Teaching Planning to City Planning Students. An Argument for the Studio / Workshop Approach

Jon Lang
University of Pennsylvania

Abstract

The studio / workshop was largely abandoned as a pedagogical device in city planning curricula during the late 1960s. It has now been reintroduced, somewhat tentatively, in number of places. The fundamental reason for this seems to be the recognition that urban studies and urban planning are not synonymous. Teaching the two as if they are fails to recognize that planners plan. This paper is an argument for the studio / workshop as an important means for providing planning students with an educational environment in which many of the basic skills that are central to the creative act of planning can be learnt and / or tested. In designing studio / workshop courses the lessons of the past must be borne in mind. Recent advances in planning theory and methods need to be incorporated into the studio experience if it is to enhance the student's understanding of the planning process. At the same time, the limitations of the studio / workshop must be recognized. This paper is offered as an invitation to the establishment of a dialogue among planning educators. While there is some empirical evidence to support the arguments presented here the data base on which it draws is largely an anecdotal one.

Introduction

Studio courses are those in which students devise solutions to specific problems and then defend them in front of a panel of experts — a jury. These courses may also involve the identification / design of the problem and the process for dealing with it. Often specific analytical, synthetical and evaluative techniques are explored. Such courses are frequently referred to as *workshops*. The term studio will be used generically in this paper to include workshops.

Studio courses have been part of the training of architects and engineers since the formalization of education in their fields. With the early movements in city planning drawing very heavily on the skills of engineers and architects, it is hardly surprising that studio courses formed the core of a planner's education. Planning education consisted of a sequence of studios and supportive courses. The first studio course in a student's education dealt with relatively simple problems and the later ones with more complex ones. The student, it was believed, developed creative and presentational skills through practice and also learnt how to use the ideas and methods of analysis and design learnt in lecture and seminar courses. His or her substantive and procedural knowledge and skills were thus built up through this amalgam of studio and supportive courses. With the change in perception of many critics and planners of the concerns of city planning as a professional activity came changes in the perception of the usefulness of the studio as a pedagogical device. It was perceived as something which might be useful in the education of physical planners but not something applicable to the education of planners concerned with social and economic issues.

The objective of this paper is to provide a description of the studio type educational experience, and its strengths and weaknesses. This understanding is necessary to evaluate the argument to be made here that the reintroduction of studio education to planning curricula is a healthy development provided its nature and potential nature are understood. This paper begins with a review of the reasons for the decline of the centrality of the studio in city planning education and the relation this has had to both the perception of the field and on the skill development of students entering the field. It then discusses the reasons that such courses are now being reintroduced and the issues that are still being debated. This provides a basis for drawing conclusions about the role of the studio in planning education. The data base for this paper is partly an anecdotal one,[1] partly based on a content analysis of a haphazard sample of course prospectuses and partly on a telephone survey of 8 major schools of planning.[2] The interpretation is, however, largely personal. It is hoped that this paper will stimulate discussion and research on how best to teach the creative act of planning.

The Studio

The studio emphasizes learning by doing. In it students identify problem situations, analyze them, design solutions and evaluate them. A variety of methods are used and the process of planning may be carried out in a linear sequence of steps or in a reiterative process depending on the nature of the exploration being conducted. Some of the work may be done on a team basis while other parts may be done individually. Throughout the process, the student is required to make predictions, think divergently and convergently, apply values, make decisions, argue, work with other people, present ideas and defend them and to consider the interrelationships between components of the environment and between components of the planning process. Above all, the student learns about the flow of activities that constitute any planning activity. It has been argued that these matters can best be taught in courses other than the studio and the studio rather than enhancing planning education inhibits it. During the sixties the studio type course gave way to other courses in many city planning educational curricula and was deemphasized in all those surveyed for this paper.

Reasons for the Decline of the Studio in City Planning Education

The studio is often perceived as applicable only to the education of those concerned with the physical and particularly, the built environment. Historically, as its name suggests, studio education has indeed involved working on the drawing board. It involved graphic work. As it became clear to planners that many urban problems, and, perhaps, the most serious of these, cannot be solved by changing the physical environment so questions about the role of the studio in city planning education began to be asked. Similarly, as the analytical techniques being taught in planning methods courses borrowed more and more heavily from economics, statistics and the behavioral and social sciences in general, so doubts were cast on the methods used and the issues being confronted in studios. Doubts were also cast on the quality of the solutions being designed by students. It was felt that what was being done in studios was simply irrelevant and out of date.

The studios were often taught by practitioners who were held in high regard by others in the profession. Often their private practices and teaching activities were so onerous that they had little time to keep abreast of current research. As a result there was often a conflict between what was being taught in theory and methods courses by full time academics and the studio course being taught by part time professionals. The professionals tended to be sceptical of what was being taught in lecture courses and the academics, many of whom had little planning experience and often a disdain for planning, were hostile to the lack of rigor of the methods used in the studios.

In the late 1960s and 1970s the situation was usually one where the people teaching studios were seldom teaching the procedural theory courses and were not used to dealing with procedural matters with any great explicitness. The studios relied heavily on intuitive processes and lacked methodological sophistication. They were thus heavily criticized. The critics were, however, generally not willing nor did they have the skills to become involved in restructuring and improving the studio experience of students. In addition, they perceived major difficulties in linking social and physical issues and when this was done the design principles used and the solutions generated had strong environmental deterministic overtones. This reflected much of the thinking of the mainstream of city planning thought throughout the first half of this century. Many planning educators heavily criticized this. This was particularly true of those, such as Herbert Gans (1968) who were primarily social scientists. These observations are all widely accepted now but there are two other more controversial observations that can be made about the reasons for the demise of the studio in city planning education.

As more and more social scientists began teaching in city planning departments and more and more students with social science backgrounds entered graduate city planning programs, interests shifted and a change in orientation of these programs began to occur. The focus first shifted from planning / design to environmental analysis. As the substantive focus shifted again from the physical environment to social and economic environments the planning orientation seemed to get lost. Normative proposal creation was no longer the central concern of the planning academies and often the professional. The hypothesis is that the cause (or possibly consequence) of this was a lack of confidence of members of the city planning academies in planning as an intellectually worthwhile and acceptable activity. Another hypothesis is that having to make planning proposals under scrutiny is highly stressful and thus both students and faculty found it easier to avoid simulations of

the value laden, highly political and often controversial act of planning. There was a retreat from argumentation. A sceptic might also add that the studios created considerable dissonance in students because they could not see how the techniques they were being taught in lecture courses could be applied to problem solving within their domains of concern.

Students were unclear about what they were learning. They were under stress. Their work was criticized and they were also aware that many of the faculty members who advocated more rigorous methods of analysis frowned on the work being done in the studios.

The result was that a lack of confidence in the studio type problem solving education arose. Instead of closely examining the studio experience, its strengths and weaknesses or examining how best specific skills might be taught, the studio was either simply abandoned or became something for those students concerned with physical design issues. In all the schools surveyed, for varying periods in the late sixties to the present, there was no urban or regional problem solving educational required of students. This period varied from 2 years to 12 years in span. The assumption implicit in this was that the skills taught in studios were either unimportant or that they would be picked up in traditional lecture and studio courses and / or they could be learnt on the job. Another view was that some people simply came to planning with creative abilities and others did not and there would be a sorting out process whereby those with low creative ability would become analysts. The assumption here was that analysis does not require design. Not much consideration was given to the impact of eliminating the studio from city planning educational curricula apart from the fact that this would free up a student's time to take other courses. In retrospect this seems to have been a major mistake both for students concerned with social issues and those concerned with the physical environment.

The Consequences

The elimination of the studio obscured some of the basic aspects of the planning process in educational curricula. It obscured the argumentative and advocating nature of city planning as a professional activity. It can be argued, however, that while these were obvious to anybody analyzing the work done in studios, it was not always clear to students taking planning studios because the work was often cloaked in the image of rationality. Many of the weaknesses of planning education also became easier to hide. There was little testing of a student's planning ability. Few occasions arose in which students were asked to design either the process of planning or solutions to specific problems. When they did, serious questions about planning education arose because the results were disappointing to faculty members.

The elimination of the studio reduced some of the stress level amongst students but also raised serious questions in the minds of many as to what planning is about — something that planning theory courses do not seem to deal with effectively. There was no other situation where the process of planning could be designed or the variety of methods available to the planner could be coordinated or plan creation skills be developed or learnt. The recognition of these factors has resulted in the reintroduction of studio type experience into planning curricula in a number of places.[3] This experience is being required of both social and physical planning students in one form or other in all the schools surveyed.

Reasons for the Reintroduction of the Studio/Workshop Course

Probably for more than any other reason, it was recognized that a central part of planning education — enhancing planning skills — was missing from planning curricula. This is true of both physical planning and social policy formulation. The concern with designing and evaluating courses of action in response to problems is what differentiates city planning from the traditional academic disciplines. Without this central concern planning education loses its external validity. At the same time several other piecemeal occurrences have lead to the reintroduction of studios in a meaningful manner.

First, decision theory presents a number of clearer, if not universally accepted, models of the planning process within a systems framework (e.g., Chadwick 1970) and of the physical design process (e.g. Studer 1970; Koberg and Bagnall 1974). These models provide a conceptually clear framework for studios. They allow students to understand the focus of attention at any time in the studio. The converse is also true, they enable the student to understand what is not being covered too. It is possible to clearly differentiate between what is and is not being covered too. It is possible to clearly differentiate between what is and is not being tackled in the studio. Secondly, planning theory has been more clearly articulated (e.g. Lindblom 1968; Faludi 1973). Thirdly, the nature of planning problems has been clearly articulated (Cartwright 1973; Rittel and Weber 1972) as is the nature of planning as an argumentative process. Studio education can make this characteristic explicit. Fourthly, the limitations of rationality and comprehensiveness in planning are better understood and more clearly articulated (Harris 1967). This can also be made explicit in the studio as analytical and synthetical processes are selected or designed.

Assumptions about Planning in the Reintroduction of the Studio

Two factors have thus coincided. These are the recognition that planning education without the studio experience is weakened and that greater clarity, if not less controversy in planning theory, enables better and clearer studio experiences to be designed for students. Similarly it is increasingly recognized that learning planning on the job is not a substitute for the systematic examination of procedural issues in a studio / workshop within the academic setting. In the working environment the task is to get the job done and not to examine issues for their own sake. This observation does not deny the role of learning on the job, but recognizes its major limitation. The reintroduction of the studio in response to these factors implies a recognition of some basic factors about the planning process.

A number of assumptions about the planning process need to be made explicit if studios are to educate students about the character of planning as it is and as it might be. The first is that planning problems are "wicked" (Rittel and Webber 1972) or "complex" or "compound" or "meta" ones (Cartwright 1973). This implies that all planning activities are carried out under time constraints and uncertainty, that there are no rules, other than those we create, for specifying the set of analytical and synthetical and evaluative methods that should be used. The second is that all planning involves some advocacy – either directly for specific groups of people or for specific ends which represent the views of specific groups of people. Thirdly, planning is a normative task – it deals with not only description and explanation of present states, it deals with the future and the prescription of specific futures. Fourthly, all statements about the future involve some type of prediction. Thus there is some degree of uncertainty about both the future context and the performance and desirability of the prescription. Fifthly, that analysis itself will not automatically dictate what the plan for the future should be. Plan formulation – attempting to solve the problem – often helps elucidate the problem. Designing involves analytical and evaluative activities; analytical activities involve both design and evaluative activities.

All of these factors can be and often are described and explained in planning theory courses. Action is the behavioral correlate of theory but one cannot learn how to do by listening although this may be a prerequisite for learning. The studio format of "learning by doing" enables the interrelationships between analytical activities, design activities and choice activities to be explored. This does imply that those teaching planning studios should have a good understanding of both theory and what is and is not happening in practice. There is now emerging a generation of scholars who have this knowledge, who are concerned about creating a better world and who recognize the strengths and limitations of the studio experience for students.

The Place of the Studio in a City Planning Educational Curriculum

One of the fundamental difficulties in the design of an educational curriculum, is to integrate or, at least, link the knowledge about the world and about planning processes and planning skills that a student learns into a package that has some discernable logic. A number of approaches are possible. One is to have studio courses in which the student learns by doing and lecture courses in which theory is taught running in parallel, another is to have theory courses followed by studios; yet another is to have the theory courses following studios. There is considerable anecdotal evidence that efforts to run theory and studio courses in parallel have not been successful, although conceptually there is no reason why this arrangement should not work. In practice it seems to work only if the same person or people are teaching both the theory course(s) and the studio. Maybe the problem is still that people teaching studios simply do not know what is being taught in other courses. The important factor is to have the objectives of whatever approach is selected logically linked to the sequence of courses that a student takes. The internal validity of the sequence must be clear and the overall objectives must be clear.

Assuming a four semester graduate program in city planning, one possibility is to have theory courses followed by studio courses; another is to reverse this order. The logic of the first is that the theory courses — both substantive and procedural — provide an intellectual framework for what follows. The argument for the second is that students will realize what they already know and what they need to know to do a better job — that it will motivate them to seek knowledge. The assumption is that theory courses will have more meaning after students have tried to do planning — that action is the basis for theory building. It also gives the student an immediate feeling for the argumentative nature of the planning process. The approach also assumes that students are highly motivated. It is, however, very stressful work for students, particularly those without any formal experience in problem solving. They are continually operating under uncertainty. If this approach is adopted, it seems to be essential that some introductory theoretical material be presented to students. Some knowledge of procedureal theory is essential.

Another question arises: "How many studio type experiences are best for a student?" The answer to this question depends on what aspects of the planning process a student (and / or the specific program) wishes to emphasize. The studio approach does assume that one learns not only by doing but that the repetition of some basic processes helps the student learn better — i.e., practice makes perfect. It is not easy to convince students about this. There is very little supportive empirical evidence for this position although there seems to be considerable anecdotal evidence. While the goal of curricula design is to eliminate unnecessary redundancy, repetition of the same basic task is only redundant when no enhancement of skills occurs. The answer to the question thus depends on the nature of the studios and the nature of the programs concerned and whether the student wishes to develop purely analytical, synthetical or evaluative skills. If it is synthetical skills, then there does not seem to be a substitute for the studio experience. There are, however, many questions that can be raised about the design of studios.

Issues in the Design of Studio Courses

It is clear that the studio cannot simulate the "real world." It can, however, focus on the development of specific city planning skills and specific aspects of the substantive knowledge required of city planners. Provided the assumptions under which the problem solving studio experience takes place are clear to students, a wide variety of substantive and procedural issues can be examined and skills practiced. The studio experience needs to be carefully designed if it is to fulfill its educational mission.

A series of questions need to be addressed in the design of studios. In general these are concerned with identifying their focus of attention. What procedural issues should be the focus of attention? What substantive issues should be addressed? What specific methods should the student be using? What aspects of the process should be given and what should the student be designing? What kinds of work should be done on a team basis and what on an individual? What specific skills should be developed? What should the role of faculty criticism be? How best can theory be integrated into the studio?

It is clear that any one studio effort cannot focus on all the processes and techniques that planners need to know how and when to use. It can be argued that students should go through the whole process of planning in each studio. If any segment is to be done well, however, it needs to be stressed. If it is the linkage between the phases of the planning process then clear assumptions need to be made about the work to be done in the phases. If it is the nature of planning analysis that is to be explored then most of the time needs to be focused on this with much less attention to the design or choice phases of the process. Doing analysis without any design reduces the understanding that a student will develop about analytical activities. If the focus is on the synthetic activity then the assumptions about the nature of the problem need to be clear so that the conditions under which the solution must be

found and the specific techniques to be explored can be understood. Without this understanding the synthetical acitivites are largely meaningless. If the focus is on evaluative activities then the analytical and design phases of the planning process need to be done more rapidly. This again necessitates the development of a clear set of assumptions so that alternative solutions will be available for evaluation.

Traditionally the studio has focused on physical planning and urban design issues. The use of the studio process to learn about social and economic planning issues and methods has lagged. The assumption seems to have been that these require less in the way of creative skills. This is a position that is difficult to defend. Still less has been done in the studio on integrating social and physical planning. Until recently there have been few concepts that enable the two to be integrated in a clear way. Also social and economic planning generally precedes physical planning and urban design thus it is difficult to integrate them in the same studio. If students are to understand the need for integrating social and physical planning this does need to be done. The concepts of behavior setting (Barker 1968; Wicker 1979), and environmental affordance (Gibson 1979; Neisser 1977) do provide links between the social and physical that can be used to clarify the purposes of and procedures used in studios (see also Lang 1980). If a studio focuses on social planning issues then the physical planning consequences needs to be understood; if the studio focuses on physical planning or urban design then the social and economic assumptions and consequences need to be dealt with explicitly.

The methods appropriate for specific analyses are not set. They are selected from a range of available methods and / or designed for specific purposes. Whatever method is selected, it represents some value position on the part of the planner or the social and political context in which he or she is working. The same is true for synthetical or evaluative and decision methods. Students need to understand this and to recognize how the choice of method biases the conclusions that are drawn and / or the solutions that are generated. As a profession we have some major limitations in our theoretical understanding of these matters, but this should not obscure the basic point that planning is not and cannot be a scientific process even though it may contain some scientific or quasi-scientific analytical techniques.

One of the objectives of a studio may be to explore specific analytical, synthetical or evaluative techniques. For example the objective may be to explore the use of various evaluative processes. In other cases the focus may be on a task to be done. What should the role of the instructor be in this case? Should the student be allowed to make mistakes or should the instructor step in and point out the pitfalls before the student spends too much time headed in the wrong direction? These are difficult questions to answer with great specificity because the pedagogical implications are not clear.

Most planning involves team work. In the professional world somebody has the responsibility for making decisions and heading the team. This is something that is very difficult to simulate in the studio where a group of peers are learning / studying together. Other issues also arise in designing studios. How does one evaluate an individual's progress when work is done in teams? What aspects of the work to be done should clearly be identified with individuals? Should the analytical and evaluative activities be those done on a team basis while the synthetical task are done on an individual basis? Common experience suggests that teams work well when tasks are clearly defined or much leg work needs to be done and less well when design work needs to be completed. Is this due to the limitations of our understanding about how to organize these tasks in the academic environment of the studio or is it something which is inherent in the tasks themselves? These are largely unanswered questions although there is some evidence that suports commmon experience (Maier 1967).

Planning practice involves the use of a broad range of skills. These involve not only problem solving skills but also communication skills. The use of the studio in developing an individual's communication skills, oral, written and / or graphic is frequently undervalued. While the studio affords opportunities to develop a wide variety of skills, it is, however, impossible to deal with them all simultaneously. In the design of any city planning educational curriculum, a decision needs to be made as to where attention is to be paid to specific skill development. Communication skills may be emphasized in specific workshops or in specific studios while other studios may focus on the development of methodological skills.

Evaluating what has been done in the studio is often difficult. If the objective is to enhance student's skills then the focus in evaluation needs to be on this. Too often, however, the emphasis is on the quality of the product. This is, however, only one measure of what has been learnt by the student. There needs to be a clear articulation of what is to be evaluated. Without this the criticism that a student receives in the jury is often misdirected. Instructors and critics alike also need to learn how to use criticism to guide as well as commend or censure students. The whole atmosphere of the studio has to be one that focuses on learning and not so much on testing. This is not easy to achieve.

Conclusion

There is a continued need to integrate theory and application in the education of city planners. The studio seems to present the most effective forum for doing this. This integration does not, however, occur automatically. It has to be carefully considered. There are many difficulties that have to be overcome. There are potentials for personality and ideological conflicts between those teaching studios and those teaching theory courses. Maybe the resolution is for each person teaching a theory or methods course to be responsible for the design and teaching of a studio. The basic point is that the assumptions and value orientation of the process used in each studio need to be understood.

It is clear even from this cursory overview of the issues that the studio has to be carefully designed. Some specifications of how studios can and should be organized are available (e.g. Hodge 1980). A studio's supporting theoretical assumptions, its purposes and what it does not cover need to be carefully articulated by its instructors and understood by students. It is clear that the design and teaching of studios requires a very high energy level and considerable forethought. It is probably the most demanding of all course types to teach well. It is also something that can be done without very much effort. The difference is usually very clear.

Studios involve learning by doing. This also is true of many analytical problems courses, such as statistics, where students are required to solve specific problems. In doing statistics there are usually a very limited number of ways, often only one, in which the problem can be solved correctly. Planning problems are very different and need a very different approach to problem-solving and learning about problem solving.

Plan making involves two basic intellectual activities — divergent and convergent production. It is possible to train these processes in the abstract through specific exercises. Planning problems are "wicked" (Rittel and Weber 1972). It is possible to tell students about this in the abstract. It is possible to describe strategies for dealing with such problems within different socio-political environments. The full import of these can be only understood by trying to define and solve problems within the argumentative framework of a studio education. These skills can be learnt on the job to some extent but in the working environment it is difficult, if not impossible, to explore issues and processes to understand the implications of working in different ways. It is difficult to learn that the process of planning has to be designed to meet the needs of the specific situation and how to learn to do it without doing it. The increasing recognition of this is leading to the reintroduction of the studio in planning education.

The studio today should be different from the comprehensive planning studios of the 1950s and 1960s. They need to be and more often are carefully designed to deal with specific substantive and procedural issues. The goal is no longer to teach a specific process but for students to develop their skills in designing processes, policies and social and / or physical plans or courses of action. There has been no clear substitute for the learning by doing, by doing planning and communicating ideas to others. At the same time the limitations of the studio must be understood.

The studio is not a good vehicle to teach theory. It is, however, a good vehicle to see the implications of theory. The studio is not a good vehicle to simulate reality. It is good for looking at aspects of reality while other aspects are held constant or assumed to exist. For studios to be successful they must be accompanied by good theory courses.

All these conclusions are based on anecdotal evidence. They should not, however, be lightly dismissed because of this. There are very few studies of the studio. The ones that do exist (e.g., Moore and Gay 1960; Hassid 1961) have focused on the architectural studio. They are informative and from the basis for some of the observations made in this paper. A next step in studying the studio would be to accept the assertions in this paper as working hypotheses. How widely are studios now being used in planning education? What is their structure? What are the feelings that students and instructors have about what is being taught? What do professionals recall of the studio experiences they had as students? How formative were they? What are successful models for integrating studios and theory courses in a curriculum for city planning education? These are all questions that require more serious study than that on which the paper is based. Above all, is there a better way of teaching planning students what planning involves and how to make plans?

Notes

[1]The information for this paper is drawn partly on responses to a discussion of studio education in planning, urban design and architecture at the Second International Converence on Urban Design at Harvard University in September 1980 (see Jon Lang, "Education," *Urban Design International,* Vol. 2, No. 2 (January-February, 1981, p. 10) to a presentation on studio education at the Urban Design Educators Conference in Puerto Rico, April, 1981 (Jon Lang, "For the Studio Method," in Ann Ferebee, ed., *Education for Urban Design,* Institute for Urban Design, 1982, pp. 71-84) and a similar discussion at the Third International Conference on Urban Design at Galveston, Texas, October 1981. Although these discussions focused on urban design much of the discussion dealt with the teaching of synthesis to city planning students.

[2]The schools were University of California at Berkeley, Columbia, Harvard, Illinois, MIT, North Carolina, Pennsylvania, and U.C.L.A. Half of the individuals surveyed regard themselves as social planners and half physical planners.

[3]This observation may be misleading. Another hypothesis may be that students interests, which have been primarily focused on social and economic issues during the late sixties and seventies are again shift ing to concern with the nature of the physical environment and what it affords people. This has been the traditional concern of studio education. The difficulty in ascertaining the degree to which studios are now being offered as part of a planning education is exemplified by the program at the University of Pennsylvania. Here the two studio type courses required of all students are called "City Planning Workshop" and "Capstone." More students are also opting to take studio courses offered in other departments. These do indeed have a physical planning bias but allow the student to pursue social and economic planning concerns.

References

Baker, R. 1968. *Ecological Psychology: Concepts and Methods for Studying Human Behavior.* Stanford, CA: Stanford University Press.

Cartwright, T. 1973. Problems, Solutions and Strategies: A Contribution to the Theory and Practice of Planning. *Journal of American Institute of Planners.* 39:179-187.

Chadwick, G. 1978. *A Systems View of Planning,* New York: Pergamon.

Faludi, A. 1973. *Planning Theory.* New York: Pergamon.

Gans, H. 1968. *People and Plans.* New York: Basic Books.

Gibson, J.J. 1979. *An Ecological Approach to Visual Perception.* Boston: Houghton Mifflin.

Harris, B. 1967. The Limits of Science and Humanism in Planning. *Journal of the American Institute of Planners.* 33:324-335.

Hassid, S. 1961. Systems of Judgment in Architectural Design. *New Building Research.* Washington, D.C.: National Academy of Science and the Building Research Council.

Hodge, G. 1980. On Linking Planning Knowledge and Action in the Classroom. *Ekistics.* 285:459-463.

Koberg, D. and Bagnall, J. 1974. *The Universal Traveler.* Los Altos, CA: William Kaufman.

Lang, J. 1981. The Built Environment and Social Behavior: Architectural Determinism Reexamined. *VIA IV.* Cambridge, MA: The MIT Press.

Lindblom, C. 1968. *The Policy Making Process.* Englewood Cliffs, NJ: Prentice Hall.

Maier, N.R.F. 1967. Assets and Liabilities of Group Problem-Solving: The Need for an Integrative Function. *Psychological Review.* 74.

Moore, G. and Gay, L.M. 1967. Creative Problem Solving in Architecture: A pilot Study. Department of Architecture, University of California, Berkeley, CA.

Neisser, U. 1977. *Cognition and Reality.* San Francisco: Freeman.

Rittel, H. and Webber, M. 1972. Dilemmas in a General Theory of Planning. Working Paper No. 194, Institute of Urban and Regional Development, University of California, Berkeley, CA.

Studer, R. 1969. The Dynamics of Behavior Contingent Physical Systems. In *Design Methods in Architecture,* eds., A. Ward and G. Broadbent. Lund Humphries.

Wicker, A. 1979. *An Introduction to Ecological Psychology.* Monterey, CA: Brooks / Cole.