hands-on guide in the development of creative skills. Space planning skills grow from consistently repeated practice and experience; consequently, learners are encouraged to apply sufficient hours of concentrated effort at the drawing board and/or on the computer screen to gain professional-quality technique. The quality of space planning solutions, particularly at the beginning of your experience, is difficult to assess. Unlike some other forms of problem solving, space planning problems usually have many "right" answers. Rarely are there "perfect" answers. Space planning solutions involve satisfying program criteria on a priority basis where the issues at the top of the list must be solved but where some of the issues near the bottom might be solved only partially, if at all. In its simplest terms, space planning almost always involves compromises, where you look for good and workable solutions rather than "correct" or "perfect" ones. Identifying and satisfying high-priority or major planning criteria is part of the learning experience presented here, but the best tools to assess quality in space planning solutions are personal exchange and critique with others. Classroom discussions, both formal and informal, are of great value. Seeking the opinion of fellow students, as well as offering your own critical commentary of others' work, will help immeasurably in developing strong critical skills. Taking advantage of classroom pinups and critiques, particularly with the expert view of

the classroom teacher (and possibly that of a guest critic), is essential in this growth process. In time, as evaluation of your own work and the work of others continues, skills in criticism improve, and you will become a better judge of your own work. At every level of professional growth, value exists in seeing another approach and in hearing objective criticism.

The step-by-step process of space planning described in this text is deliberately geared to the learning of a complex skill. Professionals in the field use many worthwhile and productive planning processes; one process is not necessarily superior to the others. This is true because of the creative element involved in space planning. As your skills grow beyond the learner's level, you will develop variations in the planning process geared to your individual thinking patterns, and ultimately you will create a complete and personalized design methodology.

Note should be made of the issue of terminology. This text contains many words and phrases that must be considered professional jargon; they are unavoidable. They are also not universal in their use. Words and phrases such as "criteria matrix," "prototypical plan sketches," "relationship diagram," "bubble diagram," "block plan," "barrier-free," "suite," "rough floor plan," and "speculative office building" are used by some professionals and not by others. Different individuals may use the same word or phrase to mean different things. The emergence of sustainability as an additional influencing factor adds even more terms. Do not allow this lack of universality in terminology to become a stumbling block in the learning process presented here.

As your space planning skills grow and achieve professional quality, you will find that these new elements in your repertoire sensitize and sharpen other related design skills and bring you several steps closer to the status of the "complete" professional.

RECOMMENDED READING

Each chapter concludes with a list of recommended readings. *Reference sources* are denoted by an asterisk (*); works without an asterisk are *reading materials*. The reference sources provide in-depth information related to basic and recurring planning and design issues and questions. The reading materials are intended to develop knowledge and skills in general planning and design areas and in some cases peripheral to space planning. Personal selections in the reading areas will depend heavily on your previous background and experience.

A concerted effort has been made to keep these lists to essential books only. It is suggested that you prioritize your planned reading efforts while using this book. More specifically, concentrate on the space planning issues and let the less critical influencing factors, such as plumbing, acoustics, and interior construction, wait until later.

Many other worthwhile texts deal with space planning and related information and skills. An Internet search is your best starting point for additional reading and research materials.

The recommended readings that relate to this introduction have been selected for their introductory qualities.

RECOMMENDED READINGS

*Ching, Francis D. K. *Interior Design Illustrated* (3rd ed.). Hoboken, NJ: John Wiley & Sons, 2012.

Deasy, C.M. *Designing Places for People*. New York: Whitney Library of Design, 1990.

Hall, Edward I. *Hidden Dimension*. New York: Anchor Books, 1990.

Sommer, Robert. *Personal Space: The Behavioral Basis of Design*. Looe, Cornwall, UK: Bosko Books, 2008.

*A reference source.

Contents

1

Planning Methodology

Space planners are presented with their task in a great variety of ways. Most users or clients are inexperienced in working with planning professionals and present their space planning problems without significantly prepared data. It is not uncommon for a business owner or manager to come to an interior designer and say, in effect, "Our staff has grown by 60 percent over the past few years, and we are still growing at a very fast rate. Our space is terribly overcrowded; what should we do?" In cases of this kind, the designer must begin with the basic tasks of charting organizational structure; identifying personnel, their tasks, and necessary equipment; analyzing the operational process; identifying important sustainability factors; and gaining an understanding of the human and cultural qualities of the organization. In effect, the planning professional must take full responsibility for organizing, analyzing, and interpreting the problem at hand.

At the other extreme are clients with considerable experience in space planning, and who may also have an in-house facilities manager or staff. They may present the designer or architect with extensive data on the number and types of personnel (including their equipment and square footage needs), spatial adjacency studies, and the desired human and esthetic qualities of the completed project—in effect, a complete space planning program. In such cases, you are relieved of the responsibility of data gathering, organization, and analysis. Obviously, the designer must fully absorb and understand the design problem or program that is presented, and may need to perform some tasks of program interpretation. These issues are discussed later in this chapter.

There is a wide range of client or program situations between the two extremes presented above. Most clients have given some thoughtful consideration and analysis to their spatial needs before engaging professional services but do not have the

in-house expertise to make a complete analysis of their problem and present it in terms easily translated into a planning solution. It is this middle ground into which most professionals step when presented with a space planning problem.

Regardless of a client's experience with planning professionals, the issues of design sensitivity and insight play a major role in the discussion. Some space planning programs that are prepared by in-house facilities management personnel deal only with hard data and are of little use in understanding the subtleties of organizational dynamics or the detailed requirements of lighting or acoustics. What at first glance may appear to be a complete and professional program may still require a great deal of organization, analysis, and interpretation on the part of the designer. Conversely, some clients who are completely inexperienced in space planning matters will bring invaluable design sensitivity and insight to the project, despite their lack of categorized data.

It is very difficult to simulate a real client or program situation in the classroom. Typically, students are presented with a written program that defines all the detailed requirements of a project, along with floor plans (and possibly additional drawings) of a real or imagined space. A space planning solution is drawn from this data. Although useful as a learning tool for students, these exercises lack the dynamics of personal interchange with a client and also ignore such real problems as internal conflicts in the client's organization, corporate mergers or takeovers, changes in management personnel, budget constraints, green rating systems, and dealings with building code administrators—all of which exist in professional situations. Bringing real or role-playing clients to classroom assignments can be helpful, just as using actual spaces that students can walk into and survey has value in making the space planning problem realistic. Even with these simulations, be aware that dealing with a broad variety of personalities, unusual time frames (from projects with tight deadlines to those that extend over years), and stringent budget requirements add unexpected and challenging elements to the space planning process when students move from the classroom to the professional setting.

DEFINING TERMS AND INTENT

The title of this chapter, "Planning Methodology," is a phrase used throughout this text to describe the phase of the space planning process that begins when the planning problem is presented to you (with or without a program) and ends when physical planning commences, usually with bubble diagrams or block plans. In some professional circles, this is called the pre-design process—meaning all the necessary steps of data gathering, research, analysis, and interpretation before actual planning. For many in the design fields, "planning methodology" and "programming" are synonymous, although some would argue that the charting and diagramming described here as part of planning methodology fall outside the bounds of programming and are part of the design process.

A great deal has been written about the general area of planning methodology. Books and articles are available about the interview process, questionnaires, observation techniques, idea generation, spatial analysis and theory, programming, design

methods, problem solving, graphic thinking, and so on. As noted in the introduction, no unified terminology is used universally or accepted by professionals in the field. Despite this lack, comprehensive reading in this subject area will reveal a body of knowledge that provides a broad variety of useful approaches to the pre-design process.

Very little has been written about space planning techniques, particularly from an instructional viewpoint. Space planning skills generally have been learned in a mentorship mode, at the drawing board or the workstation, in the studio classroom and/or the professional design firm. The primary intent of this book is to provide a written foundation for the space planning process. Although a planning methodology is described and recommended here, it is dealt with in a concise manner so as to give full attention to the more elusive planning and design-related parts of the process. This should not be construed as minimizing the value of the pre-design process; to the contrary, good space planning cannot be accomplished without the professionally thorough pre-design analysis generally defined here. The text presents a simple and workable method succinctly so as to move on quickly to the physical planning phase. You are strongly encouraged to read about and acquire skills in a broad range of pre-design techniques, both verbal and graphic, in order to gain many analytical tools to apply to the problem-solving challenges you will face as a professional. The Recommended Reading at the end of this chapter provides direction for expanding that knowledge and those skills.

Another brief note on terminology: Several steps in the space planning process described and recommended throughout the text are identified by words or phrases unique to the text, such as "criteria matrix" and "relationship diagram." In each case, these words or phrases are defined thoroughly, and potential conflicts with other terminology common to the field are identified.

THE SYNTHESIS GAP

Among professionals working in the field, a generally accepted process or sequence of tasks occurs from the point at which the planner begins to work on a project to the point at which project analysis is complete and the physical planning process begins. Despite many variations in technique or terminology that planners may apply, the basic process of creating a design program consists of the next eight steps, presented here in an extremely abbreviated form, using a typical corporate or institutional setting for this instance.

1. Interview
   - **a.** Executive level (organizational overview)
   - **b.** Managerial level (departmental function)
   - **c.** Operations level (process and equipment detail)
2. Observe (existing or similar facilities)
   - **a.** Assisted observation
   - **b.** Unobtrusive observation
   - **c.** Inventory of existing furniture and equipment (when it is to be reused)
3. Establish architectural parameters
   - **a.** Acquire complete base plan data (including mechanical and electrical services)
   - **b.** Compile contextual data (architectural, historical, social)

   c. Research environmental and code constraints
   d. Complete basic site inventory (sun angles, breeze directions, and rainfall amounts)
4. Organize collected data (the first-phase program)
   a. Place data in sequential format most useful for planning
   b. Summarize confirmed quantitative factors (square footage, FF+E (furniture, fixtures and equipment) count, equipment sizes, etc.)
   c. Record first thoughts on conceptual planning approach
5. Research the unknowns
   a. Gather detailed information on process and equipment
   b. Gather case study information on similar facilities
   c. Integrate researched data with first-phase program
6. Analyze the data
   a. Discover planning affinities (working interrelationships, public/private zoning, special acoustic needs, etc.)
   b. Discover scheduling affinities (maximize use of space)
   c. Identify planning or architectural relationships (site, environmental, structural, mechanical, sustainability, and electrical conditions)
7. Interpret and diagram the data (the complete program)
   a. Define the functional problems in planning terms
   b. Establish a basic conceptual approach (in terms of human/social image/esthetic, and sustainability goals)
   c. Prepare relationship or adjacency diagrams (for client and designer visualization)
8. Summarize the data (the finished document)
   a. Finalize project concepts—*state the problem*
   b. Outline and tally basic budget issues
   c. Prepare a package for client approval to serve as the designer's manual for space planning

The analytical process just described will never produce a space planning solution. Regardless of how thorough the process may be, creating a physical solution requires that analysis be put aside and a process of synthesis begun. That synthesis requires a creative understanding of all elements of the analysis, to place the programmatic elements in a physical juxtaposition that will satisfy users' needs. The word "creative" in this context must be seen in its broadest sense, in which functional, esthetic, and technical issues must be addressed and resolved. The heart of the problem-solving task in space planning occurs in making the transition from the analytical pre-design phase of the project to the creative design solution phase.

The entire design process is one of synthesis, in which many disparate factors are integrated into a useful whole, but the initial mental or creative leap from the analytical phase to the first physical plan solution is the most difficult single step in the process. If the pre-design process is very thorough, it may bring you, the planner, several steps closer to a physical solution or may make the creative leap a shorter, easier one. For the purposes of this text, the void between the completed design program and the planning solution is referred to as the "synthesis gap," and it might best be visualized graphically, as shown in Illustration 1–1.