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Abstract: Transport planning is an integral part of most Australian planning programs. This paper summarises research conducted at Griffith University in 2009 on teaching and learning in transport planning education. A detailed examination of learning objectives is used to frame the problem, drawn from course outlines in Australian and US planning programs. Where once transport planning education was narrowly focused on predicting and planning for roadway capacity, the subject now encompasses a wider set of problems including sustainability, equity, neighbourhood amenity and health (Handy et al. 2002:piii). Learning objectives therefore include: understandings of planning theory, and how these relate to transportation planning; understandings of key concepts in transportation and land use planning; practical skills in capturing information on travel behaviour, in analysing that data, and in modelling and simulation to predict transport futures; and, other educational goals, including academic writing, statistical skill development, and presentation skills. The paper explores how these learning objectives can best be met, using examples provided by Frank (2002), Flyvberg (2001), Van Zuelen (2000) and Rose (2006). Recent changes to the Griffith University course in line with these approaches are then examined in detail, noting both their advantages and their significant limitations.

Graduate planning education is contested terrain. Pulling in one direction are the demands of academic legitimacy on a professional degree program housed in a university setting. Tugging from another direction are the demands of professional practice, captured by the students needing instruction with real-world relevance and by prospective employers looking for well-prepared new graduates. These forces need not work in opposition, but too often they do.

(Ozawa and Seltzer 1999:257)

Introduction

As Ozawa and Seltzer (1999: 257) suggest, graduate planning education is indeed contested terrain. The demands of professional practice, exemplified by the standardised curriculum demands of the Planning Institute of Australia (PIA) and the more general demands of employer groups, push planning educators towards practical skill and legal training. As noted by Stiffler (1999: 208) there are many who suggest that with planning schools changing to meet the minimum standards set by PIA and like bodies we will find ourselves (as with minimum requirements in zoning ordinances) with a 'mandated minimum' becoming the maximum actually achieved in planning education. Yet planning is a progressive discipline. It generally seeks to transform and reform human settlements. This demands a more critical academic education to produce more broadly aware, analytical and sophisticated graduates.

One of planning's key sub-disciplines is transport and land use planning, which I define more broadly than Krizek and Levinson (2005) to encompass many aspects of transport geography, transport policy and urban studies. Transport and land use planning is generally seen as an integral part of most undergraduate urban planning programs. The subject seeks to provide all planning graduates with understandings of the benefits and problems of mobility and accessibility, and the relationships between land use and transportation, such as the ways in which transport contributes to the form and structure of all cities, at multiple scales. But there are problems for the educator seeking to teach this subject. Where once transport planning education was narrowly focused on predicting and planning for roadway capacity, the subject now encompasses a wider set of problems including sustainability, equity, neighbourhood amenity and health, as well as traffic congestion (Handy et al. 2002: piii). Transport and land use planning therefore represents an 'intersection of land use and transportation ... two topics that have risen to be front and centre for the planning profession' (Krizek and Levinson 2005: 304). How does one create effective teaching in a subject for which the scope is large and the demands of industry diverse?

This literature review explores how planning educators are working to create effective teaching and student learning in the subject. Until this century there was little academic discussion of teaching in transport and land use planning, transport geography, or transport policy, with recent research by Rodrigue (2003), Handy et al. (2002), Krizek and Levinson (2005), Balsas (2001) and others emerging to fill the gap. There has been much more attention given to planning and urban studies education as a whole, and to transport within engineering education. The present review seeks to summarise and synthesise this research. It commences with a more detailed examination of possible objectives for teaching transport and land use planning, framing the problem of how planning educators may meet these learning objectives. The review then seeks to summarise the research on three key aspects relating to the problem, examining the implications for teaching practice.

Objectives for teaching in transport and land use planning

Goal-setting is an important element of effective teaching and student learning, and teachers should be making clear to students 'what has to be understood, at what level, and why' (Ramsden 2003: 86). Though the context and content of transport planning

courses differs greatly, drawing on Krizek and Levinson (2005) and Handy et al. (2002), the multiple learning outcomes expected from such courses generally include:

1. understandings of *planning theory*, and how these relate to transportation planning;
2. understandings of *key concepts* in transportation and land use planning, such as the 'utility of travel' and the value of travel time savings; conceptualisations of such notions as transport networks, accessibility and mobility; and understandings of how planners conceive of and plan for the various transport modes;
3. *practical skills* in capturing information on travel behaviour, in analysing that data, and in modelling and simulation to predict transport futures; and,
4. *other educational goals*, including academic writing, statistical skill development, presentation skills and the like.

Operationalising the research question of 'how does one create effective teaching in this subject', the review focuses on the 'problems' of providing effective student learning outcomes for objectives 1, 2 and 3, above.

Problem 1. *Planning theory* within a transport and land use planning context

Historically, transport planning has been unidimensional and ignorant of its theoretical bases in instrumental and scientific rationality, claiming it to be an objective science based on models and data. This rational planning model was the 'dominant theoretical influence in planning theory for much of the 20th century' (Ozawa and Seltzer 1999: 258). Key features of the rational planning model include selecting goals, identifying and evaluating alternative options, and producing a recommended option, with the planner viewed as a value-neutral-analyst providing advice to political decision-makers, seemingly apart from (or above) the political fray surrounding projects and policies (Ozawa and Seltzer 1999: 258). Though the planner's role may remain mostly that of an analyst and advisor, this theory of instrumental rationality has been subject to strong critique by knowledge and action theorists such as Friedmann (1998) and by communicative planning theorists such as Healy (1997) and Forester (1999a), amongst others. Perhaps nowhere has this critique been more savage than in the sub-discipline of transport and land use planning (i.e. see Jacobs 1961; Vigar 2002). As such, transport and land use planning education is faced with dilemmas such as how to convey an understanding of planning theory, its contestation, and its application for planning process and decision-making in the field of transportation.

Though the transport planning profession is now cognisant of these problems, it generally continues to employ them 'in research, in practice and in teaching (Willson 2001: 6,9). In planning schools a significant challenge is how to teach planning theory, which has often been marginalised within the planning curriculum (Frank 2002: 321). And yet the theoretical basis of planning should be integral to many subjects within a planning degree program, not the least in transport and land use planning where the empirical practice of 'doing planning' meets forcefully with the theory that informs such methods and processes.

The approach at most institutions tends to be towards conventional lecturing and readings as the only means of providing students with planning theories and related concepts. And this can be a useful means to introduce theoretical issues and alternative planning processes. However, if one is to attempt to break from the cycle of theory-less transport planning education, one may follow the lead of Frank (2002: 322-23) who, drawing on Harris (1992), Schön (1987) and Friedmann (1989), suggests a more experiential approach, with three key objectives for the teaching of planning theory:

- a) exposing students to people with different values from their own;
- b) facilitating discussions between people who hold different values and conflicting world-views; and,
- c) to help students understand power and political dynamics.

Flyvberg (2002: 5), who promotes a similar approach, suggests that ‘students can safely be let loose in this kind of reality, which provides a useful training ground with insights into practice that academic teaching often does not provide’. These objectives cannot be met using a surface approach to learning, via simplistic task completion or other limited methods. Such objectives require students to first understand key theoretical ideas and their contestation, based on both evidence and argument. And these objectives lend themselves to the characteristics Ramsden (2003: 60) puts forth in terms of “high structure, a strong knowledge base, ability to apply one’s own and other people’s ideas to new situations, and integration of knowledge”.

Objectives *a* and *b* are not easily met within a single transport and land use planning course. But it is possible to expose students in fieldwork and in guest lectures to people with different values and worldviews regarding transport and urban questions. Balsas (2001: 321) used an extensive set of diverse guest speakers in developing his course focused on cycling and pedestrian planning. This included often oppositional actors such as engineers, advocates, police and planners, amongst others. At Griffith we have done a little of this (but not to the same extent due to time and logistical constraints) but have instead developed workshop activities within the transport planning course that get students to discuss with cyclists and pedestrians their often opposing views of conflict on path networks, and to then discuss these issues with the state and local government officials responsible for managing these paths. These activities give much greater nuance to the ‘hard’ empirical data of the bicycle and pedestrian behaviour data that students also collect and model. Such approaches can help to produce planners who can better “anticipate and respond reflectively to the pressures of political power and the challenges of working with value differences” (Forester 1999b: 176).

But teaching planning theory to undergraduates is especially problematic. As Frank (2002: 326) notes, we lack a literature on planning theory written for students, rather than academic colleagues. This places additional pressure on teaching staff to enable student learning on key theoretical platforms and how they relate to practice, whilst students are also wrestling with the key concepts and problems of transport and land use planning. A primer on planning theory, with an Australasian perspective, could be a very meaningful contribution to improved teaching across our schools.

Problem 2. Teaching *key concepts* in transport and land use planning

Research by Handy et al. (2002) suggests no uniform approach has yet emerged for the teaching of transport planning within planning schools. We know most about the content of transport and land use planning courses as currently being taught in planning schools in the US from research conducted by Krizek and Levinson (2005). They surveyed 15 North American transport planning courses in undergraduate planning programs for the year 2001-02. Drawing on their work one can identify seven ‘themes’ within the curricula (see Table 1).

Table 1 Themes in transport and land use planning curricula (derived from Krizek and Levinson 2005: 309-12)

Theme	Contents
Theory	the basics of urban and/or transportation economics; utility theory; travel behaviour; induced demand; planning theory
Process	political institutions; decision-making frameworks
Policy	plan content; key directions for transport and land use policy (i.e. travel demand management, transport and land use integration, intelligent transport systems); key debates (i.e. higher density vs. sprawl, road pricing)
Applications	roads, public transport, environment
Models	the bid rent, gravity, or other models of urban form/travel; micro-simulation; impact analysis modelling
Design	urban form and structure: transit-oriented development, new urbanism, and neighbourhood design
Other	understandings of travel behaviour

A review of course outlines in undergraduate transport planning programs at the Royal Melbourne Institute of Technology (RMIT), the University of Melbourne and (my own course) at Griffith University suggests the Australian focus broadens to cover topics such as pedestrian and cycle planning, a little freight and logistics, and even planning for car parking, in addition to those topics noted by Krizek and Levinson. This perhaps reflects the greater dominance of walking and public transport in Australian cities, and the need to train land use planners in issues of car parking and the management of freight (including planning for the deliveries of goods).

There are two problems that emerge here. The first relates to the vast scope of these concepts and the temptation for educators to deal with all of them, at the expense of depth. The second relates to the often mono-disciplinary approach taken to teaching these concepts, especially in student learning activities.

Firstly, given the wide set of concepts that could be included, tightening and refining the scope of a transport and land use course proves difficult. Krizek and Levinson (2005: 313) note the potential for such courses to assume a ‘survey-of-the-field’ nature, precluding detail and, by inference, deep learning. Rodrigue (2003: 75) also notes this problem and suggests educators should seek to provide coherence within this milieu – akin to what Biggs (1999: 76) describes as ‘maximising structure’.

Speaking from the perspective of transport geography education, Rodrigue (2003: 75) suggests there are three main challenges:

- *'Theoretical and conceptual'*: which cover the theoretical and conceptual foundations that help explain travel behaviour, events and processes;
- *'Methodological'*: which include how transport information is analysed, using a wide array of methods and information technologies, and which should 'go beyond abstraction'. Students should 'apply procedures to analyze the parameters of a problem' and explore 'paths towards a solution'; and,
- *'Technical and technological'*: involving the development of specific technical skills, which I will discuss further in section 3.

I would more clearly add the dimension of planning theory and practice to this list. Regardless, drawing together a curriculum that prioritises these 'challenges' will mean excluding some content from what would otherwise be an exhaustive sweep of the field. However, the omission of some less important concepts provides the opportunity for sufficient time and resourcing for deep learning on what appear to be more important concerns.

The second issue, that of mono- vs. multi-disciplinarity in teaching transport planning concepts, relates to the historical legacy of instrumental rationality within the profession and the once narrow focus on methods for analysing and managing road traffic. As Van Zuylen (2000) suggests, transport problems are too complex and too difficult for resolution by mono-disciplinary approaches. One should instead teach students to look for ways to either disaggregate problems into sub-problems, then solve them using the approach of a single discipline ('inter-disciplinarity'), to integrate and create truly multi-disciplinary approaches to seek a single solution, or to take the approaches of one discipline to enhance and improve the potential of another (methodological triangulation) (Van Zuylen 2000: 75). As such, transport planning education should look to encourage students to seek solutions from across and drawing together environment-behaviour research, traditional travel behaviour research, transport economics, modelling, communicative planning and other approaches to solve transport problems. At Griffith this means we have rejected teaching approaches that focus solely on the empirical activities of data analysis and modelling of transport data, instead complimenting these with qualitative research approaches that require understanding of different values and in resolving conflict. We could do more. In this way we can balance graduates 'traditional technical skills and the "softer" kinds of skills demanded of today's transportation planners' (Handy et al. 2002: 93). But it is still inevitable that we must teach specific skills in analysing and modelling travel.

Problem 3. Imparting *practical skills* in travel behaviour survey, data analysis and modelling

Handy et al. (2002: 53) interviewed a sample of US transport employers and found they were seeking two technical skillsets in graduates: (1) transport data analysis and the interpretation of statistics, and (2) understandings of how to evaluate transportation models (which should not be confused with transport modelling skills per se). The authors argued that planners need to be able to 'look at numbers and

make sense out of them, for planning purposes and in order to explain them to the public' (2002: 53).

But such skills are 'especially challenging to provide' (Handy et al. 2002: 75) There are many pedagogical approaches to such skills training which are beyond the scope of this review to consider (see pp19-20 of Conole et al. 2004 for examples). The transport and land use planning courses at RMIT, the University of Melbourne and Griffith University use a series of workshop and/or self-completed assessment activities for students to analyse aspects of travel behaviour data and to engage with key aspects of transport modelling. These exercises are generally cognitive and non-experiential in their approach, and require students to demonstrate only a level of comprehension (beyond recall and towards understanding of the material in context, but not quite at the level of advanced cognitive synthesis – see Gist 1997: 210). Further, the majority of these exercises only require simplistic practice of a skill, not performance in a more complex or 'natural' setting. They also tend towards individualised learning and do not offer means for socially-situated learning.

Student learning in contexts outside of the classroom, especially in hands-on experiences, has been associated with improved student learning (Elwell and Bean 2001). Such an approach was trialled by Geoff Rose (2000; 2006), who saw the value of 'simulated consulting' in themeing a set of transport data analysis and modelling activities and in placing his transport engineering students in a field research environment (Rose 2006: 2). This approach was adopted at Griffith University in 2009 seeking to advance the following student learning objectives:

- Survey development skills, including travel survey methods, formats, question development, and ethical considerations;
- Field survey administration skills, including team development and task assignment, co-ordination and management, health and safety awareness, and professional conduct of surveys with the public;
- Data cleaning, editing and analysis skills
- Basic knowledge of simulation and modelling of future travel patterns, and use of model outputs for planning purposes.

Interlinked workshops and related assessment items require students to move through these four objectives, which require at different times engagement in reflective observation, abstract conceptualization, active experimentation and concrete experience – all aspects of Kolb's learning cycle (1981). The simulated consulting approach is problem-based, improves student motivation, involves students in collaborative group-work in simulated communities of practice, and situates the learning within the 'natural' setting of professional consulting – including under the supervision and guidance of real-world transport professionals (Rose 2000: 57).

At its heart, this is situated learning, which may be defined as 'a learner executing tasks and solving problems in an environment [that] reveals the various intended uses of the knowledge' (Billett 1994: 112). Situated learning provides one of the theoretical underpinnings for the practicum programs that are common within planning and is also a powerful theory for understanding the experiences of persons involved in planning projects (see Gberardi 2000 for more on this). Students:

‘come to understand the purpose of the knowledge they are learning; learn by actively using knowledge rather than passively receiving it; learn the different conditions under which their knowledge can be applied; and acquire knowledge in dual form, both tied to the contexts of its uses and independent of any particular context, thus promoting its transfer to new problems and new domains’ (Tabbert 1993, quoted in Roakes and Norris-Tirrell 2000: 102).

We want the students in the Griffith course to experience what Billett (1994: 121) refers to as the ‘repeated and explicit nature of external reinforcement’, discovering first hand what works and what does not work in attempting to stop a passing cyclist and elicit a response to a short survey, what terms are understood by the population, and the performance that clients in state and local governments are seeking in both survey conduct and final data presentation. Skill development is experiential and reinforced by external stimuli. Course evaluations from Semester 2, 2009 will indicate whether we’ve achieved success.

An advantage of Rose’s approach is that it helps build the necessary ‘strong and respectful links between (transport) professionals and educators’ (Handy et al. 2002: 91). The disadvantages include the time and effort required of the lecturer (especially tedious issues such as obtaining Ethics clearances), the logistics of any field activities or external agency involvement in the activities, and the problems inherent in group work, especially group assessment (Rose 2000: 63-64; Rose 2006).

Summary

The findings of this review suggest various refinements are needed in the teaching of transport and land use planning, at Griffith and elsewhere, to achieve improved student learning outcomes. Educators need to break the cycle of theory-less transport planning education, inserting theory into their courses. This may take the form of conventional teaching approaches (lectures, readings, etc.) but the way forward suggested by Frank (2002: 322-23), including external parties in the students learning experiences, offers more. This approach may be realised by both fieldwork activities (as at Griffith) and/or by inviting persons of very different worldviews about transport and land use issues into the classroom, as used by Balsas (2001).

It is not possible for transport and land use courses to cover everything in the limited time generally available for the subject in a broader degree. Regardless, a key finding of this review is that planning educators should avoid this path given the likelihood of limited ‘surface’ learning. Significant curricular improvements can be made by omitting less important transport planning concepts and by embedding an effective structure into courses; allowing for sufficient detail and a carefully selected set of activities on key aspects, and encouraging deep learning by students.

Approaches are now available in themeing workshop activities and in situating learning to promote critical skills in the analysis, interpretation and presentation of transport data, and in understanding how to evaluate transportation modelling. Though the approach provided by Rose (2000; 2006) requires more effort by a course’s teaching staff, it offers significant advantages in placing learning in a more appropriate context, forcing students to actively acquire and use their knowledge in a

self-reinforcing community of practice, with external reinforcement, under the guidance of real transport professionals.

To generate such changes requires transport planning academics to both understand the limitations of their current approaches, and to think carefully on ways to improve their student's learning. As Handy et al. (2002: 93) note, 'the challenges may be daunting, but the potential payoff is promising'.

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