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Is Urban Planning Education Necessary for Civil Engineers?

C. J. KHISTY

ABSTRACT

The Education Committee of the Urban Planning and Development Division of the American Society of Civil Engineers undertook a nationwide survey of undergraduate civil engineering programs to investigate whether civil engineering graduates were sufficiently prepared to practice in the urban planning arena. The findings of this survey are presented and discussed in this paper. The interface between urban planning and civil engineering as well as the appropriate role of civil engineers in urban planning are also discussed. The results of the survey indicated that almost 90 percent of the respondents believed that civil engineers should participate in urban planning activities; 88 percent believed that urban planning education should be obtained by taking either a required or elective course. Minor changes in civil engineering curricula were also suggested.

Historically, the civil engineer has been involved in many aspects of city, urban, and regional planning. This involvement ranges from the technical aspects of land development, transportation systems, and utility systems to the socioeconomic and political aspects of presenting proposals at public meetings or working with community groups in the analysis of alternatives. In such a context, the fundamental question arises: How should civil engineers be prepared for such activities? More specifically, are civil engineering graduates currently sufficiently prepared to practice in the urban planning arena, or should there be planning courses in the typical civil engineering undergraduate curriculum?

OBJECTIVES

Given the basic question, the Education Committee of the Urban Planning and Development (UP & D) Division of ASCE undertook a nationwide survey of civil engineering programs to investigate this question. The primary objective of this paper is to present and discuss the results of this survey.

Other questions germane to this topic are, What is the interface between civil engineering and urban planning? What is the appropriate role of civil engineers in urban planning? What changes (if any) are necessary in civil engineering undergraduate curricula for civil engineers to fulfill their appropriate role in urban planning? In this paper, the author attempts to answer these questions as well.

SCOPE OF URBAN PLANNING

Planning is a basic human activity that involves thinking ahead or organizing to get things done. The term "urban planning and development" covers those activities concerned with the planning and development of towns, cities, and regions. Planners deal with problems people have holding their communities together, coping with pressures of urbanization and development, and trying to provide an opportunity for everyone to improve the quality of life. Apart

from just physical planning, most planners are forced to wrestle with policy issues connected with solving urban problems. Although functional specialization is becoming increasingly popular, planners believe that the strength of their profession lies in the integrated approach to problem solving, the understanding of public policies, and the use of citizen feedback (1).

Planning has developed through an eclectic accretion of concepts from a wide range of disciplines. Pollard, in a cogent article on the state of the art of planning (2), showed that there were at least 3,700 basic relationships between the elements of a plan and people and organizations involved. Therefore, the best definition of "planner" is the three-word definition "one who plans"; this should be interpreted as one who contributes significantly to the planning process because no one can be expected to do it all. Effective planning requires close working relationships between many diverse professions, organizations, and individuals; it must be responsive to the needs of many segments of society. Add to these the elements of politics and the variety is infinite (2).

The comprehensive planning process that was formulated in the mid-1960s was based on the premise of rational choice. It evolved out of the early experiences with large-scale urban transportation studies in the mid-1950s and early 1960s. A new image of planning, based on public participation, began to emerge across the United States in the late 1960s and early 1970s. Today, it is generally understood that planning must satisfy the information requirements of the decision maker and of the decision-making process (3). In summary, "the world moves into the future as a result of decisions not as a result of plans" (4).

CIVIL ENGINEERS IN URBAN PLANNING

The number of civil engineers involved in urban planning in the United States is hard to estimate, and their degree of involvement is even more difficult to assess. What is known generally, however, is that there is a significant interface between civil engineering and urban planning.

There are about 85,400 active members (excluding student members) of the ASCE, of whom 8,546 are currently affiliated with the UP & D Division. This affiliation works out to 10 percent of the total membership. ASCE has 22 divisions, of which 3 are closely related in some way with urban planning and development. If the affiliation of these three divisions, indicated below, is added to that of the UP & D Division, the total of 34 percent is impressive (5,6).

ASCE Division	No. of Members
Highways	10,815
UP & D	8,546
Urban transportation	3,216
Water resources planning and development	6,064
Total	28,643

During the years, there has been controversy among several disciplines about the place of the civil engineer in urban planning. Planners historically have come from several professions, such as architecture, civil engineering, economics, landscape architecture, political science, and sociology. Only recently has the profession of urban planning had its own undergraduate curriculum (7).

As early as 1961, ASCE stated the following (8):

> The roots of urban growth lie in the service systems that make possible the intensive use of land. These service systems are provided by civil engineering practice, which is one of the logical disciplines upon which to base a practice of urban planning.

Clair summed it up as follows (7):

> The planning, development, and redevelopment of our cities involve the exercise of numerous disciplines but none more than that of civil engineering, which embraces the broad areas of planning and development of land for residential, commercial, and industrial uses; transportation, including parking, traffic, transit, highways, streets, airports, railroads, and harbors; sanitary engineering, including water supply and distribution, sewerage works, flood damage prevention, and waste disposal; a wide variety of other public works; and urban renewal, with all the varied technologies involved in slum clearance, rehabilitation, and conservation of urban areas.

Civil engineers have played an important part in making possible the modern city, both through the scientific method and through the development of the art of engineering. As generalists they have been competent in heading teams of planners. As specialists in planning endeavors, such as planning, designing, and laying out public works, transportation systems, and industrial developments, they have had few contenders. In these planning fields, civil engineers have by virtue of their education and experience served as urban transportation planners, highway planners, water-resources planners, pollution control specialists, and land-use planners, to name just a few.

It is generally conceded that the nature and success of the civil engineer's continued participation both as a generalist or as a specialist will depend on a requisite viewpoint. Some of the more senior members of the profession are disturbed that civil engineers appear to be playing a lesser role in planning than was the case two or three decades ago. Others are concerned that civil engineering as taught in many professional schools is not adequate for many positions in urban planning.

THE ENGINEERING-PLANNING INTERFACE

In the past 20 years the civil engineering profession in general, and some of its components in particular (e.g., transportation, environmental engineering, and planning), have acquired theoretical underpinnings, methodological tools, and a vast range of public and private involvement. Today, the profession carries a distinct societal responsibility and this responsibility is increasing (9).

Naturally, there is an increasing need for professional sociotechnical problem solvers in areas historically viewed as being in the realm of civil engineering; this is particularly so in areas such as transportation, environmental, and water resources planning. A major reorientation in societal values in the United States has been in progress for at least the past 15 years. Now that the basic technological infrastructure is in place in terms of community support systems, and federal funding is becoming more difficult to obtain, society now appraises projects with a broader spectrum of socially desirable criteria (9).

In the past, simple economic efficiency, with

which engineers were all too familiar, was the dominant concern. The broadened view of evaluation criteria and impacts means that design and decision processes of the recent past are now inadequate. Public agencies are responding in increasing numbers to the change in societal values. Planning, designing, and implementing projects requires a new mix of professional talents, which has led to a need for individuals with multidisciplinary backgrounds as integrators. This need for engineers who are not only competent engineers but who are also capable of dealing with the wide range of issues in planning is real (9). A leading midwestern university has the following to say in this context (10):

> There are many skillful engineers who can do an excellent job of physical design and construction, using the best available technology, once the policy and social parameters have been specified. But the engineer who deals competently and creatively with policy and social factors is rare. Likewise, there are many planners who are insensitive and naive when it comes to matters of technology and physical science.

Although undergraduate programs in urban planning are comparatively rare, a brief look at such a program is helpful as a basis for comparison. Most planning programs are designed first to expose students to a range of issues involved in planning the social, economic, physical, and political aspects of the environment, and second to develop skills in a particular area of concentration. Emphasis is placed on interdisciplinary study. Students are required to take introductory courses on the planning process, the history of human settlement, and quantitative methods. Students usually select one or more concentrations such as environmental analysis, urban development, physical facilities planning, and social policy and community planning. In addition, there are supporting courses that emphasize management, implementation, and analytical methods. In planning schools where engineering is also taught, it is often found that transportation courses form an important part of the curriculum because of its pervasive influence on urban development and spatial patterns of behavior. This topic has been extensively examined and documented (11,12).

Figure 1 shows the overlap in subject content between undergraduate programs in civil engineering and urban planning. Curve A represents civil engineering and Curve B represents urban planning.

CURRICULUM REVISION

A variety of civil engineering curricula exist across the country. The so-called 4-year degree program ranges from 120 to 169 semester hours, with the average being about 132 (13). Running debate exists on the contents of the civil engineering curriculum. Many civil engineering educators and practitioners believe that programs at all levels must be broadened to introduce knowledge from other fields, such as the social sciences. Society, in general, expects engineers not only to design effectively and economically, but also to accept responsibility for economic, social, environmental, and other consequences of their work. Wenk sums it up as follows (13):

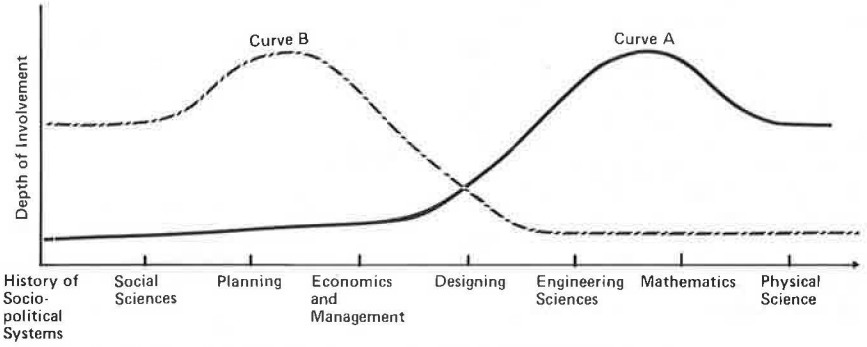
> A new agenda for engineering education may be required, distinguished less by specialization than by breadth. It would be based on technical disciplines but in the problem oriented matrix. Graduates would be characterized by versatility, comprehension of social processes, sensitivity to public policy and to the importance of critical judgment in distinguishing truth from propaganda, and fired by the images of the future and the willingness to participate in governance.

There has been pressure to increase the content of civil engineering programs in mathematics, science, engineering, and computer applications. Technical support courses such as surveying, management, communication, and professionalism and ethics have also been mentioned as areas needing urgent expansion. Such diverse currents have made it difficult for educators to decide what to include and what to exclude in a revised curriculum.

DEVELOPMENT OF THE SURVEY INSTRUMENT

The survey instrument was developed through a joint effort of the committee members of the UP & D Division, and its distribution was underwritten by the ASCE. It was sent to the chair or other administrative head of all 208 civil engineering departments and programs that were listed by ASCE as of the summer of 1981. The analysis of the results was done in 1982, and the author spoke to several of the respondents in 1983. The instrument consisted of 15 questions grouped in 4 general areas (the specific questions are given in the next section):

1. General attitudes. Two questions addressed the attitude of the respondent toward the perceived relationship between civil engineering and urban planning and the civil engineer's appropriate role in planning and development activities (see Questions 1 and 2).
2. General need for training in planning. Four



Note: Curve A is the undergraduate civil engineering program and Curve B is the undergraduate urban planning program.

FIGURE 1 Interface of undergraduate programs in civil engineering and urban planning.

questions addressed the general need for training and how it might be best accomplished (see Questions 3 to 6).

3. Explicit training needs. One question was directed to identify desirable planning-oriented topics (see Question 7).

4. Existing training. The last eight questions were concerned with obtaining specific factual information about the respondent's program (see Questions 8 to 15).

The survey instrument was directed not only to assessing the current status of urban planning education for civil engineers, but also to identifying the perceptions of civil engineering educators as to the need for such training. Note that the respondents were all educators who may or may not have had any experience with or have been acquainted with urban planning.

RESULTS OF THE SURVEY AND COMMENTS

There were 115 usable responses (55.3 percent) returned.

Question 1. How do you view the relationship between civil engineering and urban planning?

Results

14%	30	a. Civil engineers, given their traditional academic training, should generally be considered as planners.
8%	18	b. Civil engineering and urban planning are separate disciplines and should be considered as such.
37%	79	c. Civil engineers who wish to practice as planners (or in planning) should take courses in planning or undertake additional degree work.
23%	49	d. All civil engineers should have some working knowledge of urban planning concepts.
17%	37	e. Planners should be licensed in a manner similar to civil engineers and architects.

If e, should all registered civil engineers automatically be eligible for registration as planners?

6 yes 31 no

The figures provide the total number of times an item was checked and the corresponding percentage. In answering Question 1, a respondent could give one or more answers. The fact that only 8 percent of the respondents believed that urban planning and civil engineering are separate disciplines indicates the extensive interface or overlap between the two areas. A combination of items a and d reinforces the interrelationship between civil engineering and planning and the necessity for a working knowledge of planning. The weak response to item e is not surprising considering that urban planning licensing and certification in the United States has been both relatively recent and comparatively unimportant.

Question 2. What is the appropriate role of civil engineers in urban planning? (check one)

Results

9%	10	a. Civil engineers should take the lead role in urban planning activities in which they participate.
2%	2	b. Civil engineers should limit their involvement in urban planning to providing technical support (e.g., technical aspects of transportation or utility systems) to planners.
87%	96	c. Civil engineers should participate in urban planning activities only insofar as they are trained/qualified--sometimes this might entail a lead role, sometimes not.
0%	0	d. As a general rule, civil engineers should not participate in urban planning activities.
2%	2	e. Other, please specify:
	110	

The high response to item c further reinforces the strong ties between civil engineering and planning. These comments are interesting in that they indicate some established views held by engineers toward planning. More than one-third of the responses indicated that additional course work, probably in the shape of electives (or possibly beyond the B.S. degree in civil engineering) should be undertaken if an engineer wanted to be considered as a planner.

Question 3. In general, education and training in planning for civil engineering should be: (check as appropriate)

	Results for Undergraduate Students		Results for Graduate Students		Results for Both	
	No.	Percent	No.	Percent	No.	Percent
a. Required course(s)	21	50	10	36	11	13
b. Elective course(s)	15	38	15	54	71	86
c. Training in planning is not necessary	3	8	3	12	1	1
Total	39		28		83	

A respondent could give one or more answers to this question. The figures provide the total number of times the item was checked and the corresponding percentage. Different interpretations can therefore be made, but the broad conclusion that can be drawn from the answers is that a required or elective course in urban planning at the undergraduate level is necessary.

Question 4. In general, education/training in planning for civil engineers should be undertaken by: (check one)

Results

4	a. The civil engineering department alone.
4	b. The civil engineering department in conjunction with other departments (excluding planning departments/schools).
20	c. The civil engineering department in conjunction with the planning department/school.
80	d. The civil engineering department in conjunction with other departments in-

cluding (if possible) the planning department/school.

__2__ e. Exclusively by the planning department/school and/or other departments.

__0__ f. Such education/training should not be undertaken.

About 92 percent of the respondents believed that planning education should be undertaken by the civil engineering department in conjunction with a planning or other department. Many universities do not have an urban planning department and the only other alternative available is to obtain such expertise from other cognate areas, such as geography, sociology, political science, and urban affairs.

Question 5. In order for civil engineers to fulfill their appropriate role in urban planning, are any changes necessary in typical civil engineering undergraduate curricula?

Results

16% __18__ a. No changes necessary.
76% __85__ b. Minor changes are probably necessary.
8% __8__ c. Major changes are probably necessary.

Almost 80 percent of the respondents believed that minor changes in civil engineering curricula were necessary for the civil engineer to fulfill an appropriate role in planning.

Question 6. Do you feel that education/training in urban planning would be better accomplished in some other way than incorporating such courses into current civil engineering curricula? (circle one)

	Yes--Strongly agree (1)	(2)	(3)	(4)	No--Strongly disagree (5)	
	6	27	26	34	16	Mean = 3.2 Standard deviation = 1.1

	Appropriate (1)	(2)	(3)	(4)	Inappropriate (5)	
Additional undergraduate or graduate work in planning	36	43	8	3	2	Mean = 1.8 Standard deviation = 0.9
On-the-job training	21	33	16	9	1	Mean = 2.2 Standard deviation = 1.0
Continuing education	25	30	15	9	2	Mean = 1.2 Standard deviation = 1.1

Other: Real-world projects
Government publications
Internship programs
Civil engineering design courses

Most respondents took the middle-of-the-road approach. They indicated that civil engineering departments were well suited for incorporating such courses within their curricula. At the same time, there was a strong feeling that other approaches were also suitable.

Question 7. For civil engineers, what specific topics should be covered in a planning course(s) or in the context of other courses? Indications below should be in terms of hours of class time spent (assume that 40 hours represents one 1-semester 3-credit class).

The ranking of topics is shown in Table 1; the resulting order is interesting. The analytical, mathematical issues involved with urban planning are preferred over the qualitative, nonmathematical ones generally associated with planners. This ordering is ironic in the sense that it would have been generally expected that engineers, because of their technical training, would tend to select topics in which they were considered weak by society. The ordering also brings out biases that civil engineers generally exhibit toward urban planning and the capabilities of urban planners.

TABLE 1 Rank Ordering of Topics

Topic	Mean No. of Class Hours	No. of Times Mentioned[a,b]	Required Course[a,c]	Elective Course[a,d]
Economic analysis	14.8	64	37	17
Transportation system planning	13.5	71	39	21
Quantitative methods	13.1	53	24	22
Modeling/simulation	10.6	56	22	25
Urban/regional economics	10.6	45	13	25
Land-use planning	10.4	61	29	22
Utility system planning	9.9	49	22	17
Planning theory	9.8	57	19	24
Environmental impact analysis	9.7	65	29	23
Urban administration	8.8	46	11	25
Planning law	8.8	43	13	25
Land-use controls	8.1	57	29	20
Economic development	8.1	34	11	20
Alternatives evaluation	7.1	54	27	18
Spatial economic theory	6.9	27	5	18
Citizen participation strategies	6.0	41	10	22
History of planning progress	5.9	41	10	26
Urban development/redevelopment	5.6	34	8	21
Housing	4.8	29	8	16

[a]Responses to Question 7.
[b]Number of times mentioned is the number of respondents who allocated any number of hours to topic.
[c]Number of times course was indicated as a required course.
[d]Number of times course was indicated as an elective course.

Also, it will be noticed from the rank ordering that topics such as economic analysis (capital budgeting), transportation systems, and quantitative methods are more likely to be taught in traditional civil engineering curricula as opposed to planning theory, land use controls, and housing.

Question 8. Given the types of topics that you have indicated above, and the general role that you have identified for would-be engineers/planners, in what kind of context should the topics be covered? (check as appropriate)

Results

23% __42__ a. In project oriented courses where possible.
31% __56__ b. In a general planning course(s).
22% __39__ c. In a sequence of courses.
23% __42__ d. In the context of other traditional civil engineering courses.

More than one-half of the respondents (b and c) indicated that the topics mentioned in Question 7 could be covered in courses. It was not surprising to see that almost one-fourth of the respondents believed that traditional civil engineering courses would be able to address the specialized topics. This brings out the bias civil engineers generally have against planning-oriented courses. Projects, by and large, are an effective means of learning a subject and it was gratifying to have 23 percent of the respondents voting in favor of project-oriented courses. However, it must be conceded that several of the courses are not adaptable to the project type, for example, planning law, citizen participation, history, and planning theory. Probably these latter descriptive courses were not the type of courses held in high esteem by civil engineers.

Question 9. Name of your college/university:_____

Question 10. Name of department:_____

Question 11. Does your department currently offer a course(s) in urban planning as a part of your required curriculum in the civil engineering program?

17 Yes 92 No If yes, how many (and specify the titles):_____

Of the 109 respondents, 17 indicated that one or more courses in urban planning were part of the required curriculum; this works out to about 15 percent of the schools surveyed. The most frequently mentioned courses were

- Transportation engineering
- Urban planning
- Planning in civil engineering
- Urban systems engineering

However, on closer examination only 8 schools (7 percent) offered courses that were indeed in urban planning.

Question 12. Does your department currently offer any such courses (as 11.) as electives?

60 Yes 53 No If yes, how many (and specify the titles).

Of the 113 respondents, 60 (53 percent) offered elective courses. The most common ones listed were

- Training planning
- Urban planning
- Transportation, general

Although these responses may appear flattering, upon closer scrutiny it was revealed that only 29 schools (25 percent) offered urban planning courses.

Question 13. Does your department currently address urban planning issues in the context of any regularly scheduled courses?

79 Yes 29 No If yes, please specify the course title(s).

Seventy-nine of the 108 departments said that they address urban planning issues in the context of any regularly scheduled courses. The most frequently mentioned courses were

7	Transportation, general
5	Highway engineering
10	Transportation planning
27	Transportation engineering
2	Urban systems planning
1	Urban problems

Note that transportation-related courses were considered the predominant ones having a planning content. Environmental courses were also mentioned.

Question 14. Total faculty members:

15 Full-time (mean) 2.4 Part-time (mean)

Total who have competency in planning issues: (Please specify)

2.5 Full-time (mean) 0.4 Part-time (mean)

The issue areas in which faculty had competency were

Environmental, general	7
Water resources	4
Transportation, general	13
Transportation planning	9
Urban planning	2
Economic analysis (engineering economics)	2

Total who are APA and/or AICP members:

3% Full-time 2% Part-time (110 schools)

Question 15. Does your college/university have a planning department/school?

56 Yes 58 No

If yes, does your department cooperate with that department/school in any way?

46 Yes 10 No

Results

21 a. Develop joint courses.
12 b. Have joint faculty appointments.
21 c. Develop joint programs and courses.
43 d. Encourage students to take courses in each other's programs and coordinate courses so there is no overlap.
___ e. Other, please specify. (Answers included projects, dual degrees, joint research.)

DISCUSSION

The two basic questions that were originally raised were

1. Are civil engineering graduates currently sufficiently prepared to practice in the urban planning area?
2. What changes (if any) are necessary in civil engineering undergraduate curricula for civil engineers to fulfill their appropriate role in urban planning?

The survey answers both of these questions, and in addition provides clues to others. The highlights are as follows:

- 87 percent of the respondents believed that civil engineers should participate in urban planning activities only insofar as they are trained and qualified; sometimes this might entail a lead role, sometimes not.

• 50 percent believed that the education and training in planning should be by taking a required course(s) in planning; 38 percent voted for an elective course(s).
• 92 percent believed that planning education should be undertaken by the civil engineering department in conjunction with a planning or other department.
• 76 percent voted that minor changes are necessary for civil engineers to fulfill their appropriate role in urban planning courses.
• Transportation engineering courses were considered the ones having the largest planning content.

Some further comments are offered based on the survey, the author's conversations with educators, his observations of numerous civil engineers and planners in practice, and his close acquaintance with both civil engineering and planning students.

The civil engineer confronts the realities, trends, and requirements of urban planning and development with certain advantages inherent in his or her training. The scientific method, systems analysis, and mathematical and quantification abilities provide the engineer with a clear head start. Also, the engineer's intimacy with the space and shape of the physical world provides an additional advantage. Add to this a thorough basic knowledge of environmental, geotechnical, water-resources, structural, and transportation engineering, and the potentialities are apparent.

Areas in which the civil engineer is probably somewhat weak are

• An appreciation of the multivariable, open-ended, conflict-ridden, value-laden nature of socio-technical problems.
• An appreciation for the interrelationships between engineering and public policy.
• The ability to apply a logical, problem-solving approach to open-ended problems.
• The ability to effectively communicate in written and oral form with a variety of individuals and groups in a broad range of social and professional settings.

Engineers solve problems in a variety of ways but they are not adept in solving wicked problems. Planning deals with wicked problems. Wicked problems have no definite formulation, no clear rules, no true-false answers. They can at best be better or worse, and there is no clear test for their solution. It is claimed that each wicked problem is unique, but at the same time each is a symptom of another deeper, more extensive problem. Engineers, by and large, are fond of using precise data and coming up with determinate one-shot answers. They usually will not question values, institutions, and given decision rules. Planners are familiar with wicked problems and messy, rough, imprecise data (14).

Engineers are comfortable with design, where design implies analysis, synthesis, and understanding. However, engineers invariably emphasize analysis and there are valid reasons for this emphasis. For one, engineers' understanding of analysis is stronger than of synthesis, and secondly, their training involves considerable analysis, particularly in the traditional areas of structures and fluid mechanics. It has only been since the introduction of transportation engineering and environmental science that the notions of systems and synthesis have begun to be included in the vocabulary of civil engineers. The notion of design being synonymous with planning and optimization is also relatively new in civil engineering. Planners, on the other hand, are familiar with synthesizing information and dealing with socioeconomic problems, although they may not prove as industrious as engineers in number crunching.

CONCLUSIONS AND RECOMMENDATIONS

Urban planning and development is not the work of one person, one profession, or one organization. With today's complexities, planning can only be achieved by multidisciplinary teams. Civil engineers will continue to be involved as specialists in urban planning, particularly in planning, designing, and constructing the physical infrastructure. However, as the scope of urban planning progressively broadens and deepens, additional knowledge will be required for effective participation and team leadership. This will include the nature of the planning process; the socioeconomic, legal, and political realities; planning theory; the synthesis and coordination of team effort; and projecting into the future and formulating sound, subjective judgments.

Some specific recommendations are as follows:

• The introduction of one mandatory course in urban planning, apart from the ones in transportation engineering usually offered. The emphasis should be on the sociopolitical trade-offs necessary for planning; some planning theory would also be helpful.
• The introduction of one or more elective courses in urban planning, offered separately or jointly with transportation, water-resources, or environmental engineering courses. This would provide an opportunity for students inclined to enter the urban planning arena to be better equipped to deal with current planning issues.
• Because the civil engineering curriculum is already overburdened with other priorities, it would not be possible to add on further course work beyond what is recommended above. Civil engineers who wish to gain in-depth knowledge of urban planning must obtain formal graduate education in urban planning, or utilize university extension or self education.

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Significant contributions notwithstanding, the findings and views presented herein are the sole responsibility of the author and do not necessarily reflect those of the other committee members or any institution.

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An Evaluation of Videoconferencing with Active and Passive Sites as a Means for Technology Transfer

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ABSTRACT

In an effort to broaden dissemination of the information presented at the Annual Meeting of the Transportation Research Board (TRB), TRB's Executive Committee approved an experimental videoconferencing session for the January 1984 Annual Meeting. The objective of this session was to gain experience with this communication medium in order for TRB to make appropriate decisions about its future uses for technology transfer. The session's effectiveness was evaluated by 180 respondents at 4 active sites and 186 respondents at 6 passive sites. The evaluation involved such things as demographics, environmental conditions at the remote sites, the presentations, and the session's general format. The effectiveness of a videocommunication session was compared with the effectiveness of a face-to-face meeting. In addition, some preliminary cost data for this type of program were obtained. In general, the program was very well received. Some specific findings can be reported: (a) it reached a considerably different audience than would have been present at the TRB Annual Meeting; (b) the environmental characteristics at the sites were satisfactory; (c) the speakers, as a group, were well received by the respondents; (d) participants reported a significant increase in knowledge as a result of attending the program; (e) there were minimal differences between the responses from the respondents at the active sites and those at the passive sites; and (f) on an individual-participant basis, the cost of the program was within acceptable limits. As a result of these and other findings, videoconferencing was determined to have a place in the technology transfer activities of TRB and should be incorporated in appropriate areas to increase the communication to field personnel.