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Teaching Integrated Land Use–Transportation Planning Topics, Readings, and Strategies

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Abstract

Planning pedagogy is increasingly focused on teaching interdisciplinary topics in an integrated and synergistic manner. The intersection of land use and transportation is that of two topics that have risen to be front and center for the planning profession. This article focuses on the manner in which planning programs and, in particular, specific courses address land use and transportation planning. After describing the context in which such courses exist, this article analyzes syllabi from fifteen courses in North American planning programs in two respects. The first examines the list of topics covered within each course by discussing the nature of primary, secondary, and peripheral topics. Second, the analysis uncovers the frequency with which specific readings are employed in each course. The article closes by discussing the nature of a land use–transportation course from the University of Minnesota in which there is a lecture and laboratory component.

Keywords: *transportation planning; land use planning; teaching; interdisciplinary; pedagogy*

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Concerns about auto reliance, vehicle emissions, traffic congestion, and sprawl have generated considerable interest about the location and character of development. Urban planning and transportation engineering education in North America have long embraced the need to address such concerns—they constitute the reasons why many students choose to pursue careers in transportation-related fields in the first place. But does the manner in which we are teaching remedies to these problems do justice to the different rationales and strategies that target such problems?

A topic that has received increased attention over the past decade from practitioners and academics alike is integrated land use and transportation. In response, we now see a burgeoning number of courses in planning programs offering specializations that bridge these two topics. Our research tallied almost twenty urban and regional planning programs offering classes that address integrated land use–transportation planning. But despite similar nomenclature, there remains considerable disparity in the content, approaches, and objectives of such courses. How are these issues approached in planning programs, and how have curricula been adjusted to respond to such demands? Is there a common set of topics, readings, and skills that are being offered in these courses?

To assist educators develop and teach a land use and transportation course (LUTC), this article centers on pedagogical issues central to this aim. It is complemented by—and aims to build upon—previous literature examining specialized land use curricula (Miller 1990), impact assessment (Burby 1992), and the educational needs of the transportation professional (Handy et al. 2002). Our central objective here is twofold: first, to draw attention to the need for urban planning programs to teach land use and transportation in an integrated manner; second, to review the approaches used by others and offer current and potential teachers a fuller perspective from which to organize their course. We hope to offer the impetus for further dialogue that would assist land use–transportation educators in standardizing the skills, topics, readings, or approaches taught in such courses.

The pedagogical portion of this research is derived primarily from two sources of data. The first is a survey of more than fifteen syllabi from planning programs in North

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America gathered during the 2001-02 academic year. The second is the experience of authors in teaching an LUTC course at the University of Minnesota. The next part of the article presents the case that these two subjects warrant integration. The following part discusses curricular and other related issues. Next, we present the results of analysis examining the substantive nature of the topics covered and predominant readings. We then comment on our experience in developing and teaching an LUTC at the University of Minnesota.

► Planning Education and Fields of Specialization

We begin by drawing attention to the degree of reductionism that exists within urban planning programs. A signature element of planning education lies in its ability to draw on closely aligned disciplines such as engineering, public policy, architecture, and sociology. Students in planning programs repeatedly mention their interest in synthesizing perspectives from multiple disciplines and applying what is learned to target important social problems. To help educate students in a focused and disciplined manner, it has become standard practice to encourage planning students to choose coursework aiming toward at least one specialization of planning (Friedmann 1996). These specializations include but are not limited to land use, economic development, environmental, housing, transportation, or historic preservation, and the definition and substance of five of these subfields is defined in a separate section of the *Guide to Graduate and Undergraduate Education in Urban and Regional Planning* (American Collegiate Schools of Planning [ACSP] 2001). The topics covered in the coursework rarely cross over into another specialization area. From a program standpoint, these specialization fields play an important part in the activities of a given department. The identification and strength of a specialization field plays out with hiring decisions, program organization and administration, and marketing the program. Table 1 tallies the number of North American graduate programs that offer each of the different specializations. The average number for a given program hovers around six.

From a curriculum standpoint, there usually exists an introductory course for a given specialization followed by a more advanced course drawing from the expertise within a particular faculty. The widespread practice of adopting these (and similar) specializations within planning programs has prompted discussion of curricular issues supporting each. One need only reference back issues of this journal to understand the attention devoted to these matters. Consider, for example, survey research that was conducted to help design appropriate

Table 1.
Master's programs and fields of specialization.

<i>Master's Specialization</i>	<i>Number of Planning Programs</i>
Environmental planning	53
Community development	44
Land use/growth management	44
Economic development	38
Transportation	34
Urban design	31
Physical planning	29
International planning	27
Geographic information systems	26
Health/human service and social planning	19
Real estate development	17
Housing	16
Historic preservation	14
Policy planning	14
Infrastructure/public service	9
Planning management	8
Rural and small town planning	8
Urban and regional development	8
Fiscal and government finance	6
Regional planning	5
Administration and law	4

Note: Data are derived from more than sixty accredited schools listed in the eleventh edition of the American Collegiate Schools of Planning's *Guide to Graduate Education in Urban and Regional Planning* (2001). The table includes only programs that listed specializations. All specializations self-reported by program.

subcurricula in land use planning (Miller 1990) or to identify how and to what extent global themes were being incorporated into planning education. Alternatively, individual instructors have provided insight as to how they have chosen to instruct their specific discipline. The rapidly changing nature of geographic information systems (GIS) instruction has been the source of a few pedagogy applications (Drummond 1995; Montagu 2001). Moudon (1995) describes how a course on urban form affects a planning curricula and highlights appropriate skills to acquire in such a class. Burby (1992) offers an exposé on skills to be gleaned from a class on impact assessment and a rationale for a model syllabus.

To our surprise, however, there exists scant literature wrestling with pedagogical issues spanning specializations. Washington and Strong (1997) demonstrate how a course on the topic of environmental planning was reworked to integrate propositions and concepts about the politics of planning, land use policies, and political philosophy; several papers implicitly mention the need for integrating theories in work trying to resolve the theory-practice tension (Baum 1997; Ozawa 1999; Seltzer and Ozawa 2002). But few pieces tackle head on how to teach topics bridging more than one field of specialization. A

powerful exposé about the future of planning education (Niebanck 1988) and several commentaries alluding to the needs of planning education (e.g., Blakely and Sharpe 1993) do not directly address how to mix different fields of specialization. The closest mention of the need for such integration we found is in the ACSP symposium on the “State of the Planning Academy: Art, Science, and Education” published in this journal (Stiftel 1991). The seven articles offered in that volume contained a consistent rhetoric calling for increased integration between different specializations. We found the absence of explicit mention of integration in planning education surprising, especially considering the heavy emphasis contemporary urban planning literature and policy initiatives place on interdisciplinary education and integrated perspectives. The call to integrate subfields is one often mentioned in planning dialogue but rarely addressed in literature of planning pedagogy.

The mantra of planning education has always been to train students to be generalists first and specialists second (Rodríguez 1993); but is it the case that this mantra could be turned on its head? It is important to recognize—and address—the deficiencies of an educational system that may channel students down paths to master independent specializations of urban planning, possibly at the expense of a broader understanding of central concepts. Anecdotal evidence from discussions at faculty meetings in many programs suggests that specializations may be fostering tunnel vision in which students graduate with little to no exposure to closely aligned planning approaches.

Many planning strategies hinging on “sustainable development,” statewide growth management, or “smart growth” require integrated approaches, combined methods, and synergism between specializations. Affordable housing by itself holds little merit without roads (transportation), public services (land use), employment opportunities (economic development), clean water (environmental), or other amenities. This is the point brought forth by Birch (2001) who describes the nature of

an entirely different kind of planner than in the past . . . one who is enriched with knowledge and skills emanating from a variety of disciplines . . . including environmental planning and growth management with its unity of land use, infrastructure investment, and regulation; transportation planning with its understanding of land use, finance, and travel behavior. (P. 415)

Aside from a final capstone or workshop course where students are encouraged to apply approaches that integrate various subfields, the opportunities for bridging fields of specialization may go unrealized.

► The Focus on Integrating Land Use–Transportation

While there exist many calls for cross-pollination within the planning literature—too many to recite here—a better understanding of how such calls work their way into planning curricula and planning pedagogy is lacking. Our focus herein is on efforts to integrate two fields of specializations, land use and transportation. We do so not only because this is the course we coteach at the University of Minnesota but also because these are topics requiring increased attention in policy circles.

This is particularly relevant considering that, independently, land use and transportation are among the top five specialization areas (see Table 1). Interest in these topics is brought about as concerns related to traffic congestion, urban sprawl, and urban growth are now among the most important issues facing the United States, edging out more traditional matters such as crime and education (Pew Center for Civic Journalism 2000). Public officials, business interests, and citizens are aggressively seeking strategies to curb automobile reliance and the consequences it engenders (e.g., congestion, seas of parking lots, increased rates of natural resource consumption). Many communities are striving for initiatives aimed to de-emphasize the automobile and encourage “smarter” and more “livable” land use planning.

The central hinge of these efforts relies on an often touted—but often unrealized—relationship between land use and transportation planning. There are at least three reasons to suggest increased pedagogical attention should be devoted to integrating these two topics. First, as Terry Moore (1996) mentions, the land use and transportation network of communities are the fundamental building blocks that form the most defining aspects of a community’s character. As communities increasingly embrace this relatively abstract notion, land use and transportation are likely to play a prominent role.

Second, the act of travel occurs because someone wants to do something somewhere else. This idea, first articulated by Jules Dupuit (1844), who wrote that “the ultimate aim of a means of communication must be to reduce not the costs of transport, but the costs of production,” was rearticulated by Mitchell and Rapkin (1954) and prompts us to consider that the nature of travel (i.e., transportation) is derived from the amount and nature of activities (i.e., land use). Thus, an individual’s location vis-à-vis the distribution of sites of potential activity is an important determinant of travel behavior and location decisions.

Third, the skills and knowledge gained from students combining both land use and transportation are among the most sought after (at least for transportation professionals). A

recent survey of transportation practitioners (Handy et al. 2002) asked those involved in hiring decisions for professional transportation planners to rate the importance of different topics and skills for entry-level planners. The top five topics in descending order of importance were the transportation and land use connection, regional transportation planning, public involvement, professional ethics, and land use planning. The appearance of land use twice in this list is notable (Handy et al. 2002) and is likely attributed to the spread of contemporary planning initiatives derived from tenets hinging on both transportation and land use perspectives (e.g., minimum parking requirements, infill development, jobs-housing balance, location efficient mortgages, pedestrian friendly design, smart growth).

It is therefore not surprising to find land use–transportation initiatives front and center in an increasing number of planning documents such as comprehensive plans, community planning goals, and urban modeling applications. The topic of land use–transportation initiatives has even formed the backbone for many community-based political campaigns. One can quickly see how land use–transportation patterns are the foundation for understanding

1. the potential of land use planning to moderate (or exacerbate) the demand for travel;
2. the value of concurrency or adequate public facility regulations;
3. the impact of transportation facilities (e.g., second and third ring highways) on development; and
4. the value of roads, highways, and parking as significant land uses themselves with environmental and quality of life effects.

Research-oriented and academic books have addressed these topics (Pushkarev and Zupan 1977; Boarnet and Crane 2001). But one need only examine the burgeoning application-oriented literature that squarely addresses the intersection between land use and transportation to see the need for this education. These works include literature addressing transit supportive land use regulations (Morris 1996), general policy primers (Moore and Thorsnes 1994; Ewing 1997b), case studies (Cervero 1998), and policy evaluation (Downs 1992, 1994; 1000 Friends of Oregon 1993).

The well-versed urban planner must possess an interdisciplinary perspective that integrates knowledge of development patterns, spatial structure, household preferences, and the circulation patterns that result. The land use planner is now expected to embody at least rudimentary knowledge of regional circulation patterns and travel behavior; transportation planners are expected to understand—and play a role in addressing—the generators of such traffic.

The marriage between land use and transportation is a natural one. Unfortunately, however, it is one that has traditionally been underserved in planning curricula. Only recently has there been an increase in the number of programs offering courses that bridge these two disciplines.

► Curricular Issues

Strategy for Surveying LUTC Courses

In an effort to understand how individual educators and programs nationwide address matters related to teaching integrated land use and transportation planning, our research strategy included the following. Based on published information (ACSP 2001) and university Web sites, we first collected basic information on all North American, Planning Accreditation Board (PAB)–accredited planning programs. This data included the size of the program, whether the program offered a Ph.D., and the program’s self-described areas of specialization. Using this list of more than eighty programs, we surveyed course offerings on the Web sites for the individual programs during the summer of 2002 for courses containing “land use” and “transportation” in the course title (or close derivatives of these words). This produced a list of fifteen courses listed by university in Table 2, including the class title and the instructor(s).¹ These fifteen courses, however, do not represent the universe of land use–transportation courses taught in North America. Anecdotal evidence suggests that some programs and courses may address topics germane to the land use–transportation debate but do so under another cover (*not* labeled “land use” and “transportation”). For example, syllabi from the transportation planning courses at both the University of Texas and the University of North Carolina at Chapel Hill introduce more than a healthy dose of land use topics into courses that fall under the banner of transportation planning. Such evidence suggests that integrative approaches are more widespread than simply those having land use and transportation in the title.

A more reliable means of identifying such courses may be to conduct a document analysis of keywords in individual course descriptions. Many programs, however, do not have course descriptions posted on their Web sites, precluding such a strategy. We reasoned that it made sense to use available information to explore our basic line of inquiry. We progressed by collecting syllabi from each of these courses either as downloadable files from the Web site or by e-mailing the instructor who was responsible for teaching the course during

Table 2.
University land use–transportation courses considered in survey
(most from 2001-02 academic year).

<i>University</i>	<i>Title of Class</i>	<i>Instructor</i>
Florida State	Transportation and Land Use	Deva Deka
McGill	Transportation and Land Development	Murtaza Haider
Michigan	Transportation and Land Use Planning	Jonathan Levine
Minnesota	Networks and Places: Transportation, Land Use, and Design	Kevin Krizek and David Levinson
Minnesota II	American Cities II: Land Use, Transportation, and the Urban Economy	John Adams
Oklahoma	Transportation and Land Development	Richard Marshment
Oregon	Regional Transportation and Land Use	Terry Moore
Penn	Transportation and Land Use	Anthony R. Tomazinis
Portland State	Transportation and Land Use	Tom Sanchez
Rutgers	Coordinating Land Use and Transportation	Reid Ewing
SUNY Albany	Transportation Corridor Planning & Management	Cliff Ellis
UC Berkeley	Transportation and Land Use Planning	Robert Cervero
UCLA	Transportation, Land Use, and Urban Form	Randy Crane
Washington	Land Use and Transportation	Paul Waddell and Dan Carlson
Wisconsin	Transportation and Infrastructure Systems Planning	Brian Stone

the 2001-02 school year. We believe that for purposes of an exploratory survey, these responses provide useful information and that focusing on these fifteen courses is more than a representative sample of LUTCs. As described in greater detail below, we sent a survey to the fifteen LUTC instructors, asking them to correspond with more detailed information about their program and syllabus.

LUTC and Planning Curricula

Our first analysis compares the LUTCs to different attributes of planning programs and curricula. Initial observation detects a positive correlation between the availability of an LUTC and the size of the graduate program. Program size can be measured using a variety of measures (e.g., number and diversity of specialty areas/concentrations, number of classes, size of student class). One of the more widely accepted measures is the size of the faculty. Based on published statistics (ACSP 2001), the average full-time equivalent (FTE) faculty from programs offering an LUTC was ten. This is approximately twice as large as the average of all programs, leading us to conclude there is a positive correlation between the availability of an LUTC and the size of the graduate program. A second, and relatively simple, measure of program size is whether the program offers a Ph.D. in planning; those programs offering a Ph.D. typically have broader and deeper curricula. This measure, however, showed to be a slightly less reliable

predictor of an LUTC. Nine of the fourteen programs surveyed offer a Ph.D. in planning.

Separate courses that address transportation planning or land use planning can be viewed as bookends to an LUTC. This begs the question of the level of detail devoted to each of the two supporting bookends of the land use and transportation topic. That is, how are topics of land use and of transportation individually approached and discussed as part of the program? Understanding this affects how such issues would be approached in an integrated course. For example, an LUTC without one of the bookend topics addressed in the curriculum may need to incorporate more basic, rudimentary aspects of one of the dimensions. This issue may

come to a head when an instructor decides whether the LUTC should cover topics at the union or the intersection between land use and transportation (i.e., are both topics covered or are only intersecting topics covered?).

Using again the course information provided on individual program Web sites, we examined the bookend status of LUTCs. Of the fourteen planning programs surveyed, eight offer classes covering land use or land use planning; nine offer stand-alone transportation planning courses (there is *not*, however, considerable overlap between these two tallies). This suggests that the majority of the programs are covering at least one of the topics separately, and there exists additional demand from students to explore the intersection more directly or in more detail.

A final issue is whether LUTCs are a part of a transportation curricula typically offered in larger civil engineering programs. Some planning programs are on campuses without civil engineering departments (e.g., University of North Carolina) or without civil engineering departments offering specializations in transportation (e.g., University of California, Los Angeles). A different study surveying sixty-six programs offering degrees or concentrations in transportation planning (Handy et al. 2002) revealed only six universities that offer joint degree programs with other units (San Luis Obispo; Georgia Tech; University of California, Berkeley; University of Nebraska–Lincoln; University of Texas–Arlington; and University of Wisconsin–Milwaukee) (the University of Minnesota has since added a dual degree program); in each case, the joint

programs were in conjunction with departments of civil engineering. It is interesting to note, however, that only one of the previously mentioned programs offers an LUTC. This suggests that the existence of a joint program with civil engineering does not necessarily increase the likelihood of having an LUTC on campus. In fact, our survey revealed that only four of the fourteen surveyed programs had civil engineering departments that offered basic and introductory level transportation programs.

LUTC Course Content

We turn now to commenting on the substantive nature of the topics and readings LUTCs taught in planning programs nationwide. As has been mentioned elsewhere (Pezzoli 2001), any content analysis of syllabi presents certain challenges. These include variations in

- length of the course (i.e., semester schedule versus quarter schedule),
- frequency of class meetings (i.e., meeting once, twice, or three times per week affects the range, sequence, and depth of issues that are covered), and
- depth in which topics and readings are described in the syllabi.

The matter is confounded in this situation by the fact that LUTCs embody a particularly diverse menu of topics that is further complicated by

- variety of instructor’s expertise and background (including civil engineering, economics, urban planning, landscape architecture),
- where the LUTC fits into the sequences of a program (e.g., as an introductory course in the first year or in the second year as a capstone),
- expectations of students’ skills and knowledge, and
- nature of other closely aligned courses in the program in which topics may be addressed.

Notwithstanding imperfections embedded within any analysis of this type, we attempted to adopt a standardized format to analyze the syllabi that would facilitate similar comparisons. Our research collected LUTC syllabi from each of the fifteen

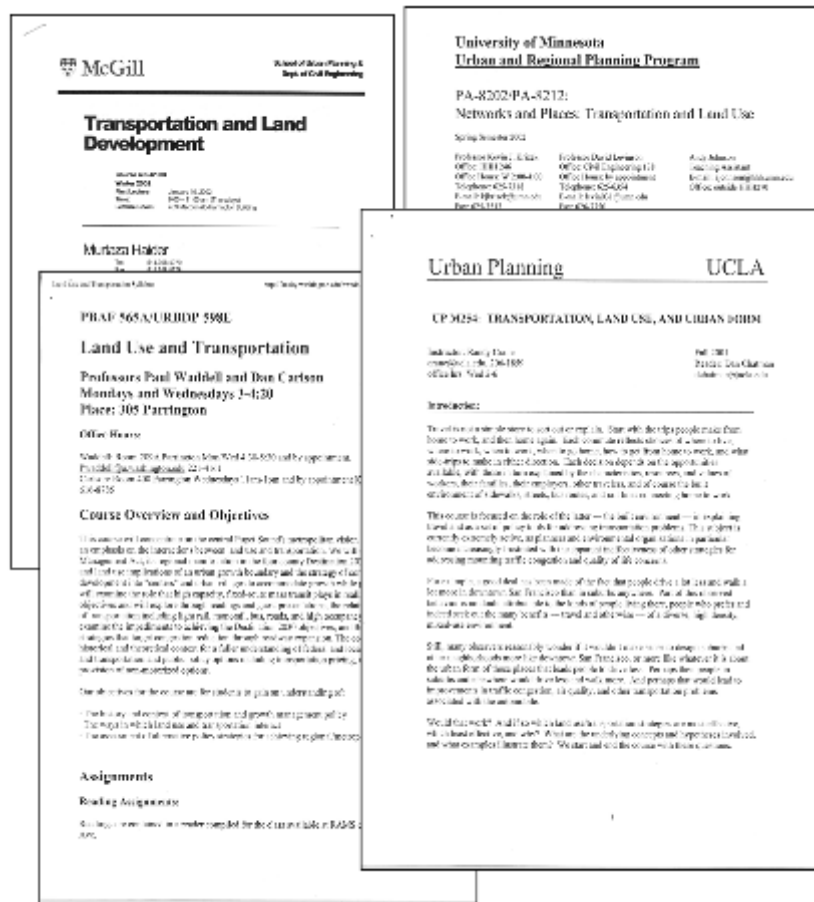


Figure 1. Example syllabi examined in the analysis.

case study courses, and we examined these syllabi across three dimensions: content, readings, and skills to be developed.

We first gathered the syllabi (Figure 1) and surveyed them by noting the general nature of the topics covered: their content, structure, and readings. From this preliminary scoping, eight themes clearly rose to the top. These eight themes consist of overview, theory, political process, policy, applications, models, design, and other. Within these eight themes, we endeavored to specify and group subtopics. To do so, each syllabus was coded by the authors to indicate which of the topics were covered at each university’s course. This second cut at slicing the data is a bit more telling. Indicating that a topic is covered means that the majority of at least a single class session is devoted to it. We certainly recognize that most of the thirty or so issues are discussed in such a course, but many may be glossed over or mentioned in passing as opposed to spending substantive time and attention to the fundamental issues. While an imperfect strategy (e.g., some topics were combined into one session, there are varying definitions of sessions,

specific lectures needed to be aggregated to one topic), it was required by the nature of the data.

To validate our initial coding, we e-mailed the instructors from the fifteen courses and asked them to verify our tally. While a somewhat crude methodology, we felt it was the best strategy given the circumstance. In addition, we invited them to provide (1) thoughts on how the LUTC course fits into the broader curriculum of their program, (2) considerations that provide the context for how they designed the course, and (3) general concerns in teaching material related to land use–transportation. Of the fifteen instructors, eleven responded with minor modifications to our draft tally, and a handful of instructors provided comments (many of which are interspersed below).

The final results are of the tally of topics is displayed in Table 3. Not surprisingly, the topic covered in all was a course overview lecture in which the instructor introduces students to the class and general issues of land use and transportation. The first tier of substantive topics covered in all but three of the courses were related to (1) transit-oriented development, the new urbanism, and site design; (2) debates about higher density versus sprawl; and (3) an understanding of travel behavior. These topics rising to the top is not surprising. First, they are intricately related to one another. Second, they represent what is commonly regarded as a core topic of land use–transportation planning—that is, using urban form to influence travel and transportation to affect land use. Third, they represent politically controversial, highly publicized, and therefore lively matters central to contemporary urban planning dialogue.

A second tier of topics was not as cohesive as the three previously discussed but no less central to land use–transportation issues. Eleven of the courses contained a theoretical component covering the basics of urban and/or transportation economics. In some cases, this was about the bid rent, gravity, or other models of urban form/travel. In others, it pertained to discussions of cost-benefit analysis or utility theory.

We noted a third tier of topics that appeared in at least ten syllabi. The matter of jobs-housing balance, and sometimes its close cousin—spatial mismatch—was first. We had expected this to be higher in the rankings because it is central to the core topics relating transportation and land use (unlike transit-oriented development, which is popular in magazine articles but really affects very few commuters). The second topic related to land use matters of growth management and zoning. Not surprisingly, seven of the courses in which this topic was covered were from programs *not* offering a graduate-level course in land use planning (see above discussion on overlap with land use courses). In these cases, it appears to be the responsibility of the LUTC to cover fundamentals of land use and perhaps even theories of when and why it is best for

government to intervene in the land market. Finally, many courses employed case studies as a means of introducing applied examples and exploring the effectiveness in real-world examples of different policies. As expected, the nature of these case studies varied based on instructor expertise and preferences. Almost all were used to demonstrate best practices, but there appeared no majority in terms of topic, geographic scale, or specific institution. As expected, cases from areas with a traditionally strong regional framework (e.g., Portland, Minneapolis–St. Paul) were highlighted once or twice. But also receiving attention were government initiatives integrating land use–transportation that did not fully depend on civic/institutional forms of government (e.g., Montgomery County, Maryland). We see the lack of consensus over practical case studies linking land use and transportation as a need in planning curricula and a fertile opportunity to broaden and advance planning pedagogy. The use of guest speakers, especially practitioners, may address this problem. However, a set of standard, well-developed cases remains necessary.

A final tier of topics introduced issues receiving increasing attention from within the transportation community—induced demand and pricing. The induced demand topic appeared when introducing the question of the degree to which a community could “build their way out of congestion”; the pricing topic usually comes in the form of congestion pricing. The international discussion of congestion pricing has been especially active in the past decade. While U.S. examples for such policies remain few, the number of locales in which some variant of congestion pricing is employed has increased significantly, and the land use–transportation community is likely to see more examples of these schemes employed over the coming years. Finally, the topic of network design was sometimes about the hierarchy and functional classification of roadways but more often appeared to be tied in with discussion of site design, transit-oriented development, and the new urbanism.

As mentioned earlier, a possibly confounding factor in this endeavor is that it is difficult to consider the content of an LUTC course in isolation, without giving adequate consideration to the content in other related courses. For example, an instructor from one of the larger planning programs comments,

Topics that your survey denotes as “missing” are often covered in our other courses. Our program has separate courses on transportation modeling, transportation economics/finance, and sprawl. We think of our five transportation courses as integrated. In addition, the other LUTC instructor may focus more on history whereas I focus on economics. Finally, our LUTC is only a ten week course, so we can’t cover what a semester course would.

Table 3.
List of themes/topics covered in land use-transportation courses

Theme	Topic	Florida		Minnesota		Portland		SUNY		UC		Wisconsin	Total
		State	McGill	Michigan	Minnesota	II	Oklahoma	Oregon	Penn	State	Rutgers		
Overview	Introduction to land use and transportation issues	*	*	*	*	*	*	*	*	*	*	*	14
Design	TOD, NTD, new urbanism, site design	*	*	*	*	*	*	*	*	*	*	*	12
Theory	Travel behavior	*	*	*	*	*	*	*	*	*	*	*	12
Policy	Higher density vs. sprawl	*	*	*	*	*	*	*	*	*	*	*	12
Theory	Urban and/or transportation economics	*	*	*	*	*	*	*	*	*	*	*	11
Policy	Accessibility, jobs housing balance, spatial mismatch	*	*	*	*	*	*	*	*	*	*	*	10
Process	Regulation of land use, zoning, growth management	*	*	*	*	*	*	*	*	*	*	*	10
Application	Case studies	*	*	*	*	*	*	*	*	*	*	*	10
Theory	Induced demand	*	*	*	*	*	*	*	*	*	*	*	9
Policy	Transportation pricing	*	*	*	*	*	*	*	*	*	*	*	8
Design	Network design: Traffic calming/context sensitive design	*	*	*	*	*	*	*	*	*	*	*	8
Application	Transit	*	*	*	*	*	*	*	*	*	*	*	8
Models	Transportation models	*	*	*	*	*	*	*	*	*	*	*	7
Models	Land use models	*	*	*	*	*	*	*	*	*	*	*	7
Process	Transportation planning process: Infrastructure/budgeting/finance	*	*	*	*	*	*	*	*	*	*	*	7
Overview	History	*	*	*	*	*	*	*	*	*	*	*	7
Other	Other	*	*	*	*	*	*	*	*	*	*	*	7
Process	Regional governance, MPOs	*	*	*	*	*	*	*	*	*	*	*	6
Application	Equity	*	*	*	*	*	*	*	*	*	*	*	6
Process	Federal policy	*	*	*	*	*	*	*	*	*	*	*	5
Policy	Travel demand management	*	*	*	*	*	*	*	*	*	*	*	5
Application	Nonmotorized travel	*	*	*	*	*	*	*	*	*	*	*	5
Models	Performance measurement	*	*	*	*	*	*	*	*	*	*	*	4
Policy	Transportation system management	*	*	*	*	*	*	*	*	*	*	*	4
Theory	Social networks	*	*	*	*	*	*	*	*	*	*	*	3
Models	Transportation impact analysis	*	*	*	*	*	*	*	*	*	*	*	3
Policy	Intelligent transportation systems	*	*	*	*	*	*	*	*	*	*	*	3
Policy	Telecommunication and travel	*	*	*	*	*	*	*	*	*	*	*	3
Application	Energy and environment	*	*	*	*	*	*	*	*	*	*	*	3

Note: TOD = transit-oriented development; NTD = neotraditional development; MPO = metropolitan planning organization.

A key point in this example is that the LUTC does not stand alone, but the topics are intricately related to the other transportation-related courses in this program.

LUTC Course Readings

We turn our attention now to the prevalent readings used in such courses. Our first observation is that there is little consensus on a standard textbook, not surprising considering two circumstances. The first is the variation that exists in core subject material (some courses approaching the interactions from a geographical perspective, others approaching them from a public policy perspective). The second relates to the variation in individual instructors and their preference for courses to reflect their own interests and expertise. Unlike microeconomics or statistical methods, there are no uniformly accepted learning outcomes for such an LUTC; we would therefore be misguided to expect a uniform text.

Two core books/manuals, however, rise to the top in terms of frequency of use. The first is the American Planning Association (APA) Planning Advisory Service Report, *The Transportation/Land Use Connection* by Terry Moore and Paul Thorsnes (1994). The bulk of this report is used in five courses. It provides an introductory overview to many of the issues that frequently appeared in the syllabi in a manner that is both practical and theoretical. The second is Anthony Downs's *Stuck in Traffic* (1992), of which parts are used in approximately four courses. The subject material of both are obviously appropriate for this topic; in both cases, however, the books are supplemented with a variety of articles. This places a greater burden on professors to develop course content and, thus, comprises a barrier to entry for teaching an LUTC. This is not atypical for graduate courses but will probably need to be remedied before LUTC becomes a standard element of the curriculum.

Only one peer-reviewed journal article appears as required reading in more than three syllabi. This article is Robert Cervero's "Jobs-Housing Balance Revisited" (1996) in the *Journal of the American Planning Association (JAPA)*. Used three times is the *JAPA* Ewing versus Gordon and Richardson debate (Ewing 1997a; Gordon and Richardson 1997), most often as part of a class topic associated with a discussion/debate over the values of high density versus sprawl. We find it interesting that few journal articles rose to the top. When we set out to gather the syllabi from these courses, we hypothesized that we would see a canon of form around land use/transportation issues. No such canon has yet formed. There is no consensus on the classical or significant articles on land use and transportation.

Table 4.
Number of times article from journal was used
in land use and transportation course.

Source	Count
<i>Journal of the American Planning Association</i>	72
<i>Transportation Research Record</i>	52
<i>Access</i>	44
<i>Transportation Research A</i>	19
<i>Urban Studies</i>	17
<i>Urban Land</i>	16
<i>Environment and Planning C</i>	13
<i>ITE Journal</i>	13
<i>Journal of Planning Education and Research</i>	12
<i>Transportation</i>	11
<i>Transportation Quarterly</i>	10
<i>Transportation Research D</i>	10
<i>Transport Policy</i>	8
<i>Journal of Planning Literature</i>	7
<i>Housing Policy Debate</i>	5
<i>Journal of Political Economy</i>	5
<i>Journal of Regional Science</i>	5
<i>Journal of Urban Economics</i>	4

Articles from the magazine *Access* (University of California Transportation Center) appeared frequently. Three articles in particular were used in a handful of courses. These three articles are "The Weakening Transportation-Land Use Relationship" (Giuliano 1995), "Travel by Design?" (Crane 1998), and "Access to Choice" (Levine 1999). These three articles lend three contemporary and different perspectives to a particularly volatile topic: the merits of land use planning and the new urbanism in addressing auto reliance. The original and directed messages of these articles combined with pithy nature of the writing and free copyright likely contribute to their widespread use.

As the movement toward open content gains ground (as it has in the sciences), it may be reasonable to see more citations from journals without copyright costs, whether they be Internet or paper based. Our survey allows us to compute the frequency of citations from the journals in Table 4 (we only list the journals with four or more hits, the top eighteen). In fact, the top three journals, *JAPA*, *Transportation Research Record*, and *Access*, are free for classroom use. This suggests that for the author hoping to earn influence, writing for a journal without copyright costs will result in many more potential reads than writing for a journal that charges for reprints.

Skills to Be Developed

The bulk of the syllabi analyzed appeared to approach the LUTC as an opportunity to introduce students to practices and

debates in each substantive area and to make clear their interrelationships. In this light, basic skills that appear to be stressed are (1) knowledge of land use–transportation interrelationships, (2) ability to succinctly articulate multiple perspectives about each topic, and (3) an understanding of how such land use–transportation initiatives fit into the larger milieu of planning strategies. A few of the courses stressed a heavy geographical component. Others aimed to cover some of the basic modeling research indicative of land use–transportation. In general, courses seemed to assume a survey nature to them that is a bit of a double-edged sword. Consider the following:

My primary concern with the LUTC is that it is the only transportation planning course offered within our department and has thus evolved into a survey of the field, requiring students with a particular interest in transportation planning to pursue more specialized course work in civil engineering. At the same time, however, my experience with this course is very positive—the students are generally enthusiastic about having an in-house course on transportation, and the land use orientation dovetails nicely with our curriculum and student interests.

On one hand, a survey course of this nature is favorably received by the students. On the other, the survey nature of the content precludes detail. As a whole, more than a few instructors lamented the fact that students did not have sufficient analytical skills to understand the course material or conduct quality research or policy analysis. This problem is especially acute as transportation is traditionally a more quantitative field than other areas of planning. This is a sentiment shared by the below instructor:

I wish that graduate [master's] city planning programs took three years to complete. This would mean that students coming into transportation/land use would have more experience with land use issues, transportation issues, and analytical techniques. I'm sure that this would apply to nearly all of our classes—having students that are better prepared to examine the topics with more rigorous techniques. I originally tried to include a quantitative component in the class, but abandoned it a few years back because I ended up having to talk more about the data/techniques compared to the substance. I now treat the course as a survey and try to expose students to a range of related issues.

► Case Study: LUTC Approach at the University of Minnesota

We now turn to offering perspectives and describing our experience in developing and teaching an LUTC. In the Urban and Regional Planning Program at the University of Minnesota, the interdisciplinary nature of the planning profession has been embraced at the administrative level. Four

courses are denoted “domain courses,” identifying topics that constitute areas where the field of planning naturally spills over into other disciplines or fields of specialization. These four courses cover topics that include land use and transportation, workforce and economic development, housing and social policy, and environment and infrastructure planning. All planning students are required to complete two of the four domain courses. Each one is team taught by one faculty member based within the planning program and another from the outside/adjacent field; by doing so, the approach aims to fully capitalize on interdisciplinary approaches. The course of interest here—land use–transportation–urban design—has been offered consecutively since the 1999–2000 academic year and primarily attracts first- and second-year planning students but also a handful of civil engineering (transportation) and geography students.

To more specifically describe the nature of this course, it is important to understand the context in which this course is taught. Civil engineering has offered a long-standing course in transportation policy and practice to serve as one bookend. For the past several years, the relatively small size of the planning faculty at the University of Minnesota has precluded a separate stand-alone course on land use planning. In the land use–transportation course, we therefore feel it is important to cover many basic tenets of land use and land use planning such as foundational theories of urban economics, explanations for the existing spatial structure in metropolitan areas, and justifications for intervening in the land market. In terms of deciding specific content to cover, its emphasis and sequence, we consulted other syllabi and tried a variety of approaches over the past three years we have jointly taught the course. Not surprisingly, we determined there are myriad ways to present such information and administer such a course. The confined time of a typical semester makes it difficult to cleanly delineate topics, lectures, and lesson plans. This is because many elements are inherently related to one another. As an example, the success of transit ridership is a topic that depends on understanding urban density gradients, which in turn depends on understanding why and how development decisions are made, which in turn requires understanding corporate and household location decisions. The circular nature of many of such phenomena makes it difficult to discern where to start.

After a few iterations of the course, we feel we have comfortably honed in on a compelling strategy to present the battery of topics that should be covered in an LUTC—and an orderly sequence for doing so. Our preferred strategy involves fully understanding the motives and behavior of different agents—agents who are often mentioned as the entities responsible for flexing their muscle over the built urban environment. Three agents of note include individuals (households), firms (

locators and developers), and government bodies. The activities of a fourth agent, the designer—for example, the city planner, the architect, the engineer, or the landscape architect—are matters that could be periodically addressed through the discussion of each agent. The macro-structures we observe in the land use–transportation context all have micro-foundations that are dictated by the actions of agents.

While covering the motives and behavior of each agent, the instructor can cover important issues and dimensions related to metropolitan land use–transportation planning and policy. With respect to individual behavior, these issues play out temporally. For example, it is important to cover factors of long-term choices (five years and beyond) such as residential location decisions; medium-term choices (a month to several years) such as employment decisions or the repetition of which mode to use; and shorter-term choices (weekly and shorter) such as activity participation, time of day considerations, and route choice. Corporations are the agents responsible for dotting the landscape with the destinations to which individuals travel for purposes of work, shop, play, or other. It is therefore important to understand decisions underlying the location decisions of both firms and developers. Oftentimes, the decisions of these agents are in response to household decisions, actions, or transportation improvements. Finally, government agents affect policy, which in turn affects the supply of land use or transportation infrastructure, the demand for travel, or the intersection of the two. This is where the policy interface is emphasized—at the neighborhood, municipal, or regional level. It is important to understand the theory, application, and efficacy of different initiatives. These include, but are certainly not limited to, urban growth boundaries, transportation capacity expansion decisions (roadways or light rail), and travel demand management approaches.

Our final schedule covers the list of topics presented in Table 5, representing approximately ten lectures that hold together the core intellectual foundations of the course. These lectures are supplemented on the second day of the week with in-depth case studies, practical applications, or guest speakers. The case studies prove especially valuable in an applied discipline such as urban planning where students are forced to learn about and examine actual behavioral decisions or policy initiatives in light of the lecture material presented on the previous class day. Specific case studies that have proved particularly rewarding include examining school desegregation and busing, specific welfare to work programs, light rail expansion projects, congestion charging in London, corporate location decisions, and new urbanism sites. Many times these are cases in our own backyard. Other examples draw from national or international projects for which there is good reading material available.

Table 5.
Listing and sequence of topics covered in University of Minnesota land use and transportation course.

<i>Week</i>	
1	Intro and framework for course Case studies and guest speakers
2	Overview of individual (household) behavior
3	Individual (household) decisions—long term
4	Individual (household) decisions—long and medium term
5	Individual (household) decisions—long and short term
6	Firm behavior
7	Developer behavior
8	Exam week (or other)
9	Overview of government behavior and evaluation
10	Government initiatives—supply considerations
11	Government initiatives—demand considerations
12	Government initiatives—allocation considerations
13	Individual student presentations
14	Conclusions Final project presentations from laboratory exercise

Finally, there is an additional laboratory component of the course that allows students an opportunity to apply a variety of intellectual and practical skills to advise part of an applied land use–transportation plan. The intent is to heighten students' understanding of the transportation and land use nexus through network and spatial analysis and design. Example projects that students have completed in past years include designing a land bridge over a designated sunken freeway section, which are common in the Twin Cities. Land bridges are used in this project for a number of reasons. First, they present a blank slate to take advantage of each group's talents and creativity. Second, they are an innovative planning tool that can achieve many social and physical goals of planning. Third, land bridges have been promised by public figures to Twin Citians since the Interstate Highways were built more than forty years ago. The skills needed for this project include understanding and merging with existing neighborhood plans, meeting with community representatives and planners, using GIS, understanding where to find and how to use common data used by planning practitioners, using design features to enhance the connectivity and network considerations of a site, zoning analysis, benefit-cost analysis, and local traffic analysis. These skills are introduced in the lab sessions, and each has a brief assignment for evaluation. The final project weaves together each of these skills and is delivered as professional presentation and staff report that details the proposed land bridge design and other built elements, the network effects of the project on the surrounding community, a discussion of the planning goals of the project with supporting arguments, and other elements. Leaders of local community groups and planners from local

agencies are invited to final presentations to comment on the applicability, feasibility, and other considerations as posed by the final student projects.

► Summary and Conclusions

Both anecdotal and empirical evidence suggest that in many planning programs, there is a growing recognition that the topics of land use and transportation should be approached in an integrated manner. We believe that an integrated land use–transportation course is an important part of planning curricula. This article provides much needed information on the level of educational activity addressing these topics. At least three major points are important to take away from this research.

The first guards us against the degree of reductionism that is easily fostered in planning education. The identity and strength of many of the specialization fields embedded within the planning profession enable the process whereby students graduate with tunnel vision. It is difficult for students to traverse fields of specialization; the curricular demand for other classes or the lack of an integrative course may prevent it. Planning is interdisciplinary by its very nature, and it is important for planning pedagogy to not lose sight of this asset. Rather, educators should facilitate the process of breaking down these barriers, which proves to be extremely important in matters relating land use and transportation. Central tenets of many smart-growth and antisprawl programs and initiatives strongly hinge on this relationship. Their understanding is inextricably linked to how effective planners are in their ability to integrate different topics relating city planning, infrastructure, and public policy. A land use–transportation course is inevitably a sociotechnical endeavor and requires integrating planning and geographic knowledge with aspects of transportation technology. Bridging the barriers between the engineers and planners should, we believe, be a central tenet of the course.

The second point relates to the content and readings of LUTCs that have been offered to date. Roughly two-thirds of the LUTCs surveyed cover each of the following half-dozen topics central to land use and transportation: (1) transport-oriented development (TOD), neotraditional development (NTD), new urbanism; (2) aspects of travel behavior; (3) higher density versus sprawl; (4) theories of urban and/or transportation economics; (5) jobs-housing balance; and (6) land use planning/growth management. There does not, however, appear to be any consensus on the readings that were appropriate for such a course. This is consistent with the work of Handy et al. (2002), who found there to be little standard or uniform approach to transportation planning education

within either planning schools or nonplanning transportation programs. Though no canon has emerged for such a course, we expect that over time, standard texts and articles will emerge as the course and field become better defined and as more empirical evidence is gathered in practical application of course topics.

The third is that there appears to be a need for additional attention on understanding where and how such a course best fits into a larger planning curriculum. Theoretical foundations in economics, behavior, and design for the course require substantial development for which many students are unprepared (analytical students may not appreciate design and vice versa). Other topics rise in importance as instructors gain more experience with the course and the priorities of society shift. It would be interesting to review this survey after some time and see how the land use–transportation course has evolved. We will need to monitor whether LUTCs become more or less specialized and whether prerequisites are more or less stringent.

A land use–transportation course provides a forum to synthesize knowledge from two core planning specializations and an opportunity to bridge the chasm between planning and engineering. However, its land use orientation will place it in planning programs rather than engineering. Institutional barriers to integrating the courses are probably minimal; it is more likely that resource constraints (lack of funding, lack of FTE faculty members, lack of motivated people to teach the class) are the reasons that it is not more widespread. However, these resource constraints are historically embedded in the decision-making processes underlying transportation and land use. Transportation decisions are generally state-level decisions in engineering-oriented Departments of Transportation. Land use decisions are made by local government planning departments and their elected supervisors. Nominally, metropolitan planning organizations are charged with reconciling this schism, yet despite the improvements to the planning process over the past forty years, there is still much to do. The future employers for students of a land use–transportation program are thus not crystal clear in the same way that individual land use or transportation courses would be. However, as it becomes clearer to professionals in both fields that they are interdependent, and that skills in both domains, (and in integrating them), are of value, we would expect that the demand for these courses would grow.

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► Note

1. The University of Minnesota offers two courses centrally covering land use and transportation issues: one oriented toward planning and policy applications, a second offering a geographical perspective of how the issues relate. Because they are offered as part of the same graduate program, however, we do not list the University of Minnesota as a second program in our count.

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