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# **THE LEARNING EXPERIENCE OF TRANSPORT PLANNERS: AN INTERNATIONAL SURVEY**

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## **1 INTRODUCTION**

The call to advance the quality of higher education should be a constant priority for academic institutions in response to the changing needs of the professions. This is particular true for transport planning, a discipline that is experiencing rapid and on-going changes due to the emerging environmental, economic, security-related and social issues that mobility is becoming increasingly more associated with. Indeed, academic institutions are faced with the challenge of ensuring that transport planning courses address the growing complexity of urban challenges (Zuylen 2000; Ramsden 2003).

Transport planning courses are typically offered in urban and regional planning or engineering departments although, in some instances, they are also offered in other institutions such as tourism, business, public policy, social science and urban studies departments. A number of studies have provided national overviews of transport planning education, such as in Australia (Mateo-Babiano et al., 2013), Switzerland (Kaspar, 1982), Canada (Ruppenthal, 1998) and USA (Krizek and Levinson, 2005). These studies have adopted different research methodologies and slightly different research questions. In any case, in these studies, it has been identified a general preference for multidisciplinary and holistic transport planning courses (see as well van Zuylen, 2000 and Ferreira et al, 2013, who confirm the same trend). In the '60s and '70s the rational technical planning model influenced the field of transport planning which led to the delivery of a technical-oriented transport-planning curriculum. With the introduction of communicative planning in the '80s and '90s, planning pedagogy was revised to capture its thrust towards policy-orientation and towards the facilitation of communicative planning processes (Handy et al 2002). This had important implications in a number of transport planning courses, which have reflected this new trend.

However, not all the transport planning courses that one can find today accommodate a broad curriculum. Moreover, only limited hours can be allocated to cover the broad and multidisciplinary field of transport planning and this means that difficult choices have to be made even when a comprehensive curriculum is desired (AESOP, 1995). Within each course curriculum designers must then choose from amongst a diverse set of important topics what should be taught. The inevitable exclusion of many concepts and topics results in curriculum gaps that might negatively affect the professional future of the students. As an alternative to this, curriculum designers can choose to make curricula as broad and comprehensive as possible, however this can lead to shallowness and superficiality and will make it difficult for students to achieve deep learning in any given subject area (Krizek and Levinson 2005, Ferreira et al, 2013). In line with this, two key questions emerge. First, how should curriculum designers solve the tension between the comprehensive and the specialist orientation in transport planning courses? Second, which subject areas should be given priority in these courses, if any?

The aim of this article is to assist curriculum designers finding their own answers to the abovementioned questions. In order to achieve that aim, an international web-based survey was conducted where transport planning professionals across the globe were asked to give their opinions on what are the subject areas and topics that they rank as the most relevant for their work and how much coverage of these subject areas should be given in an ideal transport planning master. It was also asked the coverage given to these elements in the master course they have attended when they were still students. Through this, the paper seeks to explore the challenges associated with teaching urban transport planning today and identify the state of the art in transport education. The study also answers some questions about the future trends of the transport planning profession.

The paper is organised in the following sections. Section 2 briefly discusses the research design choices and setup of the data gathering. The relevant characteristics of the sample (survey respondents) are also presented. Section 3 discusses the research results. A discussion of significant differences found among different countries, professional roles, and age groups is included. Section 4 provides conclusions and briefly discusses the future of transport education.

## **2 METHODOLOGY**

### **2.1 DATA GATHERING**

The research is based on a database gathered through an international web survey. The respondents are professionals involved in transport planning that attended a master degree. The master could have been in any field. The data was gathered with a Qualtrics survey and it was available in English only. We distributed the survey and several reminders via mailing lists from national transport planning professional organizations, research groups, and via a number of LinkedIn and Facebook groups on transport, geography and urban planning. The survey's structure could be completed within fifteen to twenty minutes. The survey is divided in four main parts.

The first part of the survey consisted of five general questions concerned with the education of the respondents. It asked the field of their undergraduate bachelor degree, the field of their master degree, the country where they attended the master, the year of completion of the master, and the duration of the course.

In the second part the respondents were asked to reply to 15 questions about how much different subject areas were covered in the master degree they have attended. These questions were answered with a 5-point Likert scale. It also included questions about the extent to which they consider that given topics are important for their work. There were a total of 46 topics and these were also ranked using a 5-point Likert scale. In terms of definitions, we considered a subject area one that includes several topics. For example, the subject area *Data collection and analysis* included the following topics: *Qualitative data collection and analysis*, *Quantitative data collection and analysis*, and *Statistics*. This section included as well an open question about the themes and topics that are emerging and which ones are losing relevance in the transport planning sector.

The fourth part consisted of four questions about their personal views, including their personal planning goals and on their level of happiness in their career.

The last part consisted of nine questions about the respondents, namely the organisations they have worked for, the nationality, the country of residence, age, gender, their employment status and their key psychological trait according to the Holland Codes (also known as the Holland Occupational Themes RIASEC (Holland 1973).

## 2.2 THE RESPONDENTS

A total of 254 respondents completed the survey. Their characteristics are presented in table 1. 26% of the respondents attended a master degree in Southern Europe, 18% in Central Europe, 33% in Northern Europe. Smaller percentages of respondents also cover other geographical areas, such as South America (1%), Northern America (12%), Asia (9%) and Australia (2%). The predominant field of the masters attended in the sample of all countries is transport and mobility. The respondents work mainly for academia, consultancy firms and public authorities. There is a prevalence of male respondents, which sadly reflects the male predominance in the sector. The predominant age group is of people from 23-34, which just finished their master degree.

Table 1 Characteristics of the respondents

Geographic area where the respondents attended their master	South Europe	Centre Europe	North Europe	South America	North America	Asia	Australia	Total
Total	66	45	83	3	31	22	4	254
<b>PG Master field</b>								
Architecture	16	6	2	1	1	2	1	29
Economics	2	2	5					9
Engineering	14	8	3		5	4		34
Geography		7	3		1			11
Other	1	5	7		3	2		18
Transport	19	5	56		7	7	1	95
Urban Planning	14	12	7	2	14	7	2	58
<b>Type of work organisation</b>								
Academia et al	15	14	10		12	3	1	55
Only Academia	32	18	9	2	9	6	1	77
Other	1	1	3			5		10
Private Consultancy	3	5	21			2		31
Public authorities	7	3	24	1	7	3	2	47
(blank)	8	4	16		3	3		34
<b>Type of employment</b>								
Employed full time	49	37	55	2	25	10	2	180
Employed part time	2	2	6	1		2	1	14
Retired		1	2		2			5
Unemployed looking for work	2					2	1	5
Other	5	1	4		1	5		16
(blank)	8	4	16		3	3		34
<b>Gender</b>								
Female	25	11	24	2	6	4		72
Male	33	29	43	1	22	16	4	148
Prefer not to say	1	1	1		1			4
(blank)	7	4	15		2	2		30
<b>Age</b>								
18 - 24	2	3	4			5		14
25 - 34	13	14	26	1	11	8		73
35 - 44	15	8	15	2	6	3	1	50
45 - 54	15	8	9		3	2	1	38
55 - 64	13	5	8		5	2	2	35
65 - 74	1	2	5		3			11
75 - 84		1			1			2
Prefer not to say			1					1
(blank)	7	4	15		2	2		30

### 3 COVERAGE AND IMPORTANCE OF SUBJECT AREAS

The second part of the survey questioned the respondents about their post graduate learning experience. In practice, this means that the survey questioned the respondents about how much different subject areas were covered in the master degrees they have attended and how important the respondents perceive these subject areas for their transport planning work.

In aggregate terms the first three most important subject areas are data collection and analysis, travel planning and transport and land use interaction (see Table 2). Even though they rank as the top three in the list of subject areas, it is relevant to notice that the values of perceived importance decrease in a quite gradual way. So there is not a clear agreement that a small number of subject areas are very important and others are considerable less important. It is also relevant to notice that, while data collection is considered well covered in the master program, this is not true for the other two most important topics. The table indicates that what is considered important for professional work is not necessarily what was most covered in the master degrees the respondents have attended. According to the survey respondents, these topics should have had more space in the master curriculum. Another quite noticeable gap is on the subject area 'soft skills for planning'. Even though this is ranked only as the tenth most important topic, the gap between the importance value and the coverage value is the highest among all subject areas. Also the subject area GIS science and spatial analysis has a quite low coverage, while it is considered important by our respondents (ranks as the fifth most important subject area).

**Table 2 Perceived importance and coverage of subject areas**

Rank for importance	Subject areas	Perceived importance of subject area (mean normalised value from 0 to 1)	Coverage of subject area (mean normalised value from 0 to 1)
1	Data collection and analysis	0.762	0.566
2	Travel planning	0.740	0.385
3	Transport and Land Use interaction	0.734	0.454
4	Transport Project Appraisal	0.722	0.414
5	GIScience and Spatial analysis	0.680	0.364
6	Modelling	0.676	0.392
7	Participation of community members and stakeholders	0.665	0.344
8	Development of transport plans	0.648	0.354
9	The policy and regulation context	0.636	0.452
10	Soft skills for planning	0.614	0.183
11	Planning theory and planning history	0.613	0.461
12	Innovations and transition management	0.596	0.258
13	Transport Infrastructure construction	0.553	0.388
14	Design skills and creative thinking	0.515	0.309
15	Financial and operational management of transport systems	0.490	0.244

Two key conclusions can be drawn from the analysis of Table 2. First, it seems reasonably clear that respondents support, in aggregate terms, comprehensive curricula as there is not a clear preference for a limited number of subject areas over all the remaining ones. Second, there is for sure room for improvement in terms of matching the importance the respondents attribute to given subject areas and the level of coverage these areas have in master degrees.

### **3.1 SPECIFIC EXPERIENCES ACCORDING TO THE FIELD OF MASTER DEGREE ATTENDED**

The coverage of subject areas varies according to the field of the master degree. Planning theory and planning history has the highest coverage in planning masters with a score of 0.59, those masters also cover quite well transport and land use interaction, the policy and regulation context, GIS science and data collection and analysis. Data collection and analysis is less covered in Architecture Master (average score 0.35), compared to the average score of 0.56. GIS is more covered in geographical Master (0.61), but only marginally in Transport course (0.32) and Economics (0.25). Modelling is slightly covered in Architecture Master (0.19%); the subject are design skills and creative thinking is covered in Architecture Master with a good score (0.65) and Urban Planning Master (0.40), but only marginally in Transport Master (0.17), Geography (0.25) and Economics (0.17). Geography masters are the ones covering the most the subject area innovations and transition management compared to other masters' field, but only marginally (0.38). Soft skills for planning are generally very marginally covered in all the Master fields, with a total average of 0.18. The maximum coverage is in Geography Masters (0.27).

There are some differences of course also in terms of how people who attended different master rate subject areas. Respondents who followed a Master in Architecture rate as very important planning theory and history, design skills and innovation and transition management, in opposition to the other groups who do not. Professionals who attended a transport master consider on the contrary design skills and creative thinking not important (average 0.43). Soft skills for planning and participation are considered important by transport planners who attained a master in Architecture, Transport and Urban planning, but not by the professionals who attained a Master in Economics, Engineering or Geography.

There are some significant differences among the different master fields also regarding the gap between the importance rate and the coverage. Innovations and transition management are rated very important and are at the same time not covered in all Master fields. This difference is higher for professional who attained a master in Architecture. The same is for soft skills for planning, especially in Architecture, Economics and Transport Masters. Modelling is another subject area that is perceived important but not enough covered in Architecture master, such as the subject areas of Transport Planning Appraisal, participation and community members and stakeholders

### **3.2 JOB ORGANISATION DIFFERENCES**

Some differences exist also in how professionals consider important the different subject areas to be covered in a master and the organization they work for. Transport planners who work in private consultancy are the ones who rate the subject area of Modelling as the most important (average 0.80). Comparing to other groups, transport planners working in public authorities rate higher the subject area of Transport Infrastructure and construction.

There are no significant differences on how professionals working in different organization types rate some subject areas. For example Land use transport interaction, Data collection and analysis, Travel planning are the three subject areas that are rated very high and this happens among different groups of people working in different organizations. Financial operational management of transport systems are rated low by all the groups.

### **3.3 COUNTRY SPECIFIC PERCEPTIONS**

Within the macro geographical areas of the sample, as detailed in Table 1, we noted some peculiar country differences. For example, transport planners who attended a master in Italy rated Planning Theory (0.67), Design skills and creative thinking (0.64) and Transport infrastructure and construction (0.64) as more important than professionals who achieved their masters in other countries, which achieved a mean respectively of 0.57, 0.48 and 0.52. On the other hand, for professionals who attended a course in United Kingdom, modelling is more significant than in other countries, as they rated it 0.71 over a mean value of 0.65. In Italy and USA, GIS and spatial science are rated as more important subject areas than in other countries.

There are no country specific differences for subject areas such as Land use transport interaction, Transport appraisal, Data collection and Travel planning, which are considered very important by all respondents disregarding their country of residence.

### **3.4 AGE, GENDER AND PERSONALITY DIFFERENCES**

There are some differences on how respondents perceived the importance of different subject areas also according to gender, age, and personality.

Women rate more important than men soft skills for planning, with an average of 0.82 for women over an average of 0.74 for men. Also participation and data collection is considered more important by women, who rated this subject area with an average value of 0.73 over 0.63 for men.

Regarding age differences, transport project appraisal is considered one of the most important subject area by older generations with a score of 0.93, compared to an average value of 0.72. Also financial and operational management is rated differently by young and old transport planners. Younger generations of transport planners consider more important other subject areas such as modelling. The increasing perceived importance of modelling grows with the younger age in an almost linear relation.

We recorded some differences also in how people perceive the importance of subject areas and their personality. People who define themselves as Artistic rate (with no surprise) design skills and creative



thinking (0.75) and Participation of community members (0.74) as the most important subject areas. People who recognize themselves as Realistic rate the Modelling subject area as the most important (0.74). Classical people rate lower (0.36) than the other groups the innovations and transition management (average of 0.59).

### 3.5 WHERE IS THE TRANSPORT PLANNING DISCIPLINE GOING?

Looking at the coverage of the subject areas along the years, it is clear that the education offer for transport planners is changing. Professional who attended their masters in the '60s stated that some subject areas were more or less covered that what professional finishing their master in 2010 did. For example there is a linear increase of the coverage of transport land use planning (from 0.31 in the 60's to 0.57 in 2010's). Also GIS science and Spatial Analysis coverage is growing (from 0.21 in the 60's to 0.40 in 2010's). Soft skills for planning's coverage is also increasing in the last years (from 0.07 in the 60's to 0.20 in the last decade). Some subject areas coverage remains stable such as planning theory and planning history or design skills and creative thinking.

From the question asking themes that are emerging in the transport-planning sector, some topics have been cited by many respondents. Those are: 'big data' (cited 28 times), 'autonomous or automated vehicles' (cited 20 times), 'land use and transport interaction' (cited 18 times), 'technology and smart mobility' (cited 14 times), 'mobility as a service' (cited 9 times). We also asked which subjects are losing relevance. Our respondents used some common keywords, such as 'infrastructure design' (cited 10 times), road and highways construction (cited 9 times); traditional modelling (cited 5 times).

## 4 DISCUSSION AND CONCLUSIONS

The results presented here are preliminary and part of an on-going research. As such, we would like to invite our readers to see them as temporary and subject to revision. The survey remains open online as we write with the aim of gathering a considerable higher number of respondents so that we can better cover more countries, age groups, and educational backgrounds. However, some temporary conclusions can be sketched. First, it seems relatively clear that transport planning professionals rate a large number of topics and subject areas as important. There is a clear resistance to dismiss knowledge as irrelevant for transport planning practice. In other words, holistic and comprehensive curricula seem to be the clear preference. In our view, this is a good sign as it shows the openness and curiosity of professionals involved in transport planning. It can show as well their awareness that transport planning is an activity with deep societal and environmental implications and relationships. It is then perceived as most needed to master a wide variety of concepts and theories, tools and techniques. However, it can also be seen as a sign of a professional crisis. As argued by Bertolini and associates already in 2008, "for urban transportation planners these are the challenging times" (2008, p. 69). Among these challenges one can count great uncertainty about the future of mobility, major environmental issues such as climate change and pollution, health problems due to physical inactivity, among some others.

Second, and in terms of what kind of knowledge transport planners tend to perceive as the most important for their work, data collection and analysis, travel planning, transport and land use interaction, and transport project appraisal were the subject areas ranked the highest. This is meaningful. All these subject areas are focused on expert content and not on procedural issues (as soft skills for planning or participation of community members and stakeholders are). Even though some argue that the communicative turn has left important marks in the planning discipline, transport planners do not seem to prioritise procedural or communicative forms of knowledge. Instead, their priorities go to the hard-core content of transport planning as a spatial and social science.

Third, it is also relatively clear that there is a mismatch between what transport professionals rank as important subjects for their work and subjects that have been covered in greater detail in the master courses they have attended. This is partially explained by the fact that only 37% of the respondents did a master on transport planning or transport studies. This can also be partially explained by the possibility that when a professional ranks something as important for work it is necessarily difficult to offer to this person enough. Indeed, the person is likely to want to receive all possible information about the subject as their professional success depends on it. Nevertheless, curriculum designers seem to have some serious work ahead, if their objective is to match better levels of coverage of subject areas and what professionals (and professional organisation) rank as important for their practice.

Fourth, and at a more conceptual level, perhaps it is time to reflect more critically about how transport planning master courses are designed. Most countries and universities still adopt a prescriptive logic to their curricula, that is, they base higher education on attendance of courses with clearly specified disciplinary orientations (e.g. transport planning, urban design, human geography). Why is that accepted so uncritically is the key question here. If transport planners recognise that holistic and comprehensive curricula is what suits them the best, why are they forced to follow pre-given modules? Maybe their best interest would be to have the freedom to choose the modules they want to attend, as is currently done in the MIT Media Lab (Ito, 2012) or some interdisciplinary graduate transportation programs also offered at MIT. However, this poses an intriguing question: how would professional associations react to this? Moreover, what would be gained and what would be lost in the world of planning if the educational background of their professionals was even more diverse? Taking into consideration that transport is a sector that has proved to be hard to change, and that private car dependence, pollution, carbon emissions, congestion, physical inactivity, among other problems, continue to be experienced at increasingly more alarming levels across the world, maybe it is time to explore new avenues of thought. Further research on these intriguing subjects is indeed most necessary.

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