Introducing Philosophical Theories to Urban Transportation Planning

or

Why All Planners Should Practice Bursting Bubbles

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Abstract—Teaching in substantive areas of planning has become increasingly calculative. Students have been taught to use techniques, but not to ask whether they are asking the right questions.

A new course which attempted to instead emphasize a meditative approach to transportation planning is described. A theme of exposing and criticizing assumptions—bubble bursting—lies at the heart of the course. Philosophical theories were taught to help accomplish this, and problem setting was shown to be essentially a question of ethics. The shortcomings of current systems analysis approaches in transportation were discussed, and the alternative of a wider form of systems research suggested by Churchman was explored. The interrelationships between transportation and related systems were stressed throughout the course.

Students expressed some concern that the course did not emphasize the practical side of transportation planning, but responded positively to the new perspectives for criticism that were introduced. Teaching the course demonstrated that there is a useful role for courses which expose and criticize assumptions rather than merely teach techniques and which reveal the essentially ethical nature of planning and all social inquiry; and that if we want future generations of thinking planners, we need to teach them how to think.

INTRODUCTION—LIFE INSIDE A BUBBLE

Planners inhabit bubbles. The bubble provides a womb-like sense of comfort and security, an uncertainty-controlled environment in which the planner can work, using the repertory of procedures on the list of problems contained within the bubble's walls. The planner may peer out to glance at the outside world; it is seen, however, only from the perspective afforded by the individual's particular bubble.

Because the bubble has invisible walls, the planner is not even aware of being in a bubble.

Heidegger [6] was surely observing the retreat into bubbles when he wrote that 'Man today is in flight from thinking. . . . Part of this flight is that man will neither see nor admit it. . . . He will say—and quite rightly—that there was at no time such far-reaching plans, so many inquiries in so many areas, research carried on as passionately as today' (p. 45). But, according to Heidegger, such work revolves around 'calculative thinking', which takes place within 'conditions that are given'. The conditions are taken into account 'with the calculated intent of their serving specific purposes. Thus we can count on specific results. Calculative thinking computes. It computes ever new, ever more promising and at the same time more economical possibilities. . . . Calculative thinking never stops, never collects itself. Calculative thinking is not meditative thinking, not thinking which contemplates the meaning which reigns in everything that is' (p. 46).

Meditative thinking is about identifying, questioning and moving beyond assumptions. It is about bursting bubbles to discover that few planning problems may be productively tackled with a limited set of technical procedures and without an understanding of how those problems relate to other questions.

At the core of meditative thinking is the asking of what to West Churchman [5, p. 132]—following his teacher Edgar Singer—is the most crucial ethical
question: should a particular question be investigated at all? Asking one question, rather than another, is an ethical act in that the answers to different questions imply the implementation of alternative sets of possible outcomes with divergent impacts on the lives of different people. Social systems and therefore social problems are necessarily interconnected. If we forget this and unquestioningly concentrate work on one part of the cloth, while ignoring the complex patterns of the fabric as a whole, the result is likely to be unharmonious and unaesthetic.

Teaching in substantive areas of planning has become increasingly calculative. As Schön [18, p. 39] puts it, attention to problem ‘solving’ has been at the expense of problem ‘setting’—students have been taught how to put real-world problems into the molds of techniques which appear to render them soluble, but have not been taught how to inquire into whether they are asking the right question in the first place.

A course taught at the University of North Carolina, Chapel Hill, during the Spring semester, 1987, attempted instead to emphasize a meditative approach to transportation planning. A theme of exposing and criticizing assumptions—bubble bursting—lies at the heart of the course. Philosophical theories were employed to help accomplish this. Problem setting was shown to be essentially a question of ethics, and students were encouraged to see alternative ways of looking at problems and the ethical implications of doing so. The interrelationships between transportation and related social systems—land-use and urban form, housing, employment, education, equity, race—were stressed throughout.

This paper discusses the need for such a course, describes the course and the experience of teaching it, and suggests that the approach it took could be useful in other substantive areas of planning.

In the following, a discussion of the limitations of narrowly-defined approaches to transportation planning is first presented. Problems resulting from the increasing emphasis put on computer techniques in planning practice and education are highlighted, with illustrations drawn from transportation demand modelling. The need for a more meditative form of thinking is argued, and philosophical argumentation put forward as a path to meditative form of thinking is argued, and philosophical theories were employed to help accomplish this. Problem setting was shown to be essentially a question of ethics, and students were encouraged to see alternative ways of looking at problems and the ethical implications of doing so. The interrelationships between transportation and related social systems—land-use and urban form, housing, employment, education, equity, race—were stressed throughout.

The question of bureaucratic barriers is one which requires several shelfloads of treatises to itself. Suffice it to say that if—with a Federal Highway Administration separate from an Urban Mass Transportation Administration—it is a rare enough event for one agency to reflectively consider roads and transit in the same breath, how much less likely it is that such an agency will simultaneously look at transportation, education, race and urban form. The intellectual barriers will be briefly considered below.

THE NEED TO BROADEN THE SCOPE OF TRANSPORTATION PLANNING

For too long transportation planning—especially in the United States—was regarded as an essentially engineering activity. Roads were to be built wherever needed to allow cars to flow quickly and efficiently. How easy it was to overlook the reality that more roads would simply intensify the anarchic Brownian motion of vehicular traffic, bringing with it pollution, congestion, and unforeseen autopian urban forms.

Major limited-access arterials were often put through low-income areas, disrupting communities but rarely providing transportation benefits to the people who live there. Looked at from this angle, a question of transportation policy becomes not only one of providing transportation facilities but of providing access to them, and so of equity. What use are freeways—which provide vehicles with ‘free’ access—to people who don’t own cars?

Access needs to be defined more broadly than the potential ability of an individual to use a particular transportation facility. Well-meaning attempts to provide ‘access’ have foundered when the concept has been narrowly-defined. Take the case of the new light rail line under construction from downtown Los Angeles to Long Beach. It is supposed, among other things, to provide access to new employment opportunities for the residents of poverty-torn areas, including Watts and Compton. Yet, if employers will not hire people from these areas because they lack skills or because they were born with the wrong-colored skins, what sort of access is thereby provided?

Questions of education and race must therefore be raised to properly probe what superficially appears to be a problem of mere physical movement. But these issues are locked away in other bubbles, not generally thought by transportation planners to be in their realm of responsibility; it is easier to let them float by on the outer horizon than to break the intellectual and bureaucratic barriers which must be traversed to engage them directly.

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INTELLECTUAL BARRIERS

Donald Schön [19] has pointed out that:

The professional schools of the modern research university are premised on technical rationality. Their normative curriculum, first adopted in the early decades of the twentieth century as the professions sought to gain prestige by establishing their schools in universities, still embodies the idea that practical competence becomes professional when its instrumental problem solving is grounded in systematic, preferably scientific knowledge. . . . The greater one's proximity to basic science, as a rule, the higher one's academic status (pp. 8-9).

Departments such as City Planning, 'yearning for the rigor of science-based knowledge and the power of science-based technique' have brought in scholars from social science departments. 'And the relative status of the various professions is largely correlated with the extent to which they are able to present themselves as rigorous practitioners of a science-based professional knowledge and embody in their schools a version of the normative professional curriculum' (p. 9).

The desirability of quasi-scientific approaches is intensified by their apparent ability to provide simple and clear-cut answers to complex problems. We have a basic intolerance for uncertainty, and it is reassuring to have 'hard numbers' which we may presume were 'rigorously' obtained to tell us in which direction to go. But, as Schön remarks, 'formal modelling has become increasingly divergent from the real-world problems of practice'.

The teaching of techniques for forecasting demand—exemplary of such formal modelling—nonetheless plays a central role in many current transportation planning curricula, equipping students to apply the principles of UTPS (Urban Transportation Planning System) modelling. Such methods form the core of the textbook Urban Transportation Modelling and Planning by Stopher and Meyburg [23], for example. The text describes the 'transportation-planning process' as a series of seven technocratic steps. An inventory is to be taken of existing travel and land use, socioeconomic population characteristics and existing transportation facilities. A series of forecasts follow: 'of land uses that should occur in the forecast period, and then of the demand that may be anticipated and the way this will occur throughout the region' (p. 60). Four models are used: to gauge total demand; allocate it between origins and destinations; between competing modes of transportation; and amongst the set of available network paths. Finally, alternative strategies for providing transportation are evaluated in the light of the above, and policy choices for planning are made.

The conduct of these transportation studies and their general structure is based on the premise that the demand for travel is repetitive and predictable, and that future transportation systems should be designed to meet a specific, predicted travel demand. This demand is itself based on an analysis and extrapolation of current travel, and an investigation of its relationship to the patterns of population, employment and socioeconomic activity [23, p. 60].

Wachs [24] provides an account of the pitfalls of forecasting of the type central to the UTPS process outlined above. The assumptions upon which the forecast is based and which influence its outcome are necessarily subjective, not objective. They can be politically-shaped, nullifying the claims to rigor of the modelling process. Past data must be relied upon: it may not be an indication of the future, especially as actions taken as a result of the forecast may change that future. It might be added that the UTPS process assumes that patterns of the past form a desirable program for the future. We may not want a future in which we simply provide transportation capacity to meet an extrapolation of current trends.

As Wachs says:

Sophistication in the technique of forecasting is . . . more apparent than real. Computers are used because there is often a great deal of data: many variables, many units of analysis for each, several time periods. These conditions lead to the requirement for training and experience in mathematics, statistics, data manipulation, and computer programming. But together, such skills ensure no special perspective on the future, and there is relatively little theory derivable from the social sciences to help one arrive at reasonable core assumptions (p. 253).

The computer has itself taken on a magic aura, especially with developments in the microcomputer and its almost universal availability for planning students to use. When, as operations researcher John Mulvey [15] suggests 'many educated people treat computers and the ensuing recommendations as objective fact', it is easy to appreciate the seductive appeal of a machine that so readily seems to deliver the truth. And, besides, the virtuosity of the machine is seen to reflect favorably on its operator.

The importance of the computer's role to educators is signified by the fact that while there was no special 'Brain User's Group' meeting to deliberate during the 1987 conference of the Association of Collegiate School of Planning in Los Angeles, there was a special day set aside for a 'Microcomputer User's Group one-day conference'. The fascination with computers is becoming ever greater, as in the tendency to formulate planning problems around what a PC can do, rather than based on the essence of the problems themselves.

Employers are partly to blame, for it has become a standard part of interviewing nascent planning professionals to ask if they know Lotus or Symphony, as if they couldn't quickly pick up the essentials of either tool while holding an entry-level position. Students, knowing that these 'skills' will be demanded of them, in turn ask for courses mak-
One modeler, for example, was unaware that the proper awareness of the assumptions driving them does not seem alarming to you at the level of the graduate presentation of the real world. If this gullibility does contrary, the user can be readily allured into an uncritical belief that the model produces numbers with the solid appearance of truth, does not invite such worries. Quite to the most important role in shaping the model's output, but these are hidden behind the scenes.

I recently forced myself to run through the algorithms of such a model on a pocket calculator to give myself the feel of what was going on—something denied by the instant recalculations of the spreadsheet. While it may not be practical to hand-calculate the projected demand for a particular transportation mode between all origins and destinations on a complex network, it does not take excessively long to run through the model with a small number of examples of origins and destinations, and this is frequently helpful in revealing the model's structure. It was only through this strategy that I discovered a glaring error in the spreadsheet model itself. Even then it was not possible to fully determine the basis of model assumptions, since this rested on the validity of sample surveys, the quality of which could not be determined by the information supplied, and on a series of judgement calls not clearly spelled out.

The graceful flow of the model, as it effortlessly produces numbers with the solid appearance of truth, does not invite such worries. Quite to the contrary, the user can be readily allured into an uncritical belief that the model is a reliable representation of the real world. If this gullibility does not seem alarming to you at the level of the graduate student, let me say that I have met too many professionals who have used computer models without proper awareness of the assumptions driving them. One modeler, for example, was unaware that the cookie-cutter relationship between commercial floorspace and the number of work trips made to a particular employment site was producing substantially more work trips to a proposed new development than the number of people expected to work there (which was specified elsewhere in the plan).

Other potential model users have been unaware of unreasonable assumptions about people's willingness to transfer (some models assume people would be willing to change vehicles five or six times during a single trip), of the applicability of the data base upon which the model they are using is calibrated, or of the myriad other details that go to determine output.

Even fewer users have paused to identify and evaluate the structure and sources of a model's mathematical architecture. The 'trip distribution' model in UTPS demand modelling which allocates trips between origins and destinations in a network, for example, is derived from the Newtonian gravity model of physics, which states that:

\[ f_{12} = \frac{G M_1 M_2}{d_{12}^2} \]

where

- \( f_{12} \) = Force of attraction between bodies 1 and 2
- \( M_1 \) = Mass of body 1
- \( M_2 \) = Mass of body 2
- \( d_{12} \) = Distance between the bodies

and

\( G \) = The gravitational constant.

In the transportation application, the body masses are replaced by the total volume of trips sent out from or attracted to each zone on the network. This volume, calculated in a previous 'trip generation' model, is a function of factors such as population and employment which, therefore, indirectly constitute the 'masses' under study. The trip distribution model distributes this total volume between the different origins and destinations. As in the Newtonian model, distance (generally specified primarily in terms of travel time) acts as a form of 'friction', which constrains attraction. (See discussion in Stopher and Meyburg [23], pp. 140–158.)

We end up with:

\[ T_{ij} = \frac{P_i A_i(F_{ij})}{\sum_j A_j(F_{ij})} \]

where

- \( T_{ij} \) = Number of trips generated by zone \( i \) and attracted to zone \( j \)
- \( P_i \) = Total number of trips produced (generated) by zone \( i \)
Bubble bursting in planning education

\[ A_j = \text{Total number of trips attracted to zone } j \]

and

\[ F_{ij} = \text{A measure of the spatial separation of zones } i \text{ and } j, \text{ generally an inverse function of travel time.} \]

The gravity model provides a metaphorical representation of a complex problem of social science in vivid, easily understandable terms. Such simplification and clarification is a hallmark of metaphor (see Lackoff and Johnson [12]). This borrowing from physics also gives the impression of scientific rigor for which planners yearn. Yet the mapping from physical bodies interacting in space to human bodies commuting across cities lacks theoretical grounding. People do not interact across space in the same way as objects, no matter how tantalizing it may be to pretend that they do.

It is not surprising, therefore, that gravity models in transportation planning have performed poorly. In response, ad hoc adjustments have sometimes been made to try to make them do better (i.e., produce the expected results) under particular circumstances. The use of such patchwork devices serves only to highlight the inadequacy of the overall theoretical conception.

In some cases, use of such models leads to the justification of poor planning. In the modelling done for the Los Angeles–Long Beach light rail project currently under construction [21], for example, an unrealistically large number of passengers was forecast to travel between the midsection of that corridor and downtown Los Angeles because many people live in the mid-corridor, there is a substantial employment base in downtown Los Angeles, and they are not geographically far apart.

Mid-corridor residents, however, unfortunately lack the skills which would get them jobs in downtown Los Angeles, even if the 'friction' of distance separating them from those jobs is relatively low. The 'friction' of inadequate education and other deprivation simply isn't accounted for by the model. By predicting trips which are unlikely to materialize, the model has, nonetheless, helped justify a new transit system ill-suited to the needs of area residents.

There are certainly applications where computers can be helpful if their use is properly taught. The extreme confidence placed in computer virtuosity is, however, misplaced. It too often provides an excuse to avoid confronting the more troublesome wider issues of planning, where there are no easy answers, and where neither faculty nor students can feel the instant glow of success that is delivered along with the neatly-printed computer output. Too often students and planners are provided with a set of computational procedures, but without a knowledge of their limitations. Too little emphasis, meanwhile, is put on providing an understanding and critique of the goals which such techniques are supposedly there to serve. A mechanistic view is taken of what are essentially social and human problems, and the core problems remain unattended to and unresolved.

What is most lacking is an exposure to different modes of thinking, an awareness of the existence and fragility of the assumptions of planning applications, and an inculcated predisposition to seek out such assumptions, critically evaluate them and move beyond them. We need to seek an alternative educational approach which throws calculative thinking in perspective, and which emphasizes relevance rather than technique in planning. The following provides a discussion of ways of possibly arriving at such an approach.

EXPLORING ALTERNATIVE MODES OF INQUIRY

We need to emphasize a more meditative form of thinking to planning students, and philosophical argumentation provides an important path to greater critical awareness. No single author has made a more important contribution to a philosophical critique of planning than C. West Churchman in his volumes on The Design of Inquiring Systems [3], The Systems Approach and Its Enemies [4], and Thought and Wisdom [5]. In the second of these he includes a 'Historical Debate' between Kant and Bentham which provides the framework for a critique of utilitarianism, the system of ethics which demands that out of a set of choices that one be chosen which provides the greatest net balance of good over evil for the greatest number of people; which looks to maximize the net balance of positive consequences, rather than ask upon what principles consequences should be arrived at, or how they should be distributed among those affected by them. Other excellent material on this subject is available in the chapters by Steven Kelman and Alasdair MacIntyre in Wachs [25].

Such study reveals first that our quantitative planning tools are essentially utilitarian in nature and, secondly, that exposing only the technical assumptions of one particular model is merely to emerge from one deeply-recessed bubble into another, perhaps slightly larger, bubble. The performance of UMTA (Urban Mass Transportation Administration) 'Alternative Analysis' using transportation demand modelling and estimates of costs in itself implies adoption of the following utilitarian formulation: that we have a set of alternative transportation systems from which to choose; that each

\[ A_j = \text{Total number of trips attracted to zone } j \]
one has associated with it a series of benefits ('pleasures' in Bentham's language) in terms of numbers of passengers carried, and costs ('pains' to Bentham) — in both dollars and travel time; and that we are to choose that one which provides the greatest net benefits over costs.

A major failing of such an approach to a Kantian critic is its refusal to confront issues of distributional justice; of who gets to benefit from the new service provided; and who gets to pay. It is not that issues of distribution are excluded: it is that 'optimal' distribution is determined as a by-product of the technical attempt at efficiency maximization. Kantians explicitly confront ethical choices by asking what 'ought' to be done out front. Utilitarians allow such allocations to be made behind mathematical closed doors, allowing values to be automatically allocated by models which they will insist are value-free.

Asking what we ought to do in a direct way allows us to pop another bubble. Applying another Kantian-rooted idea allows us to pop one more. That idea is that data do not come to us theory-free, but that there is necessarily an a priori framework through which information is filtered. Awareness that a filter exists can lead us to try to examine its presuppositions, and to inquire whether some other filter might not be better. Of course, if the nature of the filter is determined by the knowledge, skills and beliefs contained within our particular bubble, and if alternative perspectives lie outside that bubble, coming to a critical awareness is no easy matter: we have to use tools available within the scope of our current bubble to hack our way out of it. Hegelian dialectic provides one possible heuristic. Making yourself argue as forcibly as possible against what you believe most deeply may—if done sincerely—lead you to a totally new conception of what you previously believed. If you believed in your model and your model told you to build more roads or more rapid transit, you might seek out the reasons not to do that. These in turn might then lead you to ask questions about the model.

Churchman [5] leads us a vital step further when he calls for an "unbounded" systems approach which must include a study of humanity, not within a problem area, but universally' (p. 8). This leads to some disturbing questions. How can we pour dollars into designing better bombs while half the world is starving? is one of them. But, to return to my more mundane subject; something which starts out as a transportation problem cannot, from this view, be adequately investigated in purely transportation terms. How can you start using a technique to choose between buses and trains on the basis of how many people they might carry before you have asked what good it would do to carry them in the first place? It is by this realization that planners may pop themselves outside the transportation bubble and come to grips with issues of race and education, poverty and discrimination, land use and urban structure. 'The problems of human society', Churchman says, 'are not like exercises at the end of a chapter of a textbook, where all information is given for you to deduce a perfect answer. But you can make some progress if you can begin to "sweep-in" to your inquiry the broader issues' (p. 126).

It would be glib to say that more enlightened thought will instantly produce a better world. But a critical view of the conceptual foundations on which our planning takes place and an understanding of the limitations of any one framework provides the groundwork for a career of seeing that there are other possibilities. Moving out of intellectual bubbles provides a path for coping with more practical bubbles too. Even the planner who leaves graduate school and goes to work in a traditional bureaucratic bubble might then be equipped to see its walls and perhaps thereby be drawn to transcend them.

A case is not made here to abandon teaching all quantitative techniques. A case is made to dispel the myth that such methods are appropriate unbiased arbiters in prescribing proper planning action to be taken, and for taking them away from center-stage in favor of a broader, more critically oriented approach than is currently taken in many transportation planning courses.

Quantitative techniques can make a useful contribution when they perform an informative rather than prescriptive function, and when they are based on theories with proven relationships between cause and effect which can withstand empirical test. Once a given level of service has been determined, transit operations planning can be effectively and efficiently accomplished with algorithms for scheduling vehicles and crews, for example. There is, also, a known relationship between highway loading and rate of flow of vehicles on a highway. We can determine quite accurately how many vehicles an hour can be accommodated on a highway before the facility breaks down with congestion. We cannot, however, precisely determine when that is going to happen. Nor can we technically determine whether we should restrict access to the road to promote efficiency, build another highway or do something else. And to invoke the textbook prescription (see Stokey and Zeckhauser [22], for example) of cost-benefit analysis to make such a determination is to be drawn into its utilitarian orientation towards supposed efficiency at the price of more fundamental issues such as justice.
BUBBLE BURSTING IN THE PLANNING CURRICULUM

It would be wrong to assume that all courses in transportation planning restrict themselves to a narrow technocratic approach to the subject. While the uncritical development of technical skills does play too great a role in many courses, others do reflect the realization in the planning profession of the need for a broader perspective.

Alan Altshuler’s [2] pathbreaking book, The Urban Transportation System, recognized the narrowness of analysis of policy alternatives which, he said, tended to focus on ‘preselected solutions’, rather than on laying bare the character of the problems generating demands for public action or on searching with a fresh eye for effective remedial strategies; that ‘policy practice frequently races ahead of policy analysis’; and, of particular significance in influencing educational approaches, that ‘The urban transportation literature is characterized . . . by a paucity of serious political analysis. The vast preponderance of scholarship in the field has been by engineers and economists who have tended to ignore political variables or merely note their relevance as contextual constraints’ (pp. ix–x).

Altshuler’s work has set the path for a more thoughtful consideration of many issues in transportation and for introducing political and institutional analysis into many transportation planning courses in a more sophisticated way.

It is still rare in such courses, nonetheless, to stress the interrelationship of transportation systems with other social systems or to systematically evaluate the assumptions of techniques rather than merely teach them. It is not current practice to directly use philosophical theories for this purpose or to make ethical analysis the central theme of the course.

One approach to the art of philosophical bubble bursting that it is to be hoped will be encouraged by Martin Wachs’ [25] excellent collection on Ethics in Planning is the increased appearance of courses devoted to ethics and its application to planning. The danger, however, is that it will remain business as usual in other courses. I am reminded here of the evident influence of his marketing course on a student in Harvard Business School’s ethics class who, two-thirds of the way into the term, looked at the professor with a puzzled but sincere expression and asked, ‘Well, how can I recognize a moral good when I see one on the shelf?’

Since ethics affects all areas of planning, all planning courses should encourage students to probe the ethical foundations of what they are doing, to not merely acquire skills, but to inquire into the wider implications of those skills and consider alternatives. The course on Urban Transportation Planning taught during the Fall 1987 term at the University of North Carolina, Chapel Hill, made a preliminary effort to do that.

A constant theme of the course was one of assumptions: recognizing them, criticizing them, and moving beyond them. The curriculum was designed to provide students with the capacity for criticism, and philosophical theories were taught and employed throughout the course to further that end. The theories were applied, however, to real world problems, and an emphasis was placed on showing how such approaches have important practical applications.

The course started by introducing themes in transportation planning. It continued with several sessions which introduced the philosophical material and discussed perspectives for understanding, critiquing and attempting to cope with transportation problems. These perspectives were used in subsequent classes to examine specific transportation issues. The course required completion of three assignments designed to both develop students’ critical abilities and to have them apply them to actual problems.

THE CLASSES

The first class provided an overview of transportation institutions and recent policy developments, looked at how transportation problems have been defined at different times, and introduced themes of political and cognitive constraints to effective planning. A psychological experiment (from Wason [27])—using students as guinea pigs—was conducted to demonstrate our tendency to go for the set of assumptions which seem to be most obviously correct, even when they actually get in the way of finding a solution to the problem at hand.

The next session included a subject too often ignored in an age when a paper more than a couple of years old is said to be dated—history. The class traced the evolution of the urban transportation system from the 19th century; examined the growth and decline of transit and the development of a public sector role; and showed how historical developments were relevant to current transportation problems. Showing the historical origins of current practices can be revealing. When it is understood that current transit pricing practices—to give one example—derive from the fare-charging traditions of horse omnibuses from the last century, the need for criticizing the assumptions of what is currently done is underlined. Jones [9] provided a well-researched, fascinating text for this session.

A major case-study—one on the case for building new rail rapid transit systems as against developing
existing bus networks—was covered in two classes. The first included some down-to-earth consumer preference theory and a discussion of the physical and operating characteristics of the different modes. But it also looked at the assumptions of city form tacitly imposed by the different approaches (rail systems suggest development towards a central place oriented city, bus systems are often associated more with dispersion), and at the presuppositions of advocates for different systems. Some of the questions asked were: Can rail systems really lead to focused urban growth? Is it desirable that they do so? Will people transfer between different modes in order to use a rail system? Why does the Automobile Club of Southern California advocate the development of a system of express buses on freeways?

The second session on the case continued discussion on these themes several weeks later, after the first assignment had been completed.

In between these classes, four lectures (each followed by a discussion) were given to introduce students to major philosophical issues and demonstrate how they might be applied in real-world planning contexts. Utilitarianism took up one class. Two texts—Stokey and Zeckhauser [22] and Stopher and Meyburg [23]—were used to argue the case for cost-benefit analysis and UTPS modelling in transportation, respectively. Kelman [10] and MacIntyre [13], among others, were used to present the case against. Stokey and Zeckhauser maintain that cost-benefit analysis promotes systematic, clear thinking. Kelman and MacIntyre both show how cost-benefit analysis is governed by utilitarian principles and discuss their flaws. As Kelman puts it, ‘It is indeed amazing that economists can proceed in unanimous endorsement of cost-benefit analysis as if unaware that in the discipline from which the conceptual framework of cost-benefit analysis arose, namely moral philosophy, this framework is, to put it mildly, highly controversial’ (p. 235). He shows why ‘there may be many instances when a certain decision might be right even though the benefits of that decision do not outweigh the costs’, and that ‘there are a number of reasons to oppose efforts to put dollar values on nonmarketed benefits and costs, beyond the technical difficulties of doing so’.

This material was used to critique utilitarianism in practice in two case studies: of planning for a commuter rail line in Los Angeles and planning for a third airport in London. In the latter case, for example, the elaborate cost-benefit analysis conducted was shown not to have accounted for—and to be unable to account for—certain principles that populations living near the proposed airport sites did not want abridged.

Session 5 was entitled ‘Barriers of Complexity’. Using the classic article by Alexander [1] which shows how ‘complexity defeats us unless we find a simpler way of writing it down’ the class introduced theory on the mind’s tendency to reject complexity, and discussed the implications for planning of our tendency to opt for simple, evocative actions which may not prove to provide solutions at all. Wachs and Schofer’s [26] article on ‘Abstract Values and Concrete Highways’ provided a provocative illustration of this theory in a transportation setting, showing the pitfalls of our inclination to focus on concrete phenomena such as highways, while glossing over the harder to conceptualize and handle but more important abstract values which should be considered to decide on whether the highways should be there in the first place.

Schön [17], Lakoff ([11] and, with Johnson [12]) and Johnson [8] have done important work on the role metaphor plays in everyday as well as planning life. They show how concepts are understood in terms of other concepts, often tacitly, and how bringing metaphorical understanding to the surface can be a significant tool of criticism. There are many rich examples of metaphor operating in transportation (to add interest, the Greek word for metaphor, actually means ‘transport!’). Our tendency to see highways as blood circulating systems—terms such as ‘arterial’, ‘circulator’ and ‘by-pass’ and references to the ‘heart’ of the city in the surface language provide vital clues—makes for one vivid case in point. Showing that metaphor actually serves to subconsciously shape the understanding of a concept—that metaphor is an instrument of thought, not just a display of colorful language—brings home the importance of the concept.

One example of the circulation metaphor at work lies in the suggestion that bringing a major new transportation facility through a depressed area will stimulate revitalization. Its inhabitants will supposedly benefit from the freer-flowing interaction thereby made possible, just as a human organ is brought back to health after a blocked artery is unclogged. Unfortunately, the rejuvenation of depressed areas requires far more than the simple installation of physical transportation links; but to those constrained to the partial view governed by the assumptions of the circulation metaphor, this may not be apparent. Metaphor, along with related issues of symbolism, imagery and myth, was covered in the sixth class.

The seventh class considered a number of alternative systems of inquiry, including Kantian, Hegelian and Singerian approaches (as discussed in Churchman [3]). Hyman’s [7] creative paper on ‘Constructive Uses of Contradictory Thinking in Transportation’ provided one source of real-world
ASSIGNMENTS

The three major assignments were designed to encourage the surfacing and criticism of assumptions in transportation planning, using theory introduced during classes.

The first assignment had two parts. The first part required students to critically evaluate and compare books by authors whose different modes of argumentation led to very different recommendations on transit system development. They had to identify the different assumptions of Meyer, Kain and Wohl [14] (who favor highway-based and express-bus transportation improvements over rail for low density western cities) and Pushkarev et al. [16] (whose findings suggest that rail systems are justifiable in many such cities), and show how the different assumptions had led to different conclusions.

The second part invited students to read between the lines of a transcript of a debate on transportation policy at Southern California Association of Governments in Los Angeles. The positions of the different parties were to be characterized with descriptions of how they each supported their positions. Students were asked to once more compare different sets of assumptions and show how they led to different conclusions.

The second assignment required the writing of an essay on a choice of topics, such as setting boundaries to inquiry: the case for forecasting future transportation demands; a critique of the underpinnings of cost-benefit analysis; or a study of competing philosophical modes of inquiry. Each essay demanded both the use of theory and its application to practical examples.

The final assignment consisted of the cooperative preparation by groups of students of presentations to be given in class in which the assumptions of the planning process were to be unearthed and critiqued. 'Roads in London', for example, required students to elucidate the development of thinking about transportation planning in London since the Second World War: examining the assumptions behind plans for an urban motorway system; how forecasting had been employed; and the involvement of 'grass roots' interests. A case on BART (San Francisco's Bay Area Rapid Transit) asked students to analyze the assumptions behind competing explanations of the rail system's creation.

HOW THE COURSE WENT

Students were quite surprised by the content of the course, and there was some concern before it had even started that it did not emphasize the practical side of transportation planning or provide the type of preparation employers were looking for. This concern was still evident among some students at the end of the course, but there was also a positive response to the new perspectives for criticism that were introduced and an appreciation that there was more than one way to do planning. One student complained in a course evaluation that there was 'too much philosophical stuff', another than the course had 'little practical use in the real world'. A third student, however, said that the 'extensive reading list will remain very useful for years', while a fourth declared that 'I genuinely carried many of the course teachings in preparing my final project, and doubtless I'll carry them in practice'.

It was often difficult to get effective discussion going on the more theoretical issues, since the approach was rather different from that of other planning courses in the department. But, while some students produced only mediocre homework assignments, others used the theoretical concepts of the course to produce insightful work.

In many ways the third assignment provided the proof of the pudding, for it required the application of what the course had taught to the interpretation of real planning issues. One presentation was outstanding and showed a highly effective use of the critical concepts taught earlier on. At the other end of the scale was a rather superficial presentation that showed little understanding or sympathy for these concepts. In the middle terrain were two moderately good presentations that showed a greater critical awareness on the part of the students than they had appeared to possess at the start of the course. They might not have burst out of many bubbles yet, but at least they were now equipped with sharp enough needles if they wanted to use them further later on.

CONCLUSION

The course on Urban Transportation Planning made an attempt to introduce subjects in a substantive area of planning with an emphasis on the use of philosophical modes on inquiry: to equip students to surface the assumptions of planning processes that so often lie hidden but are equally often at the core of problems of inadequate planning. It showed that proposed solutions to problems would be futile if the assumptions which defined the problems were inadequate; and it encouraged broader-based thinking about planning
methods. It did not teach students how to use Lotus, but prepared them to watch out for the pitfalls of using such tools unreflectively.

Teaching the course demonstrated that there is a useful role for courses which expose and criticize assumptions rather than merely teach techniques, and which reveal the essentially ethical nature of all planning—not just transportation planning—and indeed all social inquiry. The experience underlined the point that if we want future generations of thinking planners, we need to teach them how to think.

In the end, it seems that we can never escape from some sort of bubble. We must always interpret the world through the artifacts of our culture and lifetime's experience. But we do have the ability to burst at least the smaller bubbles that constrain our effectiveness as planners; the habit of deliberately seeking to do so can only result in increased freedom of movement. Planning has become too calculating, too unthinking. Planners should endeavor to seek out a meditative way of thinking. And that is why all planners should practice bursting bubbles.

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REFERENCES