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Improved Partnership Working for Local Authority Transport Planning

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Diverse perspectives need to be brought together to facilitate the organisational delivery of more sustainable transport plans and policies. This necessitates close-working partnerships and good cross-sector learning. This paper looks at the rationales for design of, and anticipated roles for, two tools to assist this process: one a guide to cross-sector and intra-organisational partnership working written specifically for local authority transport practitioners; and the other an online framework within which practitioners can better identify and utilise other products from the research programme. Whilst grounded in UK research and experience, the lessons learned are generic to the European context. The paper also investigates the success of DISTILLATE's own interdisciplinary approach and relates this to the literature, in particularly to the idea of 'double loop learning' by which individuals and organisations (research and practitioner) can acquire the new knowledge necessary to make the step-change towards more sustainable transport systems and practices. This is followed by a discussion of the implications of this for supporting decision-making more widely in the field of transport and infrastructure.

Keywords: double loop learning; knowledge transfer; stakeholder engagement

1. Introduction

This paper is one of a series on a UK research programme, DISTILLATE (Design and Implementation Support Tools for Integrated Local Land use, Transport and the Environment), which carried out research into six barriers deemed of particular importance to UK local authorities and developed a series of products designed to support local authorities in their decision-making. The DISTILLATE research programme was funded under the UK Engineering and Physical Sciences Research Council's Sustainable Urban Environment initiative which placed a particular emphasis on research which met the needs of practitioners and which were multi-disciplinary, reflecting the complex nature of the problems to be tackled, and multi-institutional, given a concern that no one institution might have the critical mass of research skills needed.

The DISTILLATE programme responded to these challenges by involving local authorities and related actors directly in the research programme and by bringing together the research skills of two interdisciplinary transport research groups, a planning school, a policy-oriented environmental research centre, and a national transport research establishment. It was designed

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to help overcome those barriers to decision-making which were judged to be most serious, and most amenable to research-led solutions. It set itself a vision of helping to achieve a step change in the way in which sustainable urban transport and land use strategies are developed and delivered. Further details of the programme as a whole, and of the role of the project reported in this paper, are provided in the overview paper (May, 2009). It is important for this paper that the seven projects were designed as an integrated programme, and this integration is particularly evident in the web-based dissemination tool which is considered in section 3 of this paper.

This paper will give the details of the rationales for design of the two 'Organisational Delivery' project outputs; the *Guide on Partnership Working* (in section 2), and the web based tool to allow practitioners to access the products of DISTILLATE and use them in an appropriate and timely way (section 3). The paper also investigates the success of DISTILLATE's own interdisciplinary approach (in section 4) and relates this to the literature, in particular to the idea of 'double loop learning' by which individuals and organisations (research and practitioner) can acquire the new knowledge necessary to make the step-change towards more sustainable transport systems and practices. Thus the paper also reports on the internal working structure of DISTILLATE and on the role of partnership and communication within the research project itself. Although grounded in the social and political sciences, the project reported in this paper did not set out to carry out original social science research (such as developing new theories). Instead, the focus was on applications that tap existing theories and associated methodologies and adapt them to real-world policy and institutional issues.

The structure of the paper is in five sections: the remainder of section one provides an introduction to double loop learning, the logical framework analysis used to specify the research programme and the background literature and case studies used to support that research. This is followed by a section (section 2) which describes the *Guide on Partnership Working*, explains how it was developed, and what was expected of it. This is then followed by a section on the web-based tool: this section broadly follows the approach of the previous section. After this, in section 4, the paper discusses the internal partnership working and transdisciplinary approach of the whole programme. Section 5 draws some conclusions.

1.1   *Double Loop Learning*

Simple transmission of knowledge may be described as 'single loop learning'. This descriptor can also be applied to academic disciplines working together where the disciplines simply come together, each plays an agreed role in establishing jointly agreed aims, and then the disciplines work separately to achieve those aims. Transdisciplinarity is more complex: here research itself involves 'double loop learning' where individuals and organisations (research *and* practitioner) acquire new knowledge – in our case the 'sustainability knowledge' necessary to make the step-change towards more sustainable transport systems and practices – in social groups rather than by independent invention[2]. Thus, when "the error detected and corrected permits the organization to carry on its present policies or achieve its present objectives, then that error-and-correction process is *single-loop* learning" but "*Double-loop* learning occurs when error is detected and corrected in ways that involve the modification of an organization's underlying norms, policies and objectives." (Argyris and Schön, 1978: 2-3). This learning is, therefore – placed on a continuum – beyond traditional ideas of policy learning or knowledge transfer where local authority officers find out about solutions already tried. The concept of double loop learning resulting in emergent knowledge (as illustrated in Fig 1) is most apposite when researchers and stakeholders co-create *new* knowledge to solve stakeholders' real world problems. Policy learning from other cities is also relevant, and is considered extensively elsewhere (*e.g.* see Marsden et al., 2009).

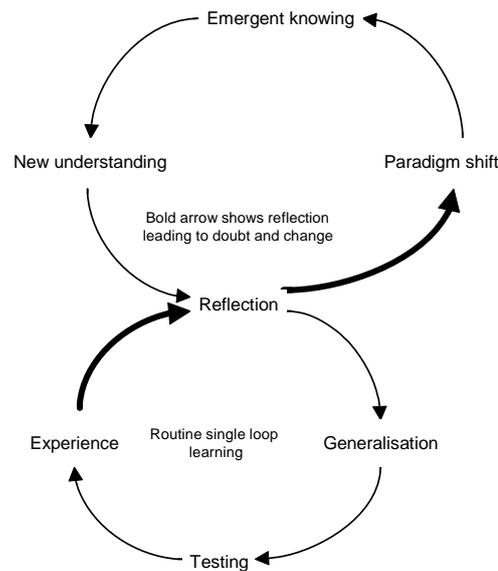[2] Thus, double loop learning may also be considered analogous with the term 'social learning'.

Figure 1. Double loop learning (after Argyris & Schön, 1978: Figure by Kate Lonsdale in Forrester et al.2008

The necessity of team working for new and co-learning is also emphasised in Carpenter *et al.* (2009) who note that: "complex problems, i.e., problems with many solutions that are quite different in execution and rankable in quality of outcome, may be solved better by a diverse team of competent individuals than by a [less diverse] team composed by the best individual problem solvers." The team should include those working within the systems of decision making and of governance as well as researchers. This learning is also clearly related to participation: learning is a process intended to lead to changes in the way things are done and thus requires shifts in understanding for practitioners, researchers, and other stakeholders, either as individuals or groups. However, no one person is expected to have the answer, but everyone has a piece of the truth – thus some form of communication and participation in joint problem solving is required. By sharing ideas in an inclusive process it becomes possible to identify some imaginative and 'out of the box' solutions.

1.2   Logical Framework Analysis

Partnership working within DISTILLATE was not solely with those outside the research community. The very functioning of the research partnership itself depended on internal communication of the purpose of individual projects' research, their proposed outputs and their anticipated outcomes. These had to be communicated to DISTILLATE partners, both academics and practitioners. In order to do this it was decided within this project to use a Logical Framework Analysis (LFA) which allows project researchers to develop a 'vertical logic as a hierarchy of objectives' in which 'activities deliver outputs, which contribute to outcomes, which help bring about the overall goal' (Bakewell & Garbutt, 2005). For this, a problem tree was drawn showing how the problems were linked, and then, using a replicated image of the problem tree, showing how each one of these sub-problems would be addressed (see Forrester 2006). In this project's LFA, three focal problems were identified as: internal communications; external communications & stakeholder engagement; and ability to uptake better decision support tools leading to enhanced evidence-informed policy making. Based on this, this project on effectiveness in organisational delivery addressed three main problems:

1.   barriers between local authority officers and external stakeholders,

2.   internal structural and internal cultural barriers within local authorities, and

3.   barriers to using evidence-based approaches to decision making in transport.

Problem 1 notes that there are barriers with stakeholders who provide or can provide direct transport solutions but who are external to local authorities: DISTILLATE questionnaire responses (Hull 2009) highlighted the difficulties of the fragmented system of governance (*e.g.* lack of control over the rail network, and privatised or deregulated bus services). There are, thus, barriers between local authorities and external stakeholders who can provide indirect transport solutions'.

The case studies (Section 1.3) found that there is a lack of joined up thinking and integration, both within and between different levels of local government. Due to the fragmented nature of the system, transport agendas can often be in conflict with regeneration or development agendas. These conflicts are also apparent at a higher level such as between the agendas of the separate UK national-level government departments responsible for: transport (Department for Transport); air quality (Department for Environment, Food and Rural Affairs); and local regeneration (largely the Department of Communities and Local Government).

There are further barriers between local authorities and different government departments: problems and conflicts exist between local and central government in relation to the planning process and this can lead to inconsistent signals on how strategic plans worked out at 'higher' levels of policy cycles should be translated into policy measures and implemented at local level. Finally, there are barriers between council officers and the public: local authorities are required to engage with different stakeholders and by doing so often enhance the decision making process, but the methods and rationales are not always clear.

Addressing the internal barriers within local authorities, Problem 2 noted that there are structural barriers within local authorities resulting in a lack of effective communication between those responsible for planning and delivery at different levels. In other words, there is a lack of communication which is institutionalised within local authorities (such as between county and district councils or local and regional governance). The UK two-tier system also traditionally splits transport and planning (the former is at a county level, the latter at a district level). These cultural barriers in local authorities are reinforced by a sectoral, departmental and disciplinary approach to transport planning. Perceptions and outlooks hinder the ability of officers to think and act creatively and flexibly. This is partially attributable to fragmentation but the case studies (see below) also found that perceptions of roles and responsibilities are also somewhat clouded by a lack of understanding of who is responsible for particular aspects of work or, where responsibilities are clear, by their abrogation to other sectors.

There are further barriers between the LA officers and LA elected members in developing policy for more sustainable transport solutions: the first DISTILLATE questionnaire (Hull 2009) highlighted the importance attributed to elected members at the problem identification stage. Change (or uncertainty) in local authority political leadership was identified throughout DISTILLATE as being a significant barrier. The study also found that elected members sometimes inhibit policy changes (such as congestion charging) as there is often a greater emphasis on perceptions of public acceptability than on evidence of effectiveness. This issue was also raised in a partner workshop where some officers commented that there is a lack of understanding and effective communication between officers and elected members.

Problem 3 stated that there are barriers created due to lack of effective communication between support tool developers, support tools users, and the users of the information generated by decision support tools. It went on to hypothesise that these barriers were created by the lack of trained personnel and other resources to implement tools, use appropriate indicators, models and

best available knowledge and by negative perception of tools, approaches and models by local authority officers and members. These latter barriers are treated further more detail in section 3.

The *Guide on Partnership Working* (Forrester 2008a) (Section 2) focused on Problems 1 and 2, while the web-based tool (Section 3) tackled Problem 3. Funding was not awarded to research the specific issue of partnership with the public.

1.3. Initial research and Case Studies

The context for the project was established through a series of case studies and literature reviews, as summarised in two early deliverables, the 'Structures Report', *Understanding the Structure of Institutions Responsible for the Delivery for Sustainable Urban Transport* (Forrester & Snell, 2006) and the 'Processes Report', *Understanding the Processes of Policy Delivery for Sustainable Urban Transport Reports* (Tricker *et al* 2007). Within DISTILLATE, from the outset, it was recognised that local authority actors differ in their values, assumptions, in the range of resources available to them as well as in the formal and informal rules and constraints under which they have to work. These differences depend on their organisation and the scale of governance at which they operate (*e.g.* Passenger Transport Executive (PTE), County Council, Unitary Council or District Council). The reports largely dealt with these non-material things as processes: under structures, they considered things like resources and formal institutions (see Table 1).

Table 1. The relationship between process & structure and the issues influencing organisational delivery (after Forrester et al., 2006)

Processes	Structures
internal mechanisms and practices	the values of key actors
	the assumptions key actors hold
	key actors' organisational responsibilities
the range of resources available to key actors: • finance • use of time • political process • staff • knowledge and skills	the range of resources available to key actors: • finance • structural allocation of time • political context (including political cycles) • access to the 'action arena' (i.e. Knowledge and Power)
actors' interpretations of formal and informal 'rules' (at the micro-level, a.k.a. rules for individual behaviour)	actors' interpretations of formal and informal 'rules' (at the macro-level, a.k.a. rules for institutional and organisational behaviour

While the Guide (Forrester 2008a) flags up the need for structural changes (such as to political and institutional behaviour) it realises that these changes to 'the system' are often outside the power of local authority practitioners, planners, executives or members to bring about. However, with respect to partnership working, there is always room for improvements in the processes adopted. Fortunately there is currently a real prospect for such improvements in the UK, given the opportunities offered by changes to the wider context within which transport decision making operates such as to Local Area Agreements[3] and City Region planning[4], and the anticipated Action Plan of the EC Green Paper on Urban Transport.

Approaches to working practices were also summarised in the Processes Report (see Table 2):

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[3] Local Area Agreements are documents which set out the priorities for a local area agreed between central government and Local Strategic Partnerships (LSPs). The LSP is the local authority working in partnership with other local stakeholders. See the DCLG website at http://www.communities.gov.uk/localgovernment/performanceframeworkpartnerships/localareaagreements/ for more details on both of these.

[4] City Region planning is where local authorities are grouped, not in Regions based on electoral and political boundaries as they currently are, but around a major urban conurbation.

Table 2. Comparison of formal and informal working practices (after Tricker et al 2007)

Formal working practices	Informal working practices
EXPLICITLY CONSTITUTED	NATURAL/SPONTANEOUS/CASUAL
• Controlled by senior managers	• Between individuals
Perform a specific task	Function supports friendship, mutual help, and confirmation of specific beliefs and ideologies
• formal rights and obligations	• develop through a variety of forces
• behaviour formatted and constrained	• contain people from various sections/levels who have something in common (beliefs, fears, aspirations, energy)
• formal group leaders	
• codified structures, rules and procedures	• may be formal members of other workgroups
• behaviour based on division of labour, through filling of well-established/historical roles	• 'cliques' – horizontal/vertical(different ranks)/sundry employees
• roles have titles, job descriptions, contracts	• may be ephemeral or unstable
• more or less permanent and relatively stable	• networks poorly defined and cut across regular channels
• networks well-defined and follow formal lines	• interpersonal relations are spontaneous
• interpersonal relations are prescribed	

The Processes Report made clear that *prescribed processes* can appear to be attractive solutions, but even where processes – and even policies – are prescribed, there is still a need for effective communication and partnership working in order to bring about the fundamental changes to actors' norms and understanding that are necessary for sustainability.

The research on partnership working was also grounded in its own series of case studies with UK local authorities working at a range of governance levels from Passenger Transport Executives – which need to work with national, regional, and local stakeholders, through county councils – relatively large sub-regional bodies with a range of sectoral powers and interests, through to local councils – again with a range of local powers and interests. These case studies also exemplified a range of interests from strategic policy setting to scheme planning and delivery.

Case studies showed that those local authorities which invested in their partnership-working strategies tended to have longer lasting outcomes than those who just treated 'stakeholder engagement' as an ad-hoc necessity. Further, case studies also showed that transport practitioners – even those with a sophisticated understanding of policy processes – who did not invest in partnership working tended to run into more problems with delivery of strategies and schemes. The case studies were drawn in the main from DISTILLATE partners but the Guide also presents two additional Welsh and Scottish examples. Close collaborative working practices between different bodies such as Passenger Transport Executives, local authorities, developers, Urban Regeneration Companies, transport providers and other agencies responsible for the implementation of transport policy measures have been a key feature in these case studies.

The PTE and county council case studies in particular showed how partnership working could help overcome the challenges presented by working with those who can provide direct transport solutions. Similarly, better understanding and communication between sectors and across local authorities was shown by case studies to help address understanding and engagement with

regional and local regeneration agendas. The Guide addresses not only the logistics of cross-sector and inter-organisation partnership working but also the context within which local authority partnerships should work. By doing this is encourages local authority transport officers to think less about how to get other sectors to engage in transport policy cycles and more about how to get transport problems addressed – and solutions delivered – within other policy cycles.

The DISTILLATE questionnaire results (Hull 2009) revealed the importance respondents give to the involvement of members of the public in the decision making process and this was borne out by the case studies. However, the case studies identify the difficulties with public involvement: members of the public often have conservative views and are unwilling to embrace change, which is a considerable barrier to sustainable transport. There is also an indirect barrier in the need for politicians to please members of the public because officers need agreement from politicians in order to implement policy options.

The questionnaire also endorsed the points of Problems 1 and 2, finding that divided responsibilities for delivery, physical locations of different departments, and different stakeholder procedures all act as barriers. While unable to address the structural basis of these problems, DISTILLATE was able to suggest process solutions through better partnership working.

2.   The Guide on Partnership Working

A great deal of the work involved in the planning and delivery of transport policy involves partnering with other individuals in the same organisation and/or with other organisations, often in quite complex arrangements. The Guide on Partnership Working was designed to assist transport practitioners in understanding partnership working and in using it better for the delivery of sustainable urban transport systems. It is designed as a non-technical handbook to steer practitioners through the processes of inter- and intra-partnership working where a partnership is defined as "any *agreed*, *structured* cooperation between two or more parties, usually formed to allow partners to do something together that they could not do separately" (Bryson *et al* 2006).

However, there already are partnership guides which address the issue of partnership working and engagement so it was realised early on that there was no need to reinvent, but rather to develop these guides and make them more accessible and understandable by the audience they were designed for, particularly in addressing the need for partnership working. Further, most of the guides available to transport practitioners are written from the perspective of getting actors from outside the transport arena or outside local authorities involved in transport processes. This DISTILLATE Guide was instead designed to help transport practitioners to stop thinking about getting others involved in transport solutions as an end point in itself but instead to think about how transport problems could be solved jointly with those others and how transport solutions could contribute to solving these others' problems.

The Guide was delivered to directly help address most of the barriers listed under problems 1 and 2 in the LFA and indirectly help the remainder. The function of the Guide is, thus, simply to help practitioners overcome the barriers to more meaningful partnership working and delivery. Key principles that have a bearing on effective partnering with individuals in the same organisation and with other organisations are addressed. The Guide discusses how such partnerships should be constituted; the quality of the relationship among the partners; who takes the lead on different aspects and how the partners engage with each other and to what purpose. It presents examples from the literature and from case studies. It identifies five 'Options for partnership' and nineteen 'Factors which can militate for success' and deals with each of these.

A study of the sources used to produce the Guide (see Forrester 2008b: Table 4) shows that the factors suggested by different disciplines and different approaches are in no way mutually exclusive: some factors that help in the delivery of sustainable policy integration also help make partnerships work, and structural factors such as the need for a strong 'champion' are valid across the board. While no one factor alone will make a partnership successful, in order to maximise the potential for delivery it was suggested in the Guide that practitioners should be aiming to achieve a significant number of these factors from the literature. The 19 factors identified are both structure factors (factors 1 to 11) and process factors (12 to 19) but for the sake of clarity they are all presented in the Guide as a single list, as shown in Table 3.

Table 3. the list of factors as it appears in the Guide

1. Partnerships should be well planned – don't just leave them to chance;
2. Partnerships work best when there are champions at all levels and in each sector;
3. Partnerships work best when the role of each partner is clear;
4. Partnerships work best when there are good internal communications;
5. Partnerships should build upon the strengths of partners and powers and tasks should be reallocated within the partnership to make the best use of partners' strengths
6. Partnerships work best when power relationships are equalized within the relationship;
7. Partnerships work best when decisions are taken at the centre of the partnership and in a transparent manner;
8. Partnerships work best when partners work in an open and sharing manner and trust is engendered;
9. Partnerships work best when the staff are located near to each other and where there is continuity of staff;
10. Partnerships work best when there is a clear link between the agendas of the participating actors and agencies, this can foster a business approach rather than an enforced 'bureaucracy' approach; and, finally,
11. Partnerships can be helped by mandatory requirement.
12. Partnerships are most likely to succeed when there is agreement as to the nature of the problem, and actors and agencies have similar goals and a similar 'world view';
13. Partnerships are most likely to succeed when actors and agencies both have a need for partnership working and when both can gain benefit through partnership working (acknowledging that this may be in time of difficulty for actors and agencies operating individually and also where the risk of failure is greater without the partnership);
14. Partnerships are most likely to succeed when partners have access to full information on the consequences of their choices and the decisions taken by partnerships should be evaluated as well as appraised;
15. Partnerships work best when there is a history of collaborative working upon which to build:
16. Partnerships work best when successes are recognised and built upon to create institutional learning;
17. Partnerships work best when there is political support;
18. Partnerships work best when evidence is separated from politics;
19. More cross-sectoral assessment tools are needed for use by cross-sectoral partnership actors.

For the purposes of the Guide, it was also necessary to introduce some background concepts to help understand the social and political structures within which partnerships can work. The Guide seeks to locate the transport planner at the centre of a wider milieu: it is important to recognise that strategies and goals are derived from this wider milieu; further, this wider milieu provides the standards ('norms') for deciding what *can* be done and what *should* be done. In other words, what *can* be done in terms of transport planning may not be possible in terms of what can be done politically or what should be done to bring benefit in terms of delivery of more sustainable outcomes to other sectors. The Guide and the case examples therein (Forrester 2008a: 19*ff*) are relevant in that they show how transport policy practitioners can proactively overcome the barriers outlined in section 1.2 of this paper.

3.   Communicating   the   DISTILLATE   products: the   Web-based Dissemination Tool

The web-based dissemination tool sought to address the third and last of the problems of the LFA problem tree (see section 1.2), and particularly the uptake of decision support tools, by helping practitioners access and use – appropriately – the other tools and guides produced by DISTILLATE as a whole.

DISTILLATE has undoubtedly produced a number of potentially useful products, but case evidence suggests that they would not be used – or certainly not be used to the fullness of their potential – unless likely users are better aware of them. Further, users' preferences and priorities are shaped by how they frame and interpret sustainability issues. Issues such as political will and public opinion also influence decisions taken. However, there is also a more institutional barrier which is the lack of adequate coordination mechanisms for sharing and using knowledge once it is created by processes such as double loop learning. The DISTILLATE web-based tool is designed as a framework within which practitioners (often decision makers themselves or technical officers who advise political decision makers) can better identify and utilise the tools produced by the research programme in order to help them address all the key issues and 'in the right order'.

From the DISTILLATE Scoping Study and from interviews with local authority officers during the case studies, we knew the need for a clear presentation. The process of policy learning has been described as "unsystematic" at best (Marsden et al., 2009). This was backed up by a review of literature looking for similar cases of communication of approach – rather than communication of fact(s) – to practitioners. In any linear communication there is a sender (simplified in this case as DISTILLATE), a message (the tools and guides) and a receiver (the practitioners). For the DISTILLATE outputs to have policy impact there needs to be iterative communication at the design stage but there also needs to be clear and effective linear communication at the end stage. Thus, the research and the communication of that research can be considered the two posts holding up the lintel of 'having a policy impact'. What gave DISTILLATE a head start in this process was the fact that the research itself was informed by iterative communication with practitioner-users.

The initial questionnaire (Hull, 2009) and the case studies found that ease of access of information – often due to lack of staff time – was seen to be an important enabling factor for uptake of design and implementation support tools. Thus ease of access to the 'right' tools is a factor which the web-based tool set out to address. Further, as transparency of tools is often an issue, the framework was designed to be as transparent as possible to the user. The siting of the web-based tool on the UK government's Local Transport Practitioners Network (LTPN) website aids this, although LTPN users have to register to get access to the site (see http://distillate.web-labs.co.uk/distillate/ for direct access to the web-tool).

The decision tree or 'flowchart' type of approach to decision making is frequently seen in transport documents (e.g. see May (2005) and DfT (2004)) so it was decided to take a similar approach to facilitating practitioners' access to the DISTILLATE products. Having decided upon this approach, the next step was to test it with the DISTILLATE local authority partners, Steering Group and wider DISTILLATE community. A very simple mock up 'decision tree' was then designed. This approach was first tested outside the DISTILLATE community at the annual UK Transport Practitioners' Meeting (TPM) in Manchester in July 2007 where it received general approbation from the practitioner community at all levels (*i.e.* senior 'strategic' practitioners as well as other officers). An afternoon session was planned and held under the title 'Partnerships as a Key to Success in Transport and Regeneration Projects' and this attracted eleven attendees from Passenger Transport Executives, Transport for London, a range of local authorities, national government and private sector including consultants. The 'TPM decision tree' became the

nascent idea for the web-based tool to function as a dissemination portal for all of DISTILLATE. The main advice provided by the practitioner attendees at TPM was that any decision tree should ideally have no more than five layers and not be unnecessarily complex or time consuming.

One other issue which came up internally to the DISTILLATE partners was the need to have a linear approach. At TPM, practitioners suggested that a 'dip-in' type web-portal which would allow practitioners to very quickly access tools to help with the task in hand within, say, a 15 minute time limit would be preferred. However, in the final tool (see Figure 2) the practitioner-user is taken through the decision tree in a progressive manner so the structure is 'imposed' upon the user. Nonetheless, the short time requirement has been met.

The development of the web-based tool in its final form involved the entire group of DISTILLATE project managers, some of whom were familiar with this sort of approach and some less so. Thus, its production was itself a journey of partnership and an illustration of double loop learning at work – the initial question of 'how to communicate my research' becoming one of 'how does my research fit in' with what practitioners will need in using the online tool.

To use the tool, as finally designed, practitioners should use the instructions provided on an opening screen (see http://distillate.web-labs.co.uk/distillate/). As the flowchart (Figure 2) indicates, the decision-making process is divided into distinct phases related to the process or implementation of a scheme or strategy. Initially, the user chooses to follow either the 'scheme-level design and implementation' or 'strategic-level policy design' route through the tool. This bifurcation of the user tool is to aid the correct identification of DISTILLATE products that are designed for scheme development or for strategy development (see also May 2009).

Within this bifurcate structure, users are guided through a sequenced series of questions relating to: objectives, indicators and targets; problem assessment; possible instruments; assessing effects of instruments; and consideration of barriers. At the end of the process, depending on whether users started by following the scheme or strategy line of questioning they are then invited to think whether their scheme could be enhanced by being part of a strategy, or whether they now need to identify schemes that might be part of their strategy. The actual design of the flowchart is not apparent to users of the website but it gives the whole process logical structure and users are shown a 'locator' on the left-hand side of the screen to show which stage they are currently considering.

The scheme or strategy details are entered by the user at the start of the process, and, at the end of the process (which should take only 15 minutes or so) detailed information on recommended DISTILLATE products is provided. This is in the form of a paragraph describing each relevant product (guidance or tool), and contact details and a web link. The weblink takes the user either directly to the guidance document or to a three-page summary document describing a tool and how to access it. The output can be viewed on the screen and also downloaded and saved or printed. Further information on the web-based tool and its design and creation can be found in the 'Report on Research' on the DISTILLATE website at www.distillate.ac.uk/outputs/products.php.
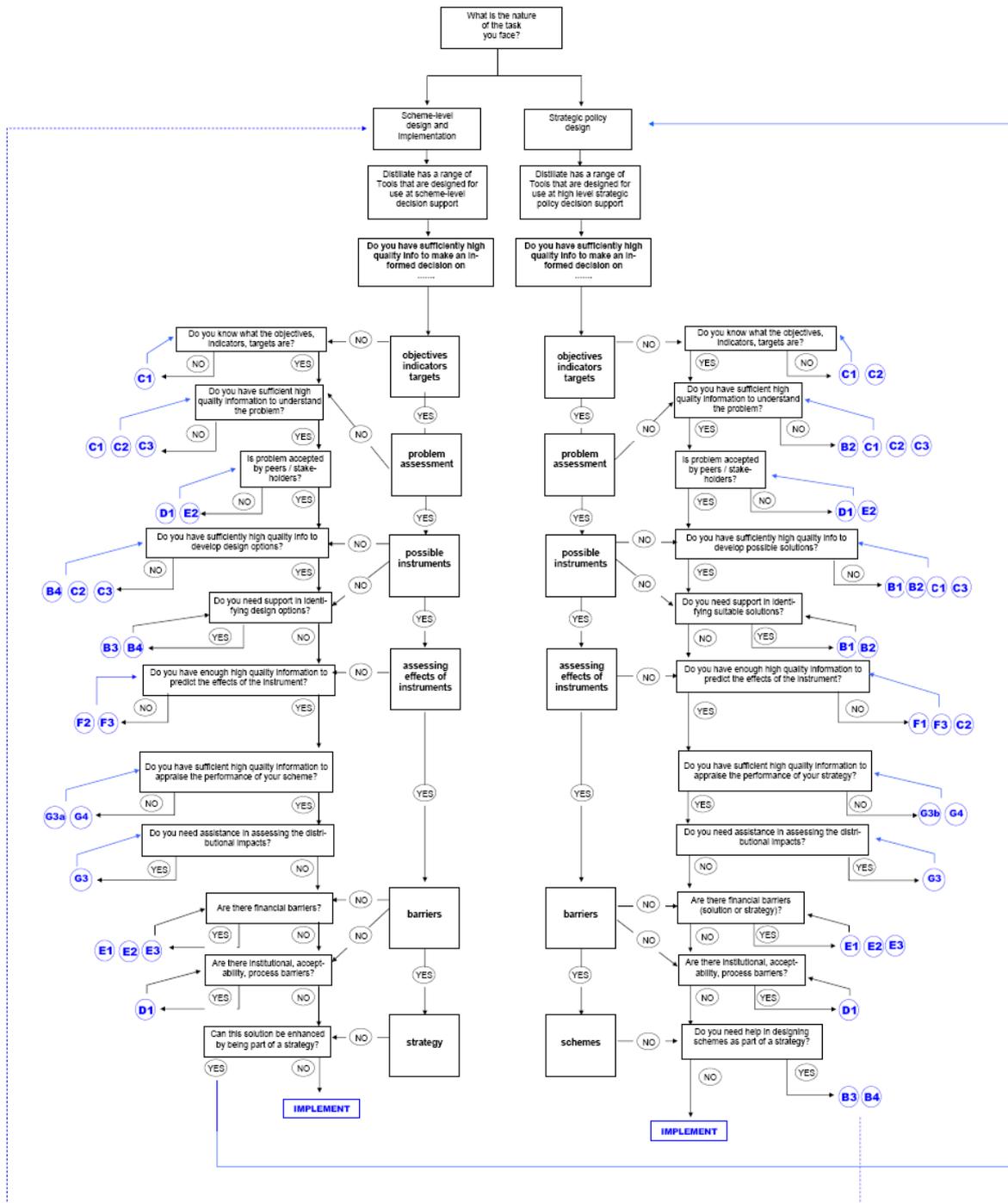
Figure 2. the 'flowchart' or 'decision tree' structure of the online tool (Figure prepared by David Watkins of Heriot Watt University).

Key to Figure: the square boxes (centre) are the stages through which the user is guided; the rectangular boxes are questions to which the user must chose an answer; and the letters in circles, C1, B4, F2, etc., are the DISTILLATE products to which the user is guided.

The main conclusion from the internal working practice leading to the development of the web-based tool is that no one organisation or individual – and no one academic or practitioner discipline – could have designed and populated the whole tool on its own. Further, the resolution of contradictory approaches – the branching decision tree and the linear sequence – was not a process which a traditional 'design and build' engineering or physical sciences research project would naturally handle so well. Sustainability in theory is easy; yet sustainability in practice is notoriously hard to define and measure. Yet this is exactly what researchers expect policy makers to do and to do it by processing information from decision support tools born out of disciplinary sciences which give partial answers to parts of problems. The DISTILLATE web-based tool attempts to get away from this. The final impact of decision support tools is clearly influenced not only by the complexity of the transport issue – which the science research addresses – but also by the complexity of the wider institutional context within which they work. Thus, our web-based 'portal' is designed to be an efficacious 'library' of the DISTILLATE decision support tools which can take into account the complexity of the system into which information is being presented.

4.   Discussion of DISTILLATE's interdisciplinary approach

DISTILLATE was one of the cross-disciplinary research projects set up by the EPSRC under the *Sustainable Urban Environment* (SUE) programme. One rationale for this approach lies in a growing realisation that the problems of sustainability demand solutions more encompassing than any one single discipline can provide. Within the SUE programme several consortia were set up to engage across traditional disciplinary backgrounds. From anecdotal evidence gleaned from some of those other projects, it appears that there has been mixed success in getting the sciences to work together successfully. It can be hypothesised that DISTILLATE's success is largely due to the vision and previous experience of the Principal Investigator, co-investigators and project managers. Working practices within DISTILLATE allowed the programme of research to try some novel solutions to produce 'sustainability knowledge' (Kasemir *et al.* 2003). How to create sustainability knowledge is not (yet) a known art. It is an emerging area and, in general, the greater and more wide-ranging the vision of the project or programme the more difficulty there is in creating trans- or even interdisciplinary success. Thus, it might be hypothesised that DISTILLATE, being the SUE transport consortium with the most wide-ranging and all-encompassing vision, would be the least likely to succeed in generating successful interdisciplinary outputs.

4.1.   Evidence for double loop learning within DISTILLATE

In order to understand the double loop learning nature of how the DISTILLATE research programme addressed the problems identified in Section 1.2, it is necessary to look back at the research background to the web-based tool as it was designed, and the principles and practicalities involved in its design and how these changed over time. The web based tool (Section 3) was initially conceived and designed as a conventional communication tool within this one project. However, the actual production of this web-based tool, as well as requiring iterations with end-user practitioners also necessitated the skills of all the Project Managers of the other DISTILLATE projects and well as direct skills input from several partners to bring it to fruition. This process also radically changed the design of the tool. This change operated by a process of partnerships within the research project itself.

In a parallel field (water management), it has been recently been argued that 'there is need for a paradigm shift' in management. It has been suggested that this new paradigm should include the following elements: participatory management and collaborative decision making; increased integration of issues and sectors; more attention to human behaviour by 'soft' measures; the

explicit inclusion of the environment in management goals; open and shared information sources (including linking science and decision making); and iterative learning cycles (Pahl-Wostl *et al*, 2008: 484-5 - abridged). All of these six elements were to be found in DISTILLATE's own internal working practices.

In addition, Design and Implementation Support Tools should encompass the knowledge of different stakeholders and sectors. Such an approach can be seen in several DISTILLATE projects: on *Option Generation;* on cross-sector *Indicators;* on *Partnership Working;* on *Funding* partnerships; and on cross-sector *Appraisal* of small and local schemes. Here, 'the essential function of quality assurance can no longer be performed by a restricted corps of insiders' (Funtowicz and Ravetz 1991). Yearley *et al* (2001) note that the need for extended peer review has met with approbation in European governance and also that it offers 'a warrant and, in some sense, a recipe for action'; in essence, that scientific expertise 'when applied to major policy problems is in need of complementary contributions' (*op.cit.*). This point is also well made in chapter 2 of the DISTILLATE Inception Report (May 2004) which further cites the European-inspired nature of DISTILLATE's research agenda.

It is acknowledged that communication and engagement are iterative processes and sustainability knowledge projects such as DISTILLATE need to listen to as well as talk to end users and practitioners. It is also clear, however, that having the most effective solution to a problem does not of itself generate an impact on policy or decision making. Put simply, the case needs to be made to the right people – those with power and influence over the decision in question – and they need to be engaged at the appropriate time in their policy cycle so as to be able to influence their decisions. This is not simply a linear communication process or even a process of consultation: 'the problem of dominant models implies that merely involving a wider group of advisors is not enough, because the diversity of viewpoints that might be the best tool for addressing uncertainty might easily be suppressed in the interests of achieving consensus' (Carpenter *et al.* 2009). Further, 'to expand the diversity of models, it is helpful to increase the diversity [as well as the number] of problem solvers on the team' (*ibid*).

In some of DISTILLATE internal project work, double loop learning (see section 1.1) can be detected and this, it is argued, indicates success in addressing some of the underlying principles of sustainability science. Within DISTILLATE there are several examples of collaborative working between researchers and practitioners – and between researchers from different disciplinary backgrounds – that has led to projects working in directions which they might not have travelled had they not carried out that collaborative work. This could be said of collaborative work on 'the social policy of indicator use' (Marsden and Snell 2009), and in the design of the small scheme appraisal method (Page *et al*, 2009) which were both influenced by social science-generated understanding of the problems faced by practitioners.

The option generation tool 'Rapid Appraisal Participatory Geographic Information System (RAP-GIS) for "Out-of-the-Box" Transport Option Generation with "Hard-to-Reach- Groups"' (Cinderby 2008) was undoubtedly influenced by the option generation project's own preparation work (Jones *et al.*, 2005); it was also influenced by thinking in this organisational delivery project, particularly with respect to re-framing of local, lay views so that they are interpretable by technical experts. The tool, described fully elsewhere (see Cinderby 2008), was designed to ensured that the option generation method helped these 'lay' views feed more directly into the policy process. While the necessity for extending the peer review base for public infrastructure planning is well recognised, there is also an emphasis on the need for authorities to open up continuing dialogues with communities and end-users to incorporate their views, preferences and valuable local insights into the process of urban design. The government's Urban Task Force (UTF) report suggests that '[t]oo often, design is imposed on communities rather than involving them' (UTF 2005). Further, the UTF has said that in many cases '[u]rban streets are over-

engineered to maximise traffic flow, pedestrians and cyclists [both usually locals] are still treated as second- or third-class citizens' (*ibid.*).

The outputs of the option generation tool – in terms of options generated for redesign of public space to facilitate walking and slow mode access – were assessed using the DISTILLATE small scheme appraisal tool (Kelly *et al.* 2008) which shows how these views can be appraised in a transparent and equally 'extended' manner. The tool 'allows users to select a set of indicators appropriate to their circumstances' (*ibid.*). Thus, taken together, these two DISTILLATE products on option generation and on appraisal allow a more direct involvement of end-users in the design and appraisal of small and local schemes.

Further, the design of both of these tools (with the same user practitioners) shows evidence of double loop learning by the researchers concerned. Neither tool would have been the same had it been designed in isolation, even if both groups of researchers had been working (independently) with the same group of practitioners. By working together, the appraisal tool designers became more aware of the importance of transparency and the need for the appraisal tool to 'make sense' within the [policy] sphere of the users. Equally, the option generation tool developers were more conscious of the need for precision and quantification so that the outputs of their option generation methodology could feed into the more quantified appraisal methodology.

5.   Conclusions

This project on organisational delivery carried out case study work with UK local authorities in order to inform its outputs and products. The resulting *Guide on Partnership Working* is a direct response to the need identified through preliminary and case study research. However, the (mainly) social scientists working on this project also needed to work in partnership with the other project staff within the DISTILLATE consortium. There are examples of successful partnership working between academic, consultancy and practitioner organisations as well as – over the life of the programme – clear evidence of academics and practitioners coming out of their compartmentalised ways of thinking to bring the DISTILLATE outputs together. The web-based tool is evidence of our own successful internal partnership working.

There is no doubt that solving the 'big issues' of environment and development, as DISTILLATE aspired to do, requires people to think 'outside the box'. Equally, there is no doubt that having a real impact with sustainability knowledge is not just about being 'right', but also about communicating knowledge, forming partnerships with those in positions of power and influence, following through from sustainable policy- and decision-making to translation into measures, so as to bring about more environmentally sustainable and [socially] equitable outcomes. However, the inherently complex nature of social systems means that while we often have (relatively) complete technical knowledge of the engineering processes we lack understanding of the social processes involved. The paradox is that although disciplinary science can help us understand the specific it lacks a framework to operate at the generic so we need the emergent knowledge that double loop learning can provide.

Thus, while in theory sustainability is easy, in practice it is notoriously difficult to implement as it is involves both uncertainty and complexity. Therefore, sustainable transport solutions to transport problems may be relatively simple but policy decisions are almost always complex. Researchers often expect policy makers to make simple solutions by processing information from decision support tools born out of disciplinary sciences which give partial answers to discrete parts of real world problems. Some of the DISTILLATE tools described above attempt to get away from this and allow decision makers and advisors to employ their own norms and understandings. The web-based tool in particular is an attempt to provide a 'decision support environment' rather than a single decision support tool. The final impact of decision support

therein is clearly influenced not only by the complexity of the transport issues – which the science research addresses – but also by the complexity of the wider institutional context within which it works.

The production of the web-based tool shows clear evidence of double loop learning occurring within the social context of the research team itself: the driving question for action moving from the 'academic'-led research to the practitioner-led utility of that research. Thus, DISTILLATE is an exemplar of the very message it tries to disseminate. In this paper, the concept of double loop learning has been reflectively applied to the DISTILLATE programme itself. By this process – it is contended – the programme managers came up with the web-based tool by an iterative process of questioning the utility of the tools they were producing and how they should be presented. This process of integration with end-users and the focus on utility and communication of outputs and products across the DISTILLATE programme has also resulted in several DISTILLATE projects producing targeted web-based summaries instead of (or as well as) lengthier academic reports.

Thus the design of the research programme, and the way it chose to communicate its outputs and products, has resulted in the high number of targeted guidance notes. Each has been specifically designed to meet a need identified by the transport practitioners themselves. Further, for the most part, it can be argued than no one organisation or discipline could have produced them on their own. This is a truism of sustainability knowledge/science. DISTILLATE thus has lessons for practitioners about how they think about sustainable solutions to support decision making and policy making for transport and infrastructure. It also has lessons for future interdisciplinary researchers and practitioners trying to grapple with these issues.

Acknowledgements

References

Argyris, C. and Schön, D. (1978). *Organizational learning: A theory of action perspective.* Addison-Wesley.

Bakewell, O. and Garbutt, A. (2005). The Use and Abuse of the Logical Framework Approach Stockholm. Swedish International Development Cooperation Agency (Sida).

Bryson, J., Crosby, B. and Stone, M. (2006). The Design and Implementation of Cross-Sector Collaborations: Propositions from the Literature. *Public Administration Review*, vol. 66, supplement 1, pp. 44-55.

Carpenter, S., Folke, C., Scheffer, M. and Westley, F. (2009). Resilience: Accounting for the Noncomputables. *Ecology and Society*, vol. 14, no. 1, pp. 13 [online].

Cinderby, S. (2008). DISTILLATE Product B4 – Option Generation Rapid Appraisal Participatory Geographic Information System (RAP-GIS) for 'Out-of-the-Box' Transport Option Generation with 'Hard to Reach Groups'. Available http://www.distillate.ac.uk/outputs/products.php (accessed August 2009).

DfT (2004). Transport Analysis Guidance. UK Department for Transport. Available from http://www.webtag.org.uk (accessed August 2009).

Forrester, J. (2006). DISTILLATE Project D: Improved Effectiveness in Organisational Delivery – Logical Framework Analysis. Available from http://www.distillate.ac.uk/outputs/Logical%20framework.pdf (accessed August 2009).

Forrester, J., Snell, C., Rosen, P., Hull, A. and Tricker, R. (2006). Understanding the Structure of Institutions Responsible for the Delivery of Sustainable Urban Transport DISTILLATE Deliverable D2. York, SEI. Available from http://www.distillate.ac.uk/outputs/reports.php (accessed August 2009).

Forrester, J. (2008a). The DISTILLATE Guide to Cross-sectoral and Intra-organisational Partnership Working for Sustainable Transport Decision Making. DISTILLATE Product D1. SEI: York. Available from http://www.distillate.ac.uk/outputs/products.php. (accessed August 2009).

Forrester, J. (2008b). Guidance to Partnership Working. DISTILLATE Research Report D1. Available from http://www.distillate.ac.uk/outputs/products.php (accessed August 2009).

Forrester, J., Gerger Swartling, Å. and Lonsdale, K. (2008). Stakeholder engagement and the work of SEI - an empirical study. Stockholm: SEI.

Funtowicz, S. and Ravetz, J. (1991). A new scientific methodology for global environmental issues. R. Costanza, (ed.), *Ecological Economics*. New York: Columbia University Press, 137-152.

House of Commons Public Administration Select Committee (2001). Sixth Report: Public Participation: Issues and Innovations. London: The Stationery Office.

House of Lords Select Committee on Science and Technology (2000). Third Report: Science and Society. London: The Stationery Office.

Hull, A. (2009). Implementing innovatory transport measures: what local authorities in the UK say about their problems and requirements. *European Journal of Transport and Infrastructure Research,* vol. 9, no, 3, pp. 202-218.

Institute for Public Policy Research (2004). Lonely Citizens: Report of the Working Party on Active Citizenship. London: IPPR.

Jones, P., Brooks, M., Lucas, K., Kelly, C. and Forrester, J. (2005). DISTILLATE Project B: Option generation – Literature Review & Annexes. University College London: Centre for Transport Studies.

Jones, P., May, A.D. and Cinderby, S. (2009). Innovative Appraoches to Option Generation. *European Journal of Transport and Infrastructure Research,* vol. 9, no. 3, pp. 237-258.

Kasemir, B., Jäger, J., Jaeger, C. and Gardner, M. (eds.) (2003). *Public Participation in Sustainability Science: a Handbook.* Cambridge University Press.

Kelly, C., Jopson, A., Menaz, B. and Forrester, J. (2008). Small & Local Scheme Assessment Tools. Deliverable G2 Research Report. ITS: Leeds. Available from http://www.distillate.ac.uk/outputs/products.php (accessed August 2009).

Marsden, G. and Snell, C. (2009). The role of indicators, targets and monitoring in decision-support for transport. *European Journal of Transport and Infrastructure Research,* vol. 9, no. 3, pp. 219-236.

Marsden, G., Frick, K., May, A. and Deakin, E. (2009). How do cities approach innovation and policy learning? Implications for Policy and Practice. Project Report for Volvo Research and Educational Foundation. Leeds: ITS.

May, A. (2004). DISTILLATE Inception Report, Leeds: Institute of Transport Studies. Available from http://www.distillate.ac.uk/outputs/reports.php (accessed August 2009).

May, A. (2005). The Decision Makers' Guidebook. Available from www.konsult.leeds.ac.uk/public/level0/l0_dmgintro.htm (accessed August 2008).

May, A. (2009). Improving decision-making for sustainable urban transport: An introduction to the DISTILLATE research programme. *European Journal of Transport and Infrastructure Research,* vol. 9, no. 3, pp. 184-201.

Page, M., Kelly, C., May, A., Jones, P. and Forrester, J. (2009). Enhancing appraisal methods to support sustainable transport and land use policies. *European Journal of Transport and Infrastructure Research,* vol. 9, no. 3, pp. 296-313.

Pahl-Wostl, C., Tàbara, D., Bouwen, R., Craps, M., Dewulf, A., Mostert, E., Ridder, D. and Taillieu, T. (2008). The Importance of Social Learning and Culture for Sustainable Water Management. *Ecological Economics*, vol.64, issue 3, pp. 484-495.

Tricker, R., Hull, A., Snell, C. and Forrester, J. (2007). Understanding the processes of policy delivery for Sustainable Urban Transport Solutions DISTILLATE Deliverable D1. Bristol, UWE and available from http://www.distillate.ac.uk/reports/reports.php (accessed August 2009).

Urban Task Force (2005). Towards a Strong Urban Renaissance. UTF, London.

Yearley, S., Forrester, J. and Bailey, P. (2001). Participation and expert knowledge: a case study analysis of scientific models and their publics. In: Hisschemöller, M., Hoppe, R., Dunn, W.N. and Ravetz, J.R. (eds.) Knowledge, Power and Participation in Environmental Policy Analysis. *Policy Studies Review Annual*, vol. 12, Transaction Publishers, New Brunswick and London, pp. 349-370.