Chapter Seven –

Analysis of Participants' Experience

7 Chapter Seven - Analysis of Participants' Experience

7.1 Introduction

DesignWays was developed to provide useful tools in the endeavour to translate global sustainability principles to practice. This endeavour will require not just the participation of a wide range of stakeholders, but also a high quality of communication and dialogue. The DesignWays process seeks to explore new relationships between individuals, societies and ecological systems. It has been developed in the light of paradigm shifts in several fields, from education to science, which can be seen as a reaction to a mechanistic and reductionist philosophy. It aims to create a tool for applying systems and holistic thinking to participatory planning, following an intellectual tradition that has roots in the philosophy of Aristotle and a long lineage of development leading to recent insights in complexity theory and new paradigm ecology (Capra 1996; Tarnas 1991). In this chapter the attributes of DesignWays, and the components used to express them, are analysed.

7.1.1 Structure of this Chapter

The main headings of this chapter are the five key attributes of DesignWays. Each of these sections is organised around the components of DesignWays (introduced in Chapter 5 in the tables comparing different participatory methodologies). Participants' experience of the Irk and Moston Vale planning processes is analysed, using data from in-depth 'before' and 'after' interviews, participants' journals and observations from the facilitator and regional stakeholders. Close attention is paid to participants' experience of the process as a learning tool.

Figure 7-1 Research Methodology - Step 5
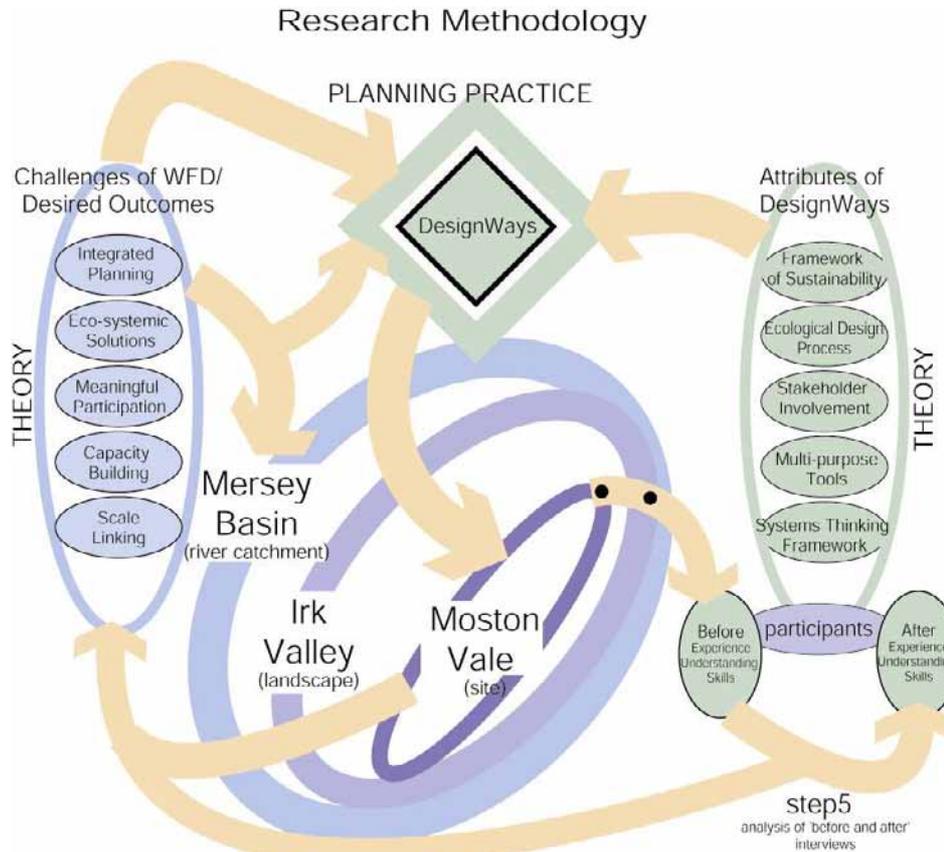
7.2 Attributes of DesignWays

The theoretical underpinnings of the five attributes of DesignWays were discussed in Chapter 5. The attributes are (also Figure 7-2):

1. educational framework of sustainability;

2. ecological design process;

3. creative involvement of stakeholders in planning process;

4. scaleable design language to link different geographic levels of scale;

5. and underlying framework of systems thinking.

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Figure 7-2 Attributes of DesignWays

5 key attributes of designways

These attributes are expressed through both the stages of the Design process and in the physical structure of the toolkit. The previous chapter described the stages of the DesignWays process, and highlighted the results from each stage.

The relationships between the Irk Valley planning workshops, the 12-stage DesignWays process and the five attributes of DesignWays are shown in Table 7-1.

Table 7-1 Relationship between workshops and DesignWays attributes

12 Stages of DesignWays		Workshop Titles for Irk Valley Process	Attributes Of DesignWays				
			educational framework of sustainability	ecological design process	creative involvement of stakeholders in planning process	scaleable design language to link different geographic	underlying framework of systems thinking
1	Creativity	Envisioning the Future – mind mapping and brainstorming new ideas	Some	Strong	Strong	Strong	Some
2	Context	Site visits and walks & Context: Existing Resources – introduction to the EASEL	Strong	Strong	Strong	Strong	Some
3	Sustainability	Quality of Life and the Environment The Natural Step & Analysis of Flow	Strong	Strong	Some	Strong	Strong
4	Limits and Solutions	Integrated Decision making – Problem tree analysis and developing goals	Some	Strong	Strong	Strong	Some
5	Values and Goals		Strong	Strong	Strong	Strong	Some
6	Filtering Ideas	Ecological Design - Nodes and Networks, application of ecological design principles	Strong	Strong	Strong	Strong	None
7	Ecological Design		Strong	Strong	Strong	Strong	Strong
8	Landscape Analysis	Landscapes – mapping historical and ecological resources	Strong	Strong	Some	Strong	Strong
9	Integrated Decision making	Design Synthesis – making connections, where do the ideas go?	Strong	Strong	Strong	Strong	Some
10	Design Synthesis		Strong	Strong	Some	Strong	Strong
11	Action Planning	More Design work and Discussion of the process & Final presentation to wider stakeholder group	Strong	Strong	Strong	Strong	Strong
12	Implementation and Review		Strong	Strong	Strong	Strong	Strong

Legend	
Strong relationship	■
Some relationship	▨
not applicable, or no relationship	☐

7.3 DesignWays Attribute 1 - Educational framework of sustainability

DesignWays is a toolkit to enable participation in planning. Unlike several of the participatory planning processes introduced in Chapter 5, it is based on a framework of sustainability. The methods used to explore this framework and apply it to planning are explored below.

7.3.1 Explicit focus on sustainability

Early in the DesignWays process participants are taught The Natural Step (TNS) framework, and are then asked to brainstorm ideas of how to make the project more sustainable. This session can also be used as a stand-alone workshop, to which more stakeholders are invited to add their input. In the shorter series of workshops for Moston Vale, the principles were introduced briefly, using the same colourful diagrams to develop the concept, but in less depth.

Several participants saw education about sustainability as an important factor in the process. One participant started the process saying he felt that many people who used the term sustainability often did not take the concept seriously:

> "Sustainability is just a word that is used all over the place. People often don't sufficiently understand what they are talking about, after all, it is a complex issue, especially when considering the often competing needs of environmental, social and economic sustainability".

He said this was the most important aspect of the process for him, going on to explain:

> *"The system conditions seemed to be very objective, you can measure them, but also the way that this is approached, there is this clarity about what the issues were and the relationships between them"*
> *(Environmental Strategy Officer at City Council 2003a).*

One participant commented that the toolkit provided *"the bigger picture, it's hooks to hang things on and the big picture to slot into" (Environmental Education Warden at Mersey Valley 2003),* whilst another noted that the use of the TNS principles *"makes you think about things in a lot more detail than I would have done before" (Programme Coordinator at Red Rose Forest 2003).* A third advantage of including the science-based framework was that it *" offset the creativity…the back to school kind of stuff and*

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it is quite nice to remind people that it all links up with a strong principle because it brings it down to earth (Creative Director of Countryscape 2003b).

It was seen as important that the process *started* from a sustainability perspective, rather than asking people what they wanted and then *"cobbling it together at the end to make it sustainable" (Project Officer at Red Rose Forest 2003a). The Chair of MVRA (2003)* echoed this sentiment from a community perspective, she thought that the framework of sustainability was important *"because you set out with a difference from the beginning".*

7.3.2 Uses sustainability criteria in decision making

The TNS principles are used throughout the process, for example: in analysing resource flows in terms of their impact on sustainability, in filtering out ideas from the plethora of new ideas developed in brainstorming, and in the decision making process used to decide which ideas derived from brainstorming should be used in final plans (Figure 7-3). Icons are used to make the decision making process visible, and to encourage dialogue about the system conditions, which helps participants to better understand how to apply the model. The metaphor in these icons is that of a warning triangle. One participant described the value of using of the triangles in the decision making process, *"That encouraged people to talk about things…. That was really interesting and beneficial" (Programme Coordinator at Red Rose Forest 2003).*

Figure 7-3 Icons used in testing ideas against TNS system conditions
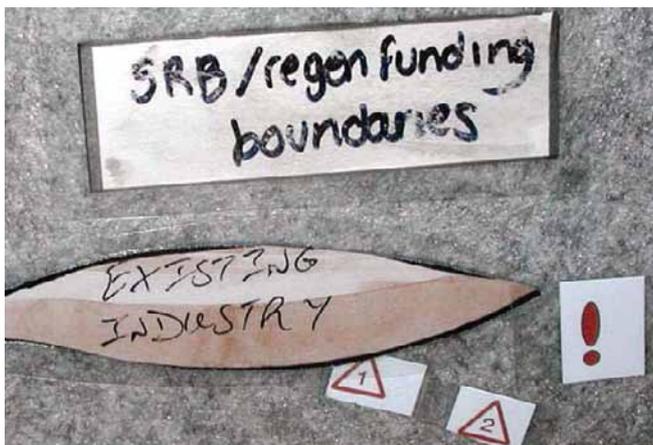
Community members considered the fact that the TNS principles were integrated into the stages of DesignWays in an active process as important: *"I think it was just being involved in it. You don't think about things like that normally. Being involved made you think about them" (Chair MVRA 2003).* The *Project Officer at Red Rose Forest (2003a)* commented that this process *"was the most confusing and generated the most discussion".* The value of this came from the fact that *"you have to actually think about it to discuss it."*

7.3.3 Focus on social capital

The concept of social capital is a central theme in DesignWays. One of the full EASELs[55] is dedicated to social capital (Figure 7-4). Its use encourages participants to think of skills, knowledge, institutions and networks in the area that can help to implement plans. Max-Neef's (1991a) nine fundamental human needs (introduced in Chapter 5) are used as a tool to help participants clarify goals and to deepen understanding of the fourth System Condition of the TNS framework[56]. Using this framework stimulated lively discussion about the aspirations of participants, which the plans could help meet. It furthered debate about the social sustainability of the ideas being proposed.

Figure 7-4 Use of prompts to stimulate discussion about fundamental human needs

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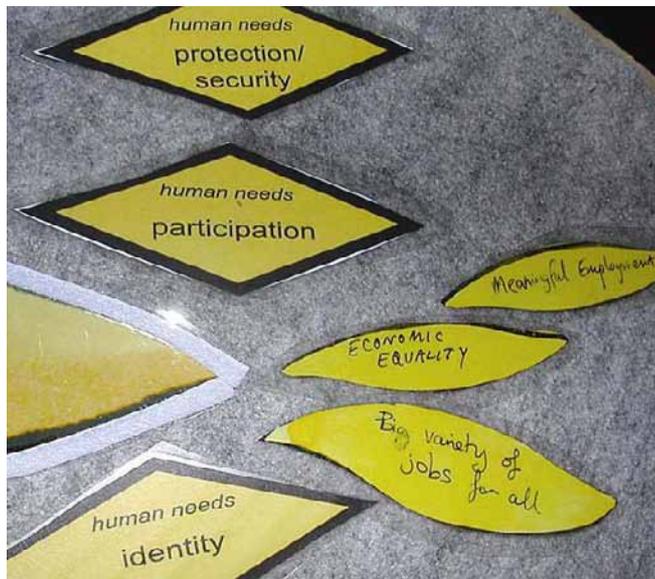
[55] **EASEL -** Framework for organizing design information using Mind Maps under the headings:
Economics, **A**ctivities, **S**ocial Capital, **E**lements and Settlements, **L**andscapes
[56]TNS System Condition Four - In a sustainable society human needs are met worldwide.

7.3.4 Focus on environmental integrity

The ecological design process and tools used in the DesignWays process help participants to apply the principles of TNS. The 'Analysis of Flow Chart' (Figure 7-5) is used to broaden participants' understanding of the many different flows of resources that go into making and running different structures and elements. These inputs and outputs are analysed against the TNS system conditions, to indicate negative environmental and social impacts and thus areas for potential improvement.

Figure 7-5 Analysis of resource flows against TNS system conditions
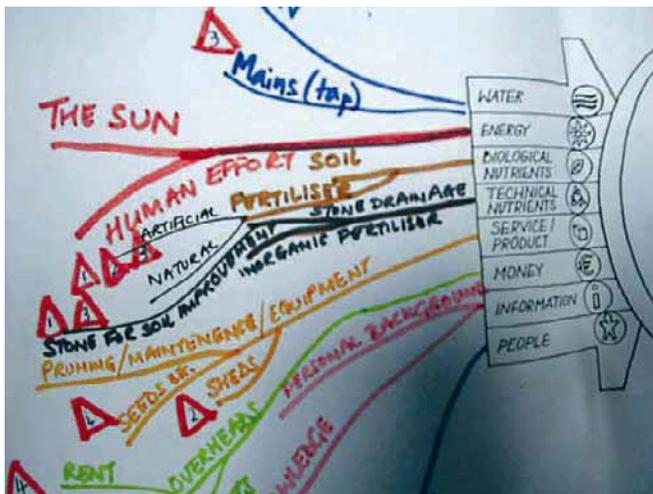
One participant reflected in her journal: *"It appeared that most of the violations of the (TNS) system conditions occurred in the input phase rather than the output phase. This illustrated how we need to develop 'upstream thinking' in order to address these violations" (Environmental Studies Lecturer at Greater Manchester HEI 2003b).*

The 'Landscape' component of the EASEL encourages participants to think of their area in terms of the water cycle, energy flows, the mineral cycle and the ecology of the area. Later in the process, the stage 'Landscape Analysis' deepens participants' understanding of the underlying ecological processes that inform the landscape. The subsequent stage Design Synthesis encourages participants to consider the integration of human infrastructure in the landscape in a way to minimise negative environmental impacts, and, where possible, to enhance the ecological integrity of the area.

7.3.5 Focus on economic vitality

The Economics EASEL encourages participants to think of the project resources in terms of income, outgoings, financial capital, physical assets (such as land), buildings, tools and machinery, and non-physical assets (such as intellectual property). Different financial systems that can help to increase economic resilience in the area are explored, both in terms of existing assets and future possibilities.

An advantage of TNS discussed in the literature is its use in developing a shared mental model of what sustainability actually means. The value of this process for encouraging dialogue and questioning of current trends was borne out in the workshop held for local businesses as part of the Irk Valley planning. Representatives from management, marketing and development from HMG Paints and Milliken Industrials, a representative from North Manchester Partnerships - Economic Development, several Project Officers (Groundwork, IVP), and an academic who sits on the MBC Research Advisory Group attended this workshop. Both businesses are considered to be models of environmental excellence, and have won awards for environmental performance. Business participants questioned their development trajectory and developed further ideas for improvement. Several participants commented that the dialogue exceeded their expectations, and challenged them to rethink their business processes.

7.3.6 Summary

DesignWays aims to provide a tool for clarifying value judgements and relating them to possible future options, within a framework of sustainability. TNS is not the only tool that can be used as an educational framework of sustainability, but it does provides a valuable tool for encouraging dialogue and shared understanding. The advantages of the TNS framework were emphasised by several participants, including some with wide experience of sustainability planning. These included:

- *"it has broadened, and given me a more refined idea, of sustainability, I mean it is such an ambiguous term" (Creative Director of Countryscape 2003a)*

- *"getting to grips with a very complicated subject" (Irk Resident 2003b)*;

- *"very interesting, and somebody had put a lot of work to break it down into something quite simple" (Project Officer at Red Rose Forest 2003a)*;

- *"I think more positively about sustainability and how I could share that information with the public and community groups" (Environmental Education Warden at Mersey Valley 2003)*;

- *"much more objective benchmark that you could use to test ideas" (Environmental Strategy Officer at City Council 2003b)*;

- *"it would be quite difficult to either miss a connection or miss an important relationship between how things relate to each other" (Environmental Strategy Officer at City Council 2003b)*;

- and *"it has given me a bit of hope really!" (Environmental Education Warden at Mersey Valley 2003)*.

Several participants (at both levels of scale) found the framework hard to understand. This was reflected by one participant who said, *"I've not got a science background, I found some of the stuff quite hard to grasp and the questions you were asking quite hard to grasp". S*he emphasised the need to have more than one opportunity to learn the framework[57] (a need echoed by several participants) *"the first time I heard it I thought, 'wow that is brilliant'. The second time I heard it I started to understand it!" (Community Liaison Officer at City Council 2003a).* All respondents, however, felt it was important to introduce TNS in the workshops at each level of scale.

DesignWays is essentially a tool to help develop a picture of future possibilities, such that outcomes are more likely to be sustainable. It aims to fill the gap between having an overview of a sustainable society, which is provided by the TNS framework, and having the skills and capacity to imagine an area, landscape, town, business, or neighbourhood within that long-term view. Ecological design can help participants imagine such a future.

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[57] The framework is repeated several times during the full series of workshops. Participants are also invited to attend workshops at both levels of scale, which offers both an opportunity to repeat sessions, and see how they are tailored to different levels of scale.

7.4 DesignWays Attribute 2 - Ecological design process

Ecological design is a powerful tool for developing new options and integrating them into a particular context. The premise of ecological design is that the way we design buildings, industrial processes, landscapes and settlements needs to be changed in order to take ecology into account. As discussed in Chapter 5, ecological design implies the application of creativity as well as scientific understanding.

7.4.1 Use of creative thinking tools

Discussing participation in the design process Enserink (2003, pg. 315) suggests, "*the absence of stimulation of participant creativity*" can inhibit the production of '*better outcomes'*.

In DesignWays, several techniques are used early in the process to help develop a future vision of what participants would like to see. Creative thinking techniques are taught to aid the development of 'out of the box' thinking and developing innovative ideas (e.g. 'po' exercises – suppose… Buzan and Buzan 1993; de Bono 1990a, 1992). The use of the 'leaves' and simple Mind Map structures helps to make alternative possibilities visible to different members in the group (Figure 7-6).

Figure 7-6 Use of prompts to encourage creative thinking
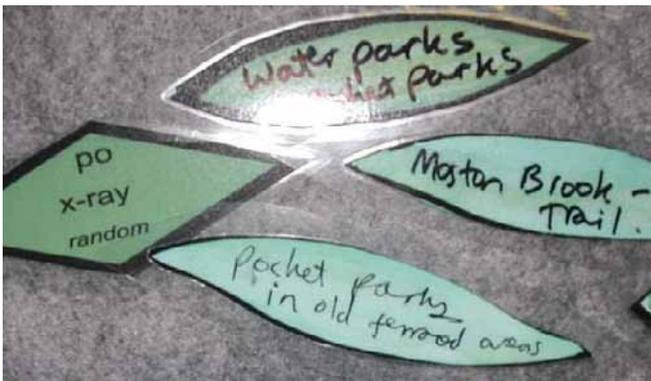
7.4.2 Focus on maximizing existing assets

The DesignWays process encourages attention to the history and context of an area. Participants are asked to brainstorm existing assets and valuable characteristics of the area very early in the process. A focus on the positive attributes of an area can help to promote creativity, and is important in setting the tone of the process. Asset based development (Kretzmann and McKnight 1993) has roots in endogenous community development. Building upon existing skills, interests and capacities in an area is an important process in developing social capital.

Ecological design aims to maximize existing assets and to work with local resources. Given that ecological assets are inherently place dependent, this consideration of assets can be very important for enhancing ecological benefits.

7.4.3 Tools to apply ecological design principles

Ecological design principles, such as 'Stacking in space and time' and 'Enhancing diversity and connections', have been developed into an integrated system in the Permaculture methodology (e.g. Holmgren 2003; Mollison 1990).

In DesignWays these principles have been elaborated and ordered into a logical sequence of design, as discussed in articles written by the author for the WWF sponsored manual *Permaculture Teachers' Guide* (Tippett, J. 2000b, c). Participants are taught ways to apply ecological design principles, inspired by ideas from *The Manual for Teaching Permaculture Creatively* (Clayfield, Robyn and Skye 1995). There are several stages of thinking about the elements of the design and their associated resource flows. Interactive templates encourage thinking about minimising the environmental impacts of resource flows, the possibilities for reusing resources and ways to enhance beneficial synergies between elements. These are organised under the overall DNA Template™ under the headings:

- **D**esigning edge

- **N**odes and networks

- **A**nalysis of flow

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The metaphors behind these templates are described in more detail on pg. 305. The way they are used in ecological design is discussed below.

Flows of energy, water, biological nutrients, technical nutrients, money and information are considered as inputs and outputs to a design element (e.g. building, factory, farm, community forest). As described above, these flows are analysed against the TNS system conditions.

Figure 7-7 'Analysis of Flow' template

The information from the 'Analysis of Flow' charts (Figure 7-7) is used to develop more ecologically sound ways of supplying the inputs to elements (such as schools, households, or businesses), and new ways of using the outputs. The 'Nodes and Networks' charts (Figure 7-8) animate the process of finding connections between these resource flows, helping to apply the principle: 'all waste = food'.

Figure 7-8 Water and Energy Nodes and Networks Charts on display

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As well as helping participants to develop more sustainable options for the area, this process acted as further education about:

> *"the current inherent unsustainability of many activities going on in the Irk. It was very revealing to see the links, and the exercise proved to be instructive for the group as it provided a graphic representation of the issue (Environmental Studies Lecturer at Greater Manchester HEI 2003a).*

The fact that there were arrows to move whilst thinking about these connections was seen as important by several participants, for example *"it was the visual, touchy-feely toy aspect, which was fun and people noticed it" (Project Officer at Red Rose Forest 2003a).*

Speaking of the ecological design process, the *Environmental Studies Lecturer at Greater Manchester HEI (2003b)* said:

> *"Seeing the issue displayed visually has a much greater impact than merely using words. Also, the physical action of changing the direction of the arrows is very empowering as is demonstrates that solutions exist and that it takes a refocusing of activities and effort to achieve sustainable outcomes".*

Participants are encouraged to contribute ideas through the stages of the design process and the form of the tools used to engage participation. The value of the physical toolkit was emphasised by a participant:

> *"I think it was very effective in [helping people link between different areas], because you often don't think about something being linked to something else. Certainly when we were doing the flow things, and the DNA ones at the end, where you had things coming in and all the arrows going across linking each other… I think it was it was a really good way of doing it" (Community Liaison Officer at City Council 2003a).*

7.4.4 Involving spatial design and analysis

Spatial arrangements and patterns play a key role in mediating flows of material and energy and in determining the long-term environmental effects of these developments. Inherently spatial, ecological design does not simply consist of substituting more environmentally friendly materials in manufacturing and production processes. Forman (1998, pg. xv) has written, "`virtually all the`

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great questions of our time involve land", but warns that the spatial configuration of landscapes is frequently overlooked in discussions of ecological sustainability.

7.4.5 Holistic perspective - human and ecological systems

Ecological design is fundamentally a social process, which aims to improve quality of life and to design systems to meet human needs. The use of the EASEL encourages participants to consider the ecological, economic *and* social aspects of a potential design. This is important, even when working on a project that is mainly concerned with one aspect, such as landscapes. Landscapes do not exist in isolation from cultural and economic forces. The holistic nature of the EASEL was seen as offering advantages both in the experience of participation and in the final outcomes of the process. Speaking of the process, one participant said *"a lot of residents don't know about sustainability issues but they will know about the local area and they can comment in that way… there wasn't one particular area that dominated, therefore everybody could do it" (Environmental Strategy Officer at City Council 2003a).* In the final product, this breadth meant *"everybody is going to be pleased with something in it" (Chair MVRA 2003).*

In the interviews participants were asked whether EASEL provided a good balance between giving a simple, comprehensive overview and providing sufficient detail. All of the interviewees felt that it was important to have an overall structure with some degree of detail, though several mentioned the need for a simple definition of the major categories. One participant commented on the value of the holistic nature of the process for encouraging social learning,

> *"Having the holistic overview is really important and it gets officers out of the mindset that I'm a planner or an officer. To get people around the table to think about the bigger picture… was really, really important" (Project Officer at IVP 2003a).*

The detailed branches were seen as *"useful because the detail brought all the different categories together, having looked at each one individually, you can see how they link together as well" (Community Liaison Officer at City Council 2003a).*

The flexible nature of the EASEL was cited as important in finding this balance. *"With the Mind Map it was made clear that you could put any branch on you wanted to and perhaps you could emphasise it … you can put on other branches if you feel like it*

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even though the ones that were there seemed to broadly cover everything" (Environmental Strategy Officer at City Council 2003a). At the same time, it was seen as providing useful hooks for thinking about a broad range of topics *"If you were working on [for instance the Landscape EASEL] you can really think in detail, which makes you think a lot harder about it rather than just thinking about everything"* (Programme Coordinator at Red Rose Forest 2003).

The overall structure was seen as important in terms of encouraging creativity:

> *"I think you need that initial structure... most people are familiar what the main branches mean and you have a common understanding of that then you can go off and be creative and put your leaves as you wish… again we were discussing our definitions and hopefully after a couple of minutes we understood and sorted it in our minds what we meant"* (Environmental Studies Lecturer at Greater Manchester HEI 2003a).

7.4.6 Focus on underlying processes and patterns

> "*In more direct aesthetic terms we can begin to talk not only about the 'form of sustainability' but also about the 'sustainability of form'… Nature cannot be left at the edge of development but must be in and a part of the processes of making, feeding, serving, repairing, and informing community*" (Paterson and Connery 1997, pg. 344).

In DesignWays emphasis is placed on protecting areas of high biodiversity and searching for ways of connecting ecosystems in the landscape, in particular through restoring riverine ecosystems. Landscape ecology provides information to ensure that developments are arranged in space such that the bulk of important attributes in a landscape are preserved. The importance of considering spatial patterns and their underlying dynamics has been an important consideration in DesignWays from its start, influenced by an analysis of the possible value of applying insights from chaos theory to permaculture design (Tippett, J. 1994, 1996, 2000a).

Layers of information are mapped in geographic space[58], using the categories of the EASEL. Community mapping, which encourages participants to draw maps of

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[58] Depending on resources using tracing paper or a GIS, or some combination of the two tools.

what they feel is important in their area (e.g. Clifford 1996), is a key component of the DesignWays process. A range of materials has been used in mapping in DesignWays projects, from local clay, to chalk, to locally collected rubbish. The use of creative techniques, such as Mind Mapping and artistic exploration of geographic maps, are woven into the design process.

The process of spatial analysis using overlays in DesignWays is influenced by the work of McHarg (1992) and Lewis (1996). Geographic models and maps are used to further synthesise and analyse this information, depending on available resources and capacity for mapping, e.g. GIS expertise and resources for building models. The process aims to provide a framework into which many exercises and design approaches can feed. The EASEL and its associated maps are designed so that existing technical information can be incorporated into the overall picture that is built during analysis.

Ecological design principles are used to guide positioning of clusters of elements (as developed in the 'Nodes and Networks' exercise described above) on the map, synthesised with information from the overlays (Figure 7-9). This process of placing elements encourages participants to discuss the possible benefits and synergies from the locations of the clusters.

Figure 7-9 Use of leaves to discuss clusters and positions on the landscape
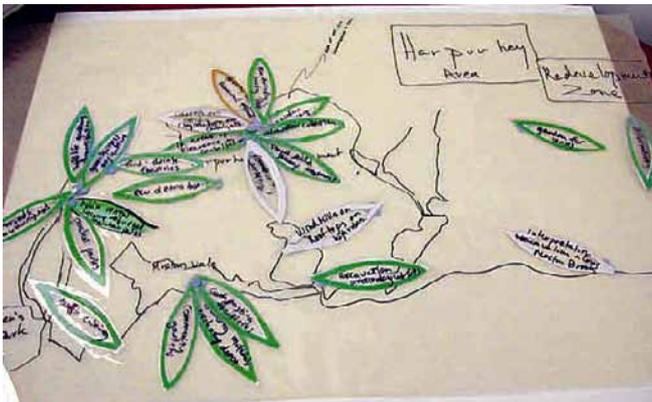
Interviews with participants on the DesignWays process indicate that they felt they were made more aware of the importance of underlying processes in shaping and influencing two-dimensional plans through using this process. One participant, with previous environmental knowledge, said of the process of using maps and the 'Nodes and Networks' charts,*" I was learning so much about how to*

think about the physical space differently" (Environmental Education Warden at Mersey Valley 2003).

Speaking of the focus on underlying processes, one participant who described himself thus, *"I trained as a planner and we are very aware of how spatial relationships influence other behaviour",* said: *"I thought it was very effective. They [processes] were all clearly taken into account"* (Environmental Strategy Officer at City Council 2003a). Speaking of the social processes, one participant said, *" I spoke to 2 or 3 people [Moston Vale residents] and they think they have a greater understanding of the different components now, rather than just looking at their physical surroundings" (Community Liaison Officer at City Council 2003a).*

7.4.7 Structured design process

DesignWays attempts to make the *process* of ecological design visible, so that different stakeholders can apply their knowledge to developing solutions to fit a particular place and context.

There have been previous attempts to codify a design process. Speaking of the move to increase participation in design in the 50's and 60's, Rowe (1987, pg. 111) stated:

> ```
> "What seemed to be necessary was a clear and logical
> procedure for producing designs that could be
> understood and participated in by all those involved".
> ```

He cited the example Hochschule für Gestaltung at Ulm, Germany, which developed "`staged process models for design`" (ibid pg. 48). A further push to increase participation in architectural design came in the 70's as post-war housing projects became deprived, crime ridden areas, and as gender and development studies questioned the role of cultural assumptions in the creation of the built environment (e.g. Misra 2002). Rowe (1987) suggests, however, that many of these attempts missed the subtlety of the design and decision making processes, and were not considered by many design professionals to be very successful.

The 'DesignWays Flow', detailing the stages of the process is shown in Figure 7-10.

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Figure 7-10 Stages of the process - the DesignWays Flow
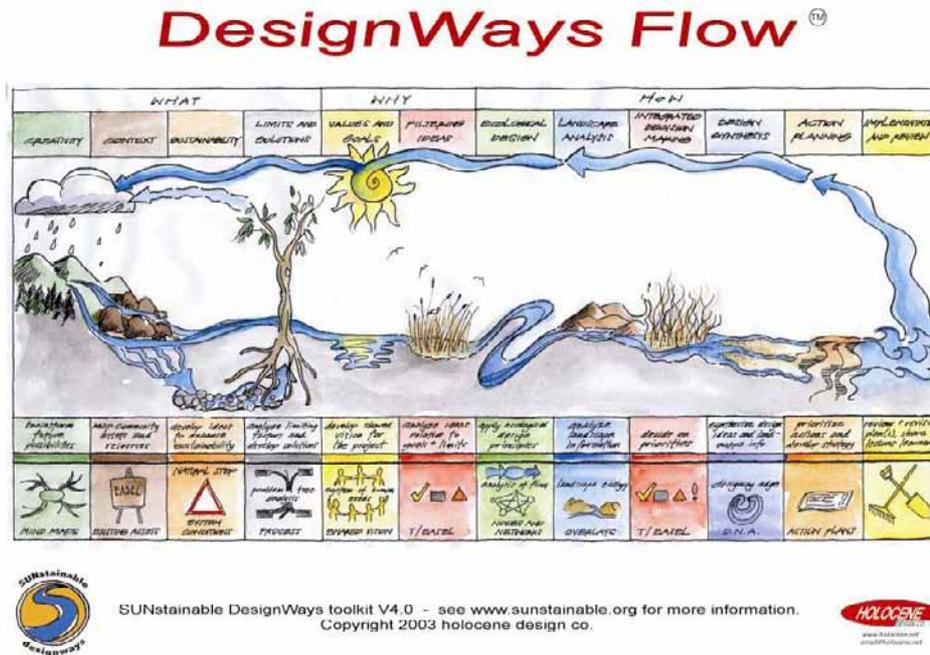
Speaking of the value of using a structured process to elicit creative thinking, a Moston Vale resident said, *"I think it definitely helped because it did provide a framework. I think without it would have been far more difficult to get the ideas".* A structured design process helps to tie the several components of DesignWays together, providing space for creative thinking as well as analysing assets.

One participant talked about the value of the stages when participants are asked to relate principles to their own context, *"that is really useful because you tie it into things that you can relate to… your own personal circumstances". S*he mentioned that different people have different perspectives, and seemed to respond to different aspects of the design process *(Environmental Studies Lecturer at Greater Manchester HEI 2003a).*

Comparing DesignWays with other participation processes he had experienced, the *Creative Director of Countryscape (2003a)* said, they had *"been a case of using a chocolate box of techniques, not so much a process".* Instead, with DesignWays *"I liked the fact that even though it seems a chaotic process, chaotic is probably the wrong word, but it does have a process behind it and that you can follow the steps, and see this is all going to fit in here… it needs that direction in a process like this".*

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A clearly structured process was seen as particularly important to allow participants to be able to drop in and out of the workshops (inevitable given their other time commitments).

7.4.8 Summary

DesignWays responds to a need identified by ecological economists, who suggest,

> *"The pursuit of sustainable development is essentially the facilitation of a social process… A participatory process is required to evolve stakeholder perceptions and values through learning" (Meppem and Gill 1998, pg. 132).*

The following section discusses the nature of this participation in DesignWays.

7.5 DesignWays Attribute 3 - Creative involvement of stakeholders in planning process

> *"Even today, people know more about their automobiles than they do about their own minds" (Wilson, E. O. 1998, pg. 97).*

DesignWays places emphasis on the *process* of participatory communication. This includes attention to both the physical form of the toolkits and the way participation is encouraged.

7.5.1 Active engagement in developing plans and options

The benefits of engaging participation of multiple stakeholders in planning were discussed in Chapter 4. Incorporating the knowledge and different perspectives of these stakeholders into the beginning of the planning process, and utilising them in the development of options and plans, can enhance the value of this participation. The value of 'stakeholder buy-in' and 'ownership of the plans' is likely to be increased to the extent that participants develop ideas themselves. By being involved in the active development of plans participants are likely to learn skills to help implement the plans.

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The stages of design are facilitated so that participants can easily communicate about the different processes, and give input at all stages. One participant described the experience of looking at the plans in the final presentation, *"You can see that is what it will look like, and there is one of my ideas. It was fantastic. It surpassed my expectations of what was achieved in the time scale" (Creative Director of Countryscape 2003a).*

7.5.2 Use of visual and presentational knowledge

Presentational knowledge, the way in which knowledge is distilled and ordered for communication, is not always treated as a significant factor in participatory stakeholder engagement. DesignWays was created with the understanding that there is a non-trivial relationship between the form of knowledge presentation, the means of engaging participation and the results that are gathered.

Tufte (1983) and Bertin (1981) emphasise that the way in which data is displayed can materially affect interpretation. This concept has echoes in design fields:

> "*It is quite clear from the history of architecture,
> and the history of ideas for that matter, that
> developments in representational techniques - such as
> perspective drawings and the systems of geometry of
> Pascal and Descartes – have had a profound effect...
> Such developments have altered what we can represent,
> see, and therefore understand and imagine" (Rowe, P.
> G. 1987, pg. 99).*

DesignWays uses graphic techniques inspired by Participatory/Rapid Rural Appraisal (PRA/RRA) and participatory diagramming methods. Participatory diagramming is a way of allowing participants to communicate in ways that may be less threatening than traditional methods (e.g. Kesby 2000; Pain and Francis 2003). PRA/RRA practice emphasises the use of shared, interactive information in order to reduce the gap between informants' information and analysis by 'experts'.

The components of the DesignWays toolkit have been designed to encourage dialogue and communication amongst participants. The physical design of the tools aims to give form to the concepts introduced, for example using the

metaphor of 'green leaves' for 'new ideas'. Laminated leaves that participants use to record ideas are colour coded to help clarify the over-arching structure and themes of the design process (Figure 7-11).

Figure 7-11 Key for tools used in brainstorming ideas
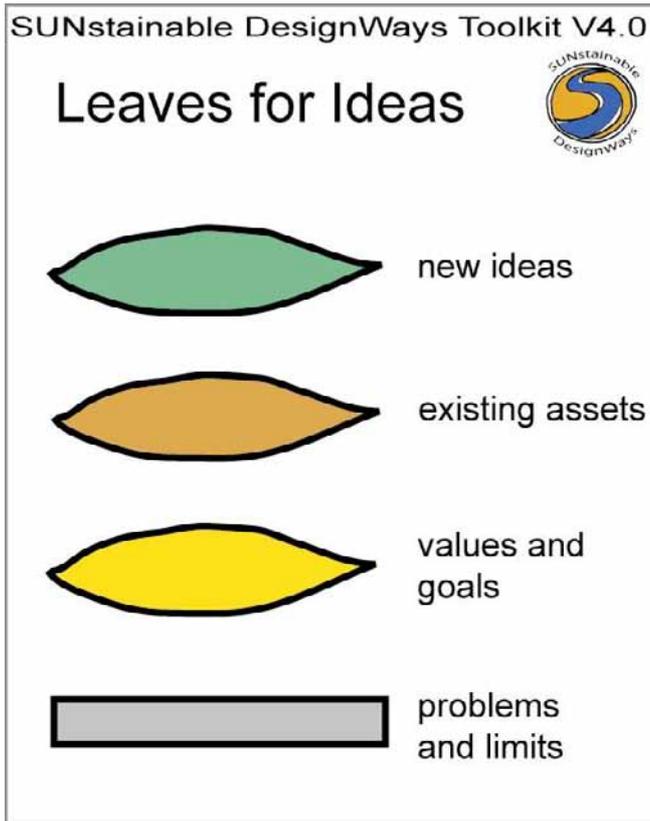
Colourful diagrams (Figure 7-12), which can be built from smaller pieces as they are taught, are used to introduce complex ideas such as TNS and ecological design principles. Graphic themes are repeated in the tools, helping to reinforce links between concepts.

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Figure 7-12 Using moveable diagrams developed by the author to teach ecological principles

As well as encouraging dialogue and making connections between different ideas, the presentational tools of DesignWays were designed to incorporate several of the metaphors discussed in Section 7.7 'DesignWays Attribute 5 – Underlying framework of systems thinking on pg. 303, so that they are educational in themselves. The use of graphics was considered important by many of the participants, and the comment *'you could see it'* was emphasised as important in interviews. One participant said *"diagrams are often the best way to show people rather than with writing or speaking and it helps to see where conflicts are and then forces people to consider what they can do about it" (Environmental Strategy Officer at City Council 2003a).*

A good example of this came during a heated discussion about use of the Moston Vale site by dog owners. Afterwards, a participant who had been adamant about restricting dog access to the site reflected, *"When I think about it she was right saying that dog walkers use this far more than anybody else".* Going on to reflect about the process of seeing other participants' points of view, and the visual tools of the EASEL, she said, *"you can see it better when it is written down and the ideas of the leaves on the trees, it really is an excellent idea" (Secretary MVRA 2003).*

The EASEL templates are used to create large, colourful diagrams. The use of Mind Mapping, and the fact that participants are asked to make decisions about where to place ideas on the EASEL, helps them to structure the flow of ideas, so that more sense is made of the plethora of ideas produced in brainstorming. The

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value of the Mind Map form of the EASEL was recognised: *"I think the EASEL was very useful. It was a lot simpler way of looking at things and it allowed everyone to put something down and to see what was important" (Chair MVRA 2003).*

7.5.3 Incorporates opportunities to use 'multiple intelligences'

The originator of the theory of `'multiple intelligences'`, Gardner (2000. pg. 4), suggests, "`humans possess a range of capacities and potentials`". The intelligences that Gardner identified are:

- logical-mathematical intelligence;

- linguistic intelligence;

- spatial intelligence;

- musical intelligence;

- bodily-kinaesthetic intelligence;

- intra-personal intelligence (ability to understand own emotions and motivation);

- and interpersonal intelligence (ability to understand motivations in social setting).

Gardner (2001) writes that using multiple intelligences in learning means that lessons are "`much more likely to remain with us, embedded in our neural networks, and to be usable in flexible and innovative ways`". Given that a major challenge in implementing sustainable water management is that of capacity building amongst stakeholders, increasing the likelihood of learning during participation in ways that can be applied to different situations is potentially important.

The DesignWays tools use colour and imagery, verbal and written words. Spatial awareness is enhanced through use of maps, and the spatial arrangement of branches of the EASEL in Mind Maps. The value of these different ways of approaching learning was recognised by a teacher on the course, *"I think you did*

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address a lot of different ideas for learning styles" (Environmental Studies Lecturer at Greater Manchester HEI 2003a).

The concept of enacted cognition (Maturana and Varela 1987) with its emphasis on learning through moving and physical engagement with the world `"demonstrates how the way we experience the world is very much an active construction involving the whole body"` (Mingers and Brocklesby 1997, pg. 500). Early development of DesignWays in Africa was influenced by awareness that principles need to be understood on intuitive as well as rational levels. Encouraging participants to move and manipulate simple objects helps to engage bodily-kinaesthetic knowledge in addition to rational knowledge. Whenever possible, site visits and small physical projects (especially of restoration or planting) are incorporated into the DesignWays process.

7.5.4 Hands-on process and dialogue

> `"The idea that the way we conduct negotiations among a range of parties with different stakes and views about an issue determines the chance of consensus in the outcome has been amazingly slow to take root"` `(Tuxworth 2002, pg. 33).`

The process of communication in DesignWays can be paraphrased as 'putting the pens in the hands of the participants'. By asking participants to write, draw and manipulate ideas, a picture of the group's thought processes emerges from their actions. This encourages learning, *"When you are actually doing something, it makes it a lot more clear" (Programme Coordinator at Red Rose Forest 2003).*

The fact that the pieces of the templates encourage movement and active involvement between participants is important (Figure 7-13). *"Even just actively putting on the leaves that was participation. Otherwise, lists with jumbled information are difficult aren't they?" (Environmental Education Warden at Mersey Valley 2003).*

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Figure 7-13 Movement of pieces of toolkit by participants

The fact that participants manipulate and develop physical artefacts during the process has several other advantages. A feeling of pride in the group develops from seeing the results of their work take form. The *Creative Director of Countryscape (2003a)* described the process of design: *"We created the tools and so you felt possession of the product at the end more so than if you had gone away and done it for us. It gave us good ownership of it, I think"*.

Habermas calls for an `'ideal speech situation'` for collaborative planning, such that effective conditions for dialogue are created, free from inequalities between participants, where communication is `'orientated towards reaching understanding'` (Harris 1995, pg. 119). Whilst agreeing with criticisms that the concept of an `'ideal speech situation'` ignores significant power differentials and inequalities in society (e.g. Sandercock 1998; Tewdwr-Jones and Allmendinger 1998), the author feels that it is important to try to develop conditions in which all participants are enabled to make a contribution to the dialogue.

Several of the techniques developed in DesignWays to encourage inclusive dialogue were developed in Southern Africa, in an attempt to allow women to have an input in mixed groups, where they often did not speak. The process encourages everyone to participate because it is non-threatening. This is due to several factors: the 'leaves', on which ideas are written, are readily available at all

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points in the workshop; participants can enter their ideas to the EASEL at any time; many people can work at the same time; and this can be done quietly or anonymously if so desired. This reduces the tyranny of him (or her) who speaks loudest or has the courage to stand up and speak in front of a crowd. As appropriate, the facilitator gathers ideas in and reads them out, so that participants do not have to 'force' their ideas into discussion. A participant commented on this important aspect:

> *"A lot of people are like me, and they are not good at speaking if there*
> *are more than 2 or 3 people around, but they have things to say. It's like*
> *a classroom at school, you get the people who say things but that doesn't*
> *mean to say that everyone else doesn't want to say things, but they can't*
> *because they know that they are not the cleverest and they might get*
> *laughed at. So they don't really participate. So this is magnificent at*
> *getting people to participate, and very important" (Irk Resident 2003a).*

Participants on previous courses the author has taught spoke a variety of African and European languages, worked in many different fields, and had a range of education from very little formal schooling to University degrees. The use of patterns and imagery in the DesignWays process, however, facilitated co-operation and communication amongst them. Whilst some participants find it daunting to write (in particular people with less formal education), the relaxed nature of the workshops and the encouragement to discuss ideas helps people who feel uncomfortable writing (or who can't write) to input ideas, so that someone in their group writes the ideas down and adds them to the EASEL [59]. Rough pictures and sketches are also seen as important data.

Initially the process can seem daunting for some participants. Several mentioned that it might be a disadvantage of the process that it requires non-traditional thinking, and that professionals may feel that engaging in such activities was

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[59] The next stage of developing this toolkit for greater accessibility will involve discussing ways of making it more accessible for the visually impaired. The emphasis on dialogue and discussion should help in this endeavour. In the workshops in Moston Vale, one lady felt uncomfortable writing, but would occasionally mention an idea, which her neighbour would then write down. The kinaesthetic nature of the EASEL may also help, in as much as the branches of the EASEL use shape and direction in addition to writing to convey meaning. The shape of the different branches of the EASEL may be designed to be more easily differentiated by touch (e.g. with the main letter of the acronym in the central piece cut out). As the toolkit is developed for production, printing on the branches of the EASEL may be complemented by the use of Braille. Many of these enhancements would also make the process more suitable for working with mixed groups of adults and children and for working with people with lower levels of literacy.

threatening to their professional dignity. Several recognised, however that this was also an advantage, and the fact that there were no experts in how to do the process meant that it acted as an 'equaliser'. The *Environmental Studies Lecturer at Greater Manchester HEI (2003a)* wrote in her project journal:

> *"The initial puzzlement surrounding the first activity actually helped the process of group cohesion, as we were all unsure about what was actually being asked for and so discussion about each others' interpretation of the task eased us all into the right frame of mind. It also helped that the activity was something that we had not done for a long time i.e. crayoning shapes, so that there were no avowed 'experts' in the group (or at least, no one claimed to be)".*

Participants add their ideas to large Mind Maps, so they quickly become part of an evolving group picture. One participant described the importance of this evolving picture, *"This is a real thing because it's like a form of participatory democracy that is ongoing" (Irk Resident 2003a).* The fact that participants themselves write their ideas down was seen as important:

> *"Even little things or things written in a different way actually showed a different meaning behind it. So if you cut that out by just getting somebody to write that up in short hand which is what happens at most meetings, you just get what they hear rather than what was said" (Environmental Education Warden at Mersey Valley 2003).*

The anonymity of having ideas 'on the table', dissociated from the person who came up with them, can both allow more controversial ideas to be aired, and facilitate a more constructive attitude to group discussion. As one participant said, *"Nobody would know you were attached to your point of view" (Project Officer at Red Rose Forest 2003a).* People are able to see connections between their thoughts and other people's, and are less apt to take a dogmatic approach to defending their ideas.

The fact that many people can input ideas simultaneously also reduces potential tedium. The structure of the toolkit was designed to allow participants to develop a graphic representation of their thought processes rapidly. As one participant said,

> *"As soon as you have your colours and charts it sparks things off, different lines linking things. It does encourage you to think creatively*

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because there are no restrictions whatsoever, so it is letting your mind put down everything rather than starting with restrictions" (Programme Coordinator at Red Rose Forest 2003).

7.5.5 Use of facilitation and process management

The process of coordinating the group work is important. This was recognised in one participant's reflection on the process in her journal:

> *"Careful facilitation and organization of the sessions meant that we were always reminded of the larger process and how the EASELs fitted into it and how other aspects of the workshops related to each other. This aspect was very important, as it could be very easy for the participants to get bogged down in the detail of the undertaking. Therefore, the role of the facilitator is central to the success of the workshops" (Environmental Studies Lecturer at Greater Manchester HEI 2003b).*

There are some stages of the design process that are enhanced by being carried out in a particular order, but for the most part it is the relationship between the steps that is important. This is similar to Checkland's (1991) understanding of the stages of soft systems methodology, in which the steps can be seen as a mosaic, and can be carried out in a variety of orders. It is the facilitator's role to understand the reasoning behind the steps, and the relationships between them, in order to tailor the process to the context and requirements of the participants.

The timing of stages of design processes in DesignWays is influenced by attention to the process of communication. In particular it has been designed to encourage participants to start with what they know and think is important, and to lead them to more abstract principles through a series of simple steps. This encourages participants themselves to make connections between these areas of knowledge.

DesignWays is in some ways a type of 'Appreciative Enquiry', in that it asks participants to start with what is valued and important in an area, and use this as the basis for developing a plan (International Institute for Sustainable Development 2000).

Two participants, one with little work experience, the other with over fourteen years', saw this focus on the positive aspects of the areas early in the process as being the most important aspect of the process. Another participant with

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considerable experience working with communities said, *"It's a good technique for giving people a voice about their concerns but not letting them dominate, and then other people feeling they are unable to say anything positive" (Environmental Education Warden at Mersey Valley 2003).*

At the same time, the problems were considered in depth. As one participant stated, *"It certainly identified all the main problems and we've tried to find solutions for them in the time we have. To my mind there is nothing that we missed" (Creative Director of Countryscape 2003a).*

The workshops are oriented towards developing solutions, which also helps to reduce confrontation. The non-confrontational approach was recognised by one participant with experience of several other types of participation *"There was no instances where people were shouting each other down or talking over each other, there was no anger at all which you could get in workshops quite easily" (Creative Director of Countryscape 2003a).*

DesignWays was designed as a step-by-step activity in order to make it easier to deal comprehensively with complex situations. This was seen as valuable in engaging participation:

> *"It's a very clear way of thinking about it, working out what we have, what your goals are, what might be the barriers to them and ways around them. I think that is really useful. It encourages you to think things through in the right order" (Community Liaison Officer at City Council 2003a).*

The use of a clear sequence with overarching patterns and principles provides a framework in which creativity is encouraged to flourish. In the anonymous surveys all seven responses to the question, 'How do you rate the balance between facilitation and group-directed work in the workshops?' were that it was 'good'. The importance of having a facilitated design process was emphasised in this reflection, *"We would never have been able to envisage anything…we need somebody like you to start it to bring it all together to show us basically what to do, you can't just put people in a room and expect it to happen" (Chair MVRA 2003).*

The physical structure of the toolkit was designed to help manage the process. The clear visual language helps participants to see what stage of the design they have reached. The use of simple acronyms and similar techniques throughout (such as the colour coded 'leaves') helps participants to remember the tools and facilitates

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communication. One resident commented the colour coded 'leaves' were *"specific and it gives the idea that you are moving from stage to stage. With post-it notes you would get a horrible mess and you wouldn't be able to distinguish one from another" (Irk Resident 2003a).*

The fact that Mind Maps can easily be used at different levels of complexity mean that the ideas in the workshops can be introduced simply, using the 'simple EASEL' (Figure 7-14), then as the workshops progress, the more complex structures are introduced (there are five, each based on a branch of the simple EASEL – e.g. one for Economics, one for Activities, one for Social Capital (Figure 7-15), one for Elements and Settlements, one for Landscape) Due to the similar headings, it is easy for participants to relate the more complex Mind Maps developed during workshops back to the simple EASEL, hence maintaining an overview.

Figure 7-14 Simple EASEL

The fact that participants use Mind Maps templates with headings written on them, and use pre-prepared 'leaves' to build up the EASEL, instead of drawing a Mind Map by themselves, could be seen as a problem. They are less likely to learn all of the skills of Mind Mapping. Checkland (2000, pg. S22) made a similar point talking of creating rich pictures:

> "*Experience suggests that its formalization via use of ready-made fragments… is not usually a good idea, except perhaps as a way of making a start. Users need to develop skill in making `rich pictures' in ways they are comfortable with".*

Figure 7-15 A full EASEL (Social Capital)

During the process participants are taught the principles of Mind Mapping and create several hand-drawn Mind Maps, both as individuals and groups (Figure 7-16). Thus, they are able to learn the skills of applying Mind Mapping in different ways.

Figure 7-16 Participants learning to Mind Map

At the same time, the use of a pre-prepared toolkit has several advantages. It creates a language of design, which facilitates communication between different stakeholders. It speeds up the process of synthesising a large amount of information. One participant commented that without such tools:

> *"It would be a bit unfocused... One could try to do exactly the same things*
> *without all these icons and things but you would almost be forced to*

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*make them up as you went along anyway, wouldn't you? So you would
just end up with something very boring. So you have these things already
and you can just get straight on with the job" (Irk Resident 2003a).*

One participant had said in the 'before' interview that she would shy away from *"showing things in diagrammatical form. I do feel intimidated really because of my own mental block to draw anything".* Commenting on the toolkit after participating in the process, she said, *"Personally I liked the way the EASEL was [pre-prepared pieces] because I have problems drawing… Whereas the leaves were attractive and they made it easier to write on them" (Environmental Studies Lecturer at Greater Manchester HEI 2003a).* She went on to say that having a pre-prepared toolkit would make her more confident in facilitating a participatory process.

Several participants said that they felt the process was *"community driven and owned" (Chair MVRA 2003),* suggesting that the use of building blocks did not diminish their sense of ability to shape the process and the final product.

7.5.6 Content education incorporated into process

Content education refers in this context to education about substantive areas of knowledge as opposed to procedural skills. The inclusion of the TNS framework as an educational model, and its role of offering a shared mental model for decision making in the process, was discussed above. During the process examples of ecological design options are used to illustrate possibilities. Each branch of the EASEL can provide a starting point for case studies of sustainable solutions, for providing essential technical information, or for practical education about key concerns and possible solutions in that area. Farrington (1997) comments that participation in bottom-up processes needs to be combined with education about possibilities, or else it will risk being limited to solutions and ideas already known to participants. Echoing this insight, one participant commented, *"Most people would be horrified at dealing with sewage on site but it can be done. It is just showing that people are doing these things, it's not just a weird idea, it can be done and in a straightforward way with just a bit of imagination" (Environmental Studies Lecturer at Greater Manchester HEI 2003a).*

There is a potential danger that such education will encourage participants to 'reflect back' what they think the facilitator wishes to hear, unduly influenced by the ideas discussed. The attention to decision making discussed below, however,

helps to give participants ample opportunity to decide which ideas developed in the workshops reflect their aspirations and fit in the context. It is the facilitator's role to create a balance between education and allowing participants a voice in the process. This requires attention and an ability to respond to the evolving dynamics of the group.

The more detailed branches of the EASEL act as an educational tool in and of themselves, and provide a stimulus for discussion amongst participants. Participants are encouraged to share their knowledge of subjects and the area under discussion. One participant described this process:

> *"It was interesting when we were all around the tables just talking, it was interesting to see where everyone was coming from. I hadn't had much to do with ecology but there was someone from the Mersey Valley, …and the sort of things that she was putting onto the leaves were totally different to what I was writing on the leaves" (Community Liaison Officer at City Council 2003a).*

7.5.7 Skills training as part of process

One of the reasons given for an increase in interest in public and stakeholder participation in the last decade has been that of the '`hollowing out`' of the state (Rhodes 2001). Reduced ability to directly implement policies requires the willing cooperation of many different actors if desired outcomes are to be achieved. Such cooperation requires a degree of agreement on the actions to be taken, and an ability to take them. In DesignWays skills are learned through active involvement in the planning process, and several of the stages involve direct skills training in new techniques, many of which are transferable to other areas of concern. For instance, techniques of creative thinking are taught at several stages of the process (based on the tools developed by de Bono 1990b, 1992, 1996, 1999). Participants learn skills of landscape analysis through working in groups to analyse resource patterns using maps and overlays. Skills of facilitation are taught as participants are engaged in more than one level of scale of planning.

The inculcation of design-awareness in the community allows more people to comprehend the effects of their actions on their communities and the environment. Design skills enable participants to make changes in their behaviour and

surroundings. Such changes can extend out from a participants' normal sphere of concern, as the Project Officer of IVP commented:

> *"You could manage housing ecologically, you could manage a bus route ecologically. It's about looking at the bigger picture and applying those four Natural Step principles … We could apply a lot more ecological principles to a lot of the things that we do". (Project Officer at IVP 2003a).*

Another participant felt that the creativity tools of the process were the most important aspect for him. He had had a lot of prior experience with creative thinking techniques, but said the important aspect of this process was seeing how they were applied, *"it is great to see a community planning tool that is very creative but has very real results" (Creative Director of Countryscape 2003a).* Several participants said they were using Mind Maps in their work after these workshops, including one participant who was only able to come to a few workshops. One said learning to Mind Map has enabled her to plan her work so that she has *"a more clear idea of what you need to do" (Community Link Officer Groundwork 2003).* A further participant commented, *" I do think it allows you to think more creatively about what you are doing" (Community Liaison Officer at City Council 2003b).*

Several participants discussed the importance of learning how to apply sustainability principles in decision making. Stressing the change he experienced during the workshops, the *Environmental Strategy Officer at City Council (2003a)* said, *"once you have come across [the system conditions] you are always thinking about them".* Speaking of skills she could apply to her own project work, the Community Link Officer at Groundwork (2003) said, *"looking at resources that go in and that go out, and where they are going and how it impacts on the environment. Normally you don't think like that. Normally you don't think about the wider issues".*

The need for participants to learn these skills during the process is given added impetus because strategic planning needs to be ongoing, with cycles of review and reflection. It is important that participants are able to carry out reflection and review themselves. As one participant reflected, *"once the consultancy process has been done … the client can manage it themselves to a degree, you really are equipping them" (Creative Director of Countryscape 2003a).*

The *Community Liaison Officer at City Council* said that she felt through doing this process, she had learned more about *"sustainability in connection with my job",* saying

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that she had expanded her thinking to include aspects of the environmental impact of houses, not just the economic and social impacts.

7.5.8 Attention to decision making process

> "*Common sense tells us that making a decision that is not in line with our values is illogical. But that is precisely what humans have done throughout history*" *(Savory and Butterfield 1999, pg. 91).*

Facilitating dialogue between different groups of people (e.g. community members, stakeholders and professionals) involves working with differences in terms of expertise and aspirations. The DesignWays process encourages a focus on common goals and values. It gives people tools to see how they can enhance those values and improve the quality of their lives at the same time. One way to move away from conflict is to focus on higher-level goals, and then to ask participants to design solutions that are acceptable to the group in terms of meeting those goals. This process is increasingly seen as important in encouraging good governance in water management, as exemplified in this quote from the 'CEO Panel - Business and Industry' on water governance:

> "*When consensus on high-level value issues is established, people will work together even when they disagree on lower level issues. Building consensus requires clarifying the values of stakeholders and finding creative ways to bridge across any large value differences that may exist*" *(Moss, J. et al. 2003, pg. 8).*

Consideration of values and goals is an essential prerequisite to the DesignWays decision making process. This is a skill which Savory (1999) considers important in creating a sustainable future, citing many well meaning projects that have not fundamentally evaluated their decision making process, and have thus failed to enact deep-seated change. This realization led to the development of an alternative decision making model in Holistic Management (Savory 1991; Savory and Butterfield 1999). The Holistic Management model has influenced the

development of DesignWays, particularly through the work of the Participatory Land Use Management (PELUM) team from Zimbabwe[60] (see UNESCO 2001).

A process of using moveable icons has been developed for applying the insights of holistic decision making. The process of T/EASELing is an acronym for '**T**esting' the ideas on the **EASEL**. A teasel is a plant, with a seed head with burrs, which has traditionally been used to card wool, to take out the unwanted seeds, tangles and bits of dirt, etc. before spinning the wool. In DesignWays, this is used as a metaphor for the process of 'carding out the ideas'. This helps to reduce the ideas to a more manageable number for the next stage of the process, ecological design. Four considerations are taken into account:

- Does this advance the groups' goals and values?

- Is this moving towards sustainability?

- Is this likely or possible given the limiting factors and problems in this context?

- How does this fit in with a strategic plan for advancing goals and moving towards targets (e.g. economic feasibility, cost-effectiveness)?

Prior to this stage, *all* ideas that were mentioned in workshops were placed on the EASEL. During the phases in which creative brainstorming is the main focus there is an attempt to suspend judgement, such that new ideas can emerge, and improbable ideas can be probed for their underlying meanings and value without being immediately discarded.

In the T/EASELing stage the goals synthesised from the process of brainstorming are used to highlight areas of significance and importance in the large number of ideas that have been generated. Moveable icons are used in an effort to make this process visible, enhance transparency and stimulate dialogue. Icons are used to show which ideas meet the group's goals, which are considered as important, which are unsustainable (using icons for the TNS system conditions) and which are less likely given current limits and problems (Figure 7-17).

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[60] The author taught on a permaculture course in Lesotho with a team from PELUM.

Figure 7-17 Key to T/EASEL icons

The T/EASELing process also helps to show ideas that could cause problems, as one participant commented, *"once you had the red triangles [T/EASEL icons for TNS system conditions] up there you could see where the problems were".* He went on to discuss the value of relating the ideas to principles of sustainability, *"I thought [the system conditions] were a really good filter and they helped ditch a lot of the bad ideas and highlight the main problems" (Creative Director of Countryscape 2003a).*

One participant described the use of icons in this process: *"that was a great way to start conversation because you would see somebody putting an exclamation mark on something and you would say 'I don't like that because of this and this'" (Irk Resident 2003a).* Several participants mentioned that it was important to actually use the icons, as the TNS system conditions were not enough on their own without a process to apply them, *"you take it away from just being a nebulous, useless concept, to actually making people think about it, discuss it" (Project Officer at Red Rose Forest 2003a).*

The colour coding of the icons and the 'leaves' was influenced by de Bono's (1999) ideas on cultivating different types of thinking, what he terms `'six hat thinking'` (Table 7-2). This use of colour coding was seen by participants as

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important: *"If it's more colourful then people are going to make different connections with the different colours and remember things a lot better, plus it is more interesting to look at" (Community Link Officer Groundwork 2003).*

Table 7-2 Elements of de Bono's 'Six hat' thinking in DesignWays

Elements of 'Six hat' thinking in DesignWays		
Colour Code	**Six Hat Thinking** (after de Bono)	**Use in DesignWays**
green	creative, generative thought	the green leaves for future possibilities
black	negative criticism	grey box - for recording problems and limits T/EASEL icon - grey box - is this idea unlikely given local resources and the limits and problems
yellow	positive criticism	yellow leaves for the goals T/EASEL icon - yellow tick mark - does this advance our goals and values?
red	intuition, feelings	T/EASEL icon - red exclamation mark – is this important/significant?
white	data entry	white boxes for notes In DesignWays, brown leaves are used to denote the existing assets, the metaphor is the soil in which the creative shoots of new ideas can grow – these assets are not seen as neutral data, as conceived by de Bono's concept of white hat thinking.
blue	overview of the process	the blue of the river running through the process in DesignWays Flow, showing the overall process into which each of the steps fits, the metaphor of a river catchment

The T/EASELing process can help to create viable and realistic plans. Often public bodies perceive participation as threatening because participants may ask for ideas that are not feasible, and expectations may be raised that if people have said they want something, the public bodies will actually deliver it. By working through the process of asking, 'which of these ideas is less likely, given the current limits and solutions?', participants are able to develop a realistic idea of what is feasible through their own dialogue. This process is especially useful in a mixed group of stakeholders and community members, as public servants and project officers can provide information about their work and the contexts in which decisions are made.

Talking of the value of having participants look at limits in relationship to the ideas developed in the workshops, the *Community Liaison Officer at City Council (2003a) said, "I think we do need to do* T/EASELing, *because they [residents] have to recognise that there are limits… I am wondering if that would help produce less resentment in the long run".* This was borne out by one Moston resident who said

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after the workshops, *"it's important to make them aware that you can want what you want but if it's not good for everybody then it shouldn't be developed, should it?" (Chair MVRA 2003)*

In speaking of dialogue and democracy, Christakis and Brahms (2003, pg. 374) suggest, "`It is imperative that each person in a dialogic forum be clear about his/her values and has the opportunity to express them. It is only through this level of transparency that productive exchanges exist`". The use of icons and colour coded leaves for goals helps to make the decision making process more visible, and enhances dialogue about decisions. The physical artefact enhances transparency about how ideas have been filtered out and chosen.

7.5.9 Summary

Whilst recognising that facilitating participatory planning well requires both skill and motivation, the author has attempted to build principles of effective communication and ecology into the structure of the toolkit, making it easier to include them in the process. This helps facilitate communication between participants, and helps to incorporate complex principles into the tools in an easy-to-use way.

7.6 DesignWays Attribute 4 - Scaleable design language to link different geographic levels of scale

The need to link actions and plans across different geographical levels of scale is a key challenge in delivering the WFD (Jones 2001b). The need for adaptive management implies the need to revise and revisit plans over time, such that a design can evolve. Even within one planning cycle, it may be necessary for participants to enter the process at different times, understand it quickly, and be able to contribute to the process. The DesignWays process offers several components that facilitate the process of integrating planning over time and at different levels of scale.

7.6.1 Uses transferable tools and materials

The EASEL forms part of the graphic toolkit of DesignWays. Using the same basic structure and templates facilitates communication between participants working at different levels of scale, as they can easily recognise the templates and see similarities and differences between the ideas generated at the different levels. One participant who went to workshops at both levels of scale commented, *"If [the structure of the EASEL] had been different you would have to learn it again, but instead we were familiar with the main branches" (Environmental Studies Lecturer at Greater Manchester HEI 2003a).*

The EASEL uses the same headings and a scaleable Mind Map structure, which is introduced at first in a simple way, and then in progressively more detail. This simple structure can be used for workshops with many people, synthesising and collecting their ideas onto a summary Mind Map.

As well as the EASEL there are several aspects of the toolkit that provide a common language of design. The metaphors embedded in these tools[61] provide a simple language that is easy to understand. This facilitates communication between people working at different levels of scale. The simple tools (e.g. 'leaves' and moveable Mind Map branches) can easily be used in different contexts, such as workshops to teach creative thinking skills, or to brainstorm ideas in a one-off workshop. A RVI Coordinator who attended the final presentation of the Irk Valley planning process wrote in a report to the Campaign, *"The tools she used would be transferable to all different scales of consultation and involvement" (Lee, M. 2003).*

7.6.2 Provides meta-data structure for planning

In the DesignWays process participants use the EASEL to synthesise and order ideas emerging from the planning process. The metaphor of an EASEL is both an acronym and a play on the idea of a framework for design that can be adapted to different uses, like an artist's easel[62]. The main elements of the EASEL (**E**conomics, **A**ctivities, **S**ocial capital, **E**lements and settlements - built

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[61] Metaphors embedded in the tools include: the 'green leaves' – shoots of new ideas growing in the soil of existing assets, the 'brown leaves' that make the soil, 'yellow leaves' for the goals, the sun which drives the whole process.

[62] The Latin root of the word easel is assellus, or ass, an appropriate biological metaphor for this process, the beast of burden that carries.

environment - and **L**andscapes) are the basic ingredients of any sustainable plan. The EASEL and its sub-categories act a metadata[63] system. Wason (2000, pg. 263) suggests, "`metadata can be considered a system that supports communications between two very diverse user communities`". One participant commented, *"The structure of the EASEL, which makes connections between these things apparent would work for anybody" (Environmental Strategy Officer at City Council 2003a).*

The categories of the EASEL have been developed over a period of 10 years. Inspiration for the categories has come from four sources:

1. an attempt by the author to think of a holistic framework that covers the most important aspects of design, from a normative perspective of encouraging sustainable development;

2. refinement of the categories through their use in planning;

3. discussions with peers and practitioners about the categories[64];

4. and the literature in the field of 'planning for sustainability' and community development (in particular Hawken, Lovins and Lovins 1999; Hough 2001; Kretzmann and McKnight 1993; Lyle 1994; McHarg 1992; Mollison 1990; Savory and Butterfield 1999; Steiner 1991).

The branching structure of the EASEL encourages participants to see associations, and to think of where there are gaps in resources (often clearly visible through spaces left blank). By being asked to fill in each category, participants are encouraged to consider resources and opportunities from a number of different perspectives.

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[63] The prefix 'meta' denotes "something of a higher or second order kind" (Pearsall 1999). Thus, metadata implies data about data, a way to organise and structure data.
[64] The following people have offered a recent review of the categories:
- Michael Guerra (permaculture designer, engineer and author, Guerra 2000);
- Dr. Emma Griffiths (Principal Street Environment Manager, Manchester City Council);
- Matthew Wilkinson (Sustainability Policy Officer, North West Regional Assembly);
- Prof. John Handley (CURE);
- Jemma Simpson (Ph.D. Researcher, CURE);
- Christopher Ling (Ph.D. Researcher, CURE);
- Jane Aspinall (Principal Planner, Bolton City Council and Ph.D. Researcher, CURE);
- Zinnia Clark (intern CURE);
- and George Terziyski (Ph.D. Researcher, CURE).

The tools directly encourage participants to consider different levels of scale. All three tools under the DNA templates help to do this. The 'Analysis of Flow' template encourages participants to consider where flows coming into an element come from, and where they eventually end up. Applying the TNS principles to these flows further encourages thinking about impacts across scales, and they encourage participants to consider global impacts of local actions.

The 'Nodes and Networks' template has four concentric rings (Figure 7-18). The central ring represents the site or landscape scale (depending on the focus of the planning process at the time), and the three further rings represent regional, national and global scales. As can be seen from this example of a template used for planning in the Irk, participants considered where supplies of energy were coming from. One participant commented, *"the sheer number of arrows entering and leaving was enlightening" (Environmental Studies Lecturer at Greater Manchester HEI 2003b).*

Figure 7-18 Energy 'Nodes and Networks' Template showing flows into and from Irk Valley
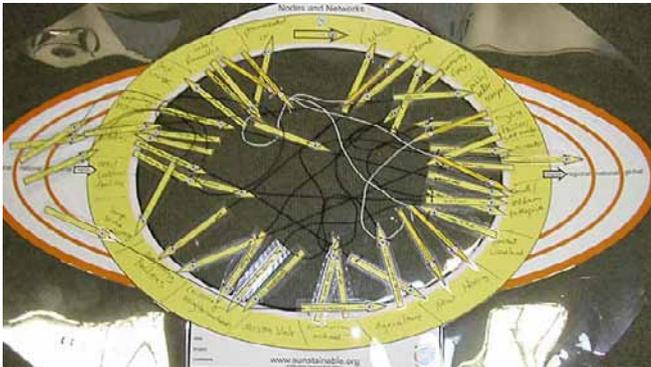
7.6.3 Use of transferable principles

Talking of the value of TNS as a tool for encouraging cooperation, Robert (1997, pg. 3) likens it to the shared understanding of football, which allows players to "`behave as a unified, intelligent body… It is the unifying idea that allows us to collaborate`". This is one of the reasons why TNS is used as the framework for understanding sustainability in DesignWays. The value of using TNS as a shared framework for communication was emphasised by the *Creative Director of Countryscape, "I thought, why hasn't this been used before and why isn't it on every wall of a consultancy?".* Another participant described the TNS

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framework as *"quite simple and quite powerful. I suppose once you get into that way of thinking you can apply it to a lot of different areas" (Environmental Studies Lecturer at Greater Manchester HEI 2003a).*

The templates used to apply ecological design principles (discussed on pg. 267) are transferable. They can be used to analyse resource flows and patterns at different levels of scale and for different aspects of a design within the same scale. This was recognised by one participant:

> *"[DesignWays] is designed for environmental and ecological projects but the ideas in it could be used for other things as well. If we were looking at a block of streets we were thinking about demolishing, you could use that and think about what you are going to put in its place on a smaller scale. If you were thinking about reshaping an area, whether it was physical buildings or whatever, then that system would still work" (Community Liaison Officer at City Council 2003a).*

Using the same format in templates for participation at the site and landscape levels of scale helps to foster the idea that sustainable design involves the application of similar patterns and principles at different levels of scale.

7.6.4 Process of linking multiple geographical scales

Integrating a bottom-up process of participation with strategic planning is a societal process. In the process of dialogue discussed above (on pg. 275) social learning between different stakeholders is encouraged (Figure 7-19). In this endeavour, transferable tools and principles encourage participants to learn from each other, and to contribute their knowledge to the plans created at each level of scale.

As well as the physical form of the toolkit, the *process* of planning and project design is important. For example, integrated water management relies on the relationships between a large body of information and data about the state of a catchment, and the process of using data as a societal activity (e.g. Wegner, McDermott and Snyder 2002). In addition to a meta-data structure and templates that create a common language for design at different levels of scale, synthesis of top-down and bottom-up planning requires a `"continuing process of negotiation and mediation"` (Carley and Christie 2000, pg. 136).

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Figure 7-19 Participants looking at EASEL for the Irk, with reference to EASELs for Moston Vale

DesignWays incorporates a process of ecological design that helps to link its various components. There is an emphasis on fluid switching between different levels of scale, which is enhanced by running planning processes at different levels of scale in parallel (Figure 7-20). Thus, participants learn to see their particular projects and areas within a larger context, and are able to cultivate 'whole systems' thinking through the stages of the design process.

Figure 7-20 Participants with regional stakeholders at final presentation

The use of the same basic format and principles does not mean that the plans created in this process are rigidly uniform. An important aspect of the DesignWays process is the value of eliciting information about the characteristics of an area and its context, and using that as the basis for design. The participatory process of DesignWays encourages people's own interpretations and expression of values in design. Whilst the same criteria for sustainability, the same principles of ecological design and the same basic structures for organising the design

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information are used, each plan created with the process is different. Due to the design process, designs are grounded in a particular context of a place and in the goals and aspirations of the residents and stakeholders. An analogy of this process can be found in the expression of DNA in the development of organisms. Very simple building blocks are used to encode information, yet each individual in a species is different.

This was recognised by the *Project Officer at IVP (2003a), "What was interesting for me was to see how the process worked at an overview level, that we were using similar tools and getting different outputs".* The outcomes of the use of the EASEL at different scales were discussed in more detail in Chapter 6. Figure 7-21 and Figure 7-22 below illustrate the differences in outcomes of the using the DesignWays process in different contexts.

Figure 7-21 Example of project design using DesignWays in Northern California

The use of a participatory design process can help to provide information about what Steiner et al (2000) term "`perceptual and cultural critical areas`", areas which are of significance to local people, and which may not be obvious from landscape data. An example of this arose in the workshops with residents in the Moston Vale area, in which the significance for local people of a particular stone (the witches' stone) was revealed. Residents told stories of standing on the stone and making a wish, a tradition that had been passed on by their grandmothers. This stone is in an area that is about to have a water treatment structure built by the water utilities company, and it could easily have been lost or bulldozed in the construction. Instead, it is to be placed at the convergence of

several paths, to form a landscape feature and a focus for interpretation of the history of the site.

Figure 7-22 Example of project design using DesignWays in South Africa
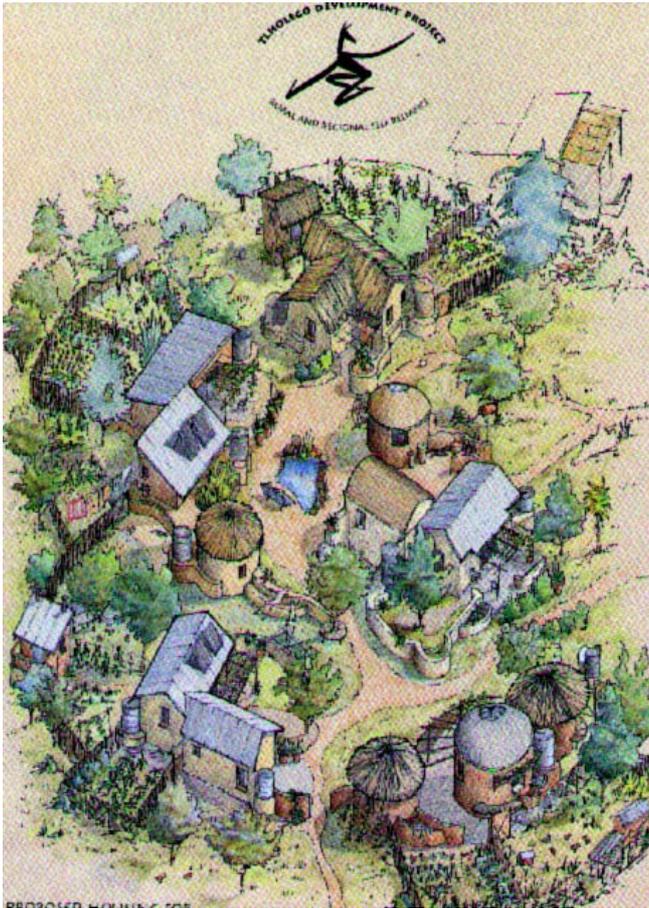
DesignWays is not seen as providing the only way to produce designs that tend towards ecological and social sustainability. The format of this toolkit is only one of a multitude of possible ways of conveying these ideas. It can be useful, however, to have a consistent format in order to facilitate cross-project and cross-scale communication. Through using a consistent framework for design, participants are able to focus on what is different and significant about their area. Time is saved using a framework for organising information, freeing more time for creative thought and dialogue. Speaking of the possible transferability of the toolkit, one participant commented: *"For people wanting to carry out any sort of consultation in the area it is a ready-made gem really. It might encourage more consultations to be done" (Creative Director of Countryscape 2003a).*

7.6.5 Summary

DesignWays is inherently a communication tool that derives most of its value from enabling dialogue between different groups of people. This is true of the toolkit as a whole and its sub-components. The EASEL and the coloured 'leaves' provide a language for coordinating design. Like a language, they are only useful in as much as they are shared and used in practice.

As well as attention to the *process* of engaging participation in planning at different scales, the underlying 'systems thinking' approach of DesignWays helps to synthesis bottom-up and top-down planning, and to 'make the whole greater than the sum of the parts'. The systems thinking framework underlying the process is discussed in the next section.

7.7 DesignWays Attribute 5 – Underlying framework of systems thinking

Capra (1982) discussed the relationship between scientific paradigms and the organisation of society. He suggests that the shifts in scientific paradigm have profound implications for the organisation of society. The last century has seen several significant shifts. A rather truncated summary follows:

- diminishing concepts of certainty in terms of predictive ability in complex systems (e.g. Funtowicz and Ravetz 1994; Ravetz, J. R. 1997);

- shifts in understanding of the nature of objectivity and scientists' ability to observe systems objectively (captured for the imagination in the phrase 'the uncertainty principle' Heisenberg 1962);

- a shift in terms of understanding the fundamental nature of reality, from particles that have an immutable existence to waves of energy that only exist in relationship to each other (e.g. implications of quantum theory related to self and society in Zohar and Marshall 1991, 1994);

- the nature of emergent properties from the interaction of different components of a system, which are not reducible to the parts of the system (e.g. Allen, A. D. and Hoekstra 1992; Koestler 1969; Miller 1995);

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- an increased understanding of self-organisation and non-linearity in systems far from equilibrium (e.g. Portugali 2000; Prigogine 1997);

- realisation of the irreversibility of time in terms of the trajectory of complex systems (as opposed to Newton's laws which imply "equivalence between past and future" Prigogine 1997, pg. 746) (elucidated in Coveney and Highfield 1991);

- increased awareness of the importance of context on the development of complex systems (e.g. Capra 1996; Kay et al. 1999);

- and an increased appreciation of the nature of the planet Earth as a self-organising system (e.g. Lovelock 1991; Margulis and Sagan 1987).

The systems thinking framework of DesignWays, based on concepts of living systems, provides a holistic framework that helps to synthesise its diverse components, and provides its key theoretical underpinnings. Medd (2001section Making Connections with Complexity Science, para. 1) cautions against attempts to apply complexity theory as if it was a monotheistic theory, ignoring the *"differences, contestations, and politics, [this] would deny the complexity of complexity science itself".* DesignWays is based on 'to the best of our knowledge' principles. The toolkit becomes useful only in as much as it is used and related back to the theoretical basis that informs it. It needs to incorporate new insights as the theoretical framework develops, allowing for a dynamic interplay between practice and theory.

The key components of its systems thinking underpinning are described below.

7.7.1 Based on systems thinking

> *"What distinguishes systems thinking is that it is a subject that can talk about the other subjects… it is a meta-discipline whose subject matter can be applied within virtually any other discipline" (Checkland 1991, pg. 5).*

DesignWays provides a process grounded in ecological principles, in order to help participants achieve sustainable plans at multiple scales. Systems thinking is used

to pull these insights together into a coherent framework, focusing on the principles common to dynamic systems. Such an approach provides scaffolding upon which to hang the insights of specialists and different interest groups.

Two different types of ecological principles are used in DesignWays. The educational framework of sustainability provided by TNS is a set of guiding principles at the level of the entire Earth, which helps to understand the relationship between human and natural systems. This is particularly important if the aim is to work with the root causes of problems, rather than continuing to treat symptoms, often with further unintended consequences stemming from the 'fixes' (think of Methyl Tertiary-Butyl Ether, the 'saviour' from lead in petrol, now considered a serious groundwater pollutant in many areas). One participant commented:

> *"TNS offered a yardstick by which we could measure the sustainability of existing resources and future developments, while at the same time, encouraging systems thinking in brainstorming and discussion" (Creative Director of Countryscape 2003b).*

Ecological design principles, originally derived from permaculture design, are used to break the concept of sustainability down into simple concepts that can be applied to the future possibilities that participants have developed in the workshops. They are also based on the insights provided by systems thinking (described in more detail below).

7.7.2 Underpinning metaphors derived from living systems

> *"Metaphors, the consequence of spreading action of the brain during learning, are the building blocks of creative thought. They connect and synergistically strengthen different spheres of memory" (Wilson, E. O. 1998, pg. 98).*

Ideas about the nature of the relationship between humans and the environment play an essential role in *how we are able to make changes* in the environment. Every aspect of DesignWays has been developed with a view to encouraging a different way of thinking about the relationship between humans and natural systems. In a study of ways to use metaphorical understanding to improve

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management, Morgan (1997, pg. 351) states "*Metaphor encourages us to think and act in new ways. It extends horizons of insight and creates new possibilities*".

In their seminal book on cognition Lakoff and Johnson (1980, pg. 3) state, "*Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature*". In case of the temptation to say – oh it is 'just a metaphor', Lakoff (2003) asks us to think of the implications that have stemmed from the metaphor 'A Nation Is a Person'. In this case, Iraq was Saddam Hussein, an individual that needed to be replaced, as Lakoff says, "*Metaphors can kill… What the metaphor hides, of course, is that the 3000 bombs to be dropped in the first two days will not be dropped on that one person*".

More than 30 years ago, Bateson (1972) wrote:

> "*It is clear now to many people that there are many catastrophic changes which have grown out of Western errors of epistemology. These range from insecticides to pollution, to atomic fallout, to the possibility of melting the Antarctic ice cap*".

Living systems metaphors are expressed in the DesignWays process in the communication tools (the graphics and the way of presenting information) as well as in the process and principles of design. The metaphor of a river flowing through its catchment is used to introduce the process of design (the DesignWays Flow) (Figure 7-23). The image of the flow of water through a landscape, with transpiration from plants creating cycles, is appropriate for thinking of the steps of the design process and the way they are related to each other.

Figure 7-23 Water cycle metaphor in DesignWays Flow

Each part of the water cycle embodies a further metaphor related to a stage of the design process (Figure 7-24). For instance, in the design process, the assets and context of the area channel design decisions, echoed in the metaphor of water formed into channels by the underlying geology of the mountain slope. The T/EASEL process acts as a filter for the flow of ideas emerging from the workshops, as wetlands act as filters in the water cycle.

Figure 7-24 Two metaphors embedded in the DesignWays Flow
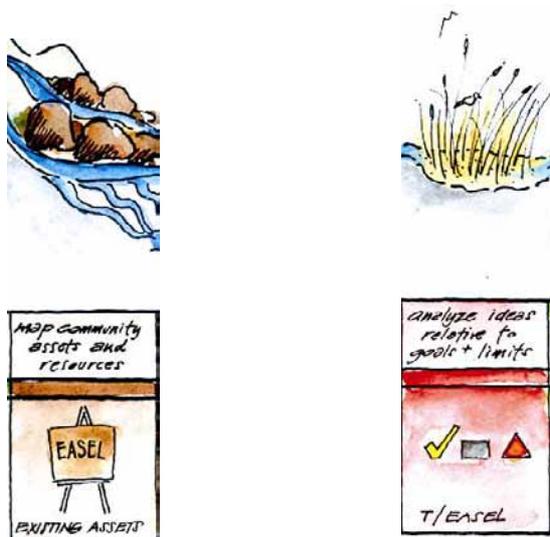
Rivers are often central images in people's perception of landscapes, important as geographical signifiers as well as creators of physical landscape form (e.g. Hulse, Gregory and Baker 2002; Verniers and Lens 1995). Rivers play a key role in knitting together human designed aspects of the environment and their interrelationship with natural processes. As one participant commented on the DesignWays Flow image, *"the whole thing is about cycles, sustainability is about cycles. So to start off with this metaphor as a cycle... was a good way to do it... one of the benefits was the fact that it made us think in systems and cycles" (Creative Director of Countryscape 2003a).*

DesignWays was developed to be applied at multiple scales. The metaphor of a river catchment is useful for coordinating thinking across levels of scale, as people tend to find it easy to understand the relationships of catchments across different levels. One Moston Resident (2003) said the image introducing the process *"was very easy to understand".*

A few participants found this metaphor difficult to start with, but said that as they went through the process, it began to make sense. One participant said she found it confusing at first, but at the end of the process that she felt it was important, giving a sense of a goal and a journey to the process.

Participants are encouraged to learn to 'think like an ecosystem'[65] through the application of ecological design principles, which are tied together through the metaphor of organisms embedded in ecosystems. This is the DNA Framework (introduced in Section 7.4.3 'Tools to apply ecological design principles' on pg. 267), which provides a graphic representation of ways of thinking of design as an analogy of an ecosystem (Figure 7-25). Each part of the DNA Framework has a set of principles and processes associated with it. Colourful charts with moveable pieces help participants to understand and apply these principles.

Figure 7-25 DNA – Designing Edge, Nodes and Networks & Analysis of Flow
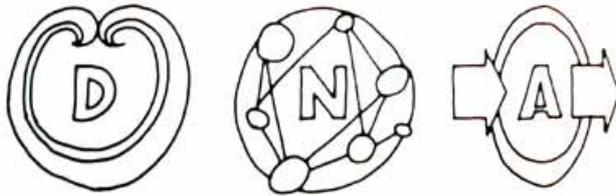
In the analogy 'think like an ecosystem' the inputs to the system are rainwater, sunlight and occasional flows of minerals (mainly in the form of soil) and species, and the outputs are clean water, biodiversity and highly structured products (which can be composted at the end of their use). The use of the word 'like' is deliberate. It implies that it would be *desirable* to design human physical and social infrastructure that is efficient in its use of the throughput of material, runs off solar energy, increases in diversity and productivity, enhances the water cycle and builds soil. These attributes reflect Forman's (1998, pg. 499) description of a system with ecological integrity, it "`has near natural conditions for four broad characteristics: productivity, biodiversity, soil and water`".

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[65] The term 'think like an ecosystem' owes a debt of gratitude to Aldo Leopold, and the concept '`think like a mountain`' (Leopold 1968). Rowe (2000) suggests that shifting the concept of a mountain to a living ecosystem represents a further step on a '`road to wisdom`'. As Wheeler (1990), California's Secretary for Resources 1991-1999, said "`To halt the decline of an ecosystem, it is necessary to think like an ecosystem.`"

Such ecologically sound infrastructure would offer many niches for other species, and have a high capacity to adapt to changing circumstances. It would also maintain a historical thread in its structure and interactions with its place. The 'think like an ecosystem' metaphor and its associated design templates provide an essential complement to the TNS principles, which can be used in decision making to avoid steps that will not be sustainable in the long term. The TNS principles tell us what to avoid, the concept of 'think like an ecosystem' provides a model of what it is we are trying to create.

7.7.3 Tools to apply systems thinking insights

> "*A shift from the view of the physical world as a collection of separate entities to the view of a network of relationships. What we call a part is a pattern in that network of relationships which is recognizable, because it has certain stability"*
> *(Capra, Steindl-Rast and Matus 1991, pg. 84).*

A key component of the DesignWays process lies in its tools for applying systems thinking insights. One participant commented, *"I've used systems thinking before and I think it has given me systems thinking as a tool to use and I think I certainly think about what we are doing in a slightly different way now. So it's been an education. To be honest with you I don't think I applied systems thinking half as much as I should have done before doing this process." (Creative Director of Countryscape 2003a).*

Six major concepts of systems thinking are:

1. requisite variety and the value of diversity;

2. the role of process in determining form;

3. holism and networks of relationships;

4. self similarity and links across scales,

5. patterns and self-organisation;

6. and cognition as the process characterising living systems.

The way the DesignWays approach incorporates these insights is explored below.

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7.7.3.1 Requisite Variety

The role of biodiversity is emphasised in the endeavour to develop eco-systemic solutions. Variety in ecosystems is essential for innovation. The word 'requisite' implies enough diversity to give the system ability to react to change, or resilience. The concept of requisite diversity is a fundamental principle of systems thinking. Discussing the need for a '`flexibility budget`' Bateson (1972, pg. 497) said, "`pathologies of our time may broadly be said to be the accumulated results of...the eating up of flexibility in response to stresses of one sort or another`".

The concept of requisite variety is built into the design process in several ways. The early focus on eliciting participants' ideas of local assets and aspects of the area that they value, helps to develop an awareness of the value of historical and ecological features. As Maturana and Bunnell (1999, pg. 84) suggest as emotive beings, we are "`concerned with conserving that which we desire`". Developing an awareness of existing assets enables them to be incorporated into the planning process, such that they are more likely to be protected and enhanced, helping to safeguard diversity.

The emphasis on creative thinking and encouraging different stakeholders to participate allows for the development of many new ideas that can be incorporated into the plans. The design process aims to teach participants skills of strategic thinking, asking 'What is it we are trying to achieve, and what are different ways of achieving this end?' Developing and implementing a variety of means of achieving a particular end can increase resilience. Speaking of what he had learned about ecological design the *Project Officer at Red Rose Forest (2003a)* said*, "looking at the big picture… Trying to get away from 'there is one way of doing it'. Trying to get as many ways of doing it as you can. You did look at things as more of a web than a linear process".*

7.7.3.2 Process and Form

Systems which are open to a flow of energy, information and materials self organise in unpredictable ways, dependent on the interaction of the parts, and on the context in which this interaction takes place (Kay et al. 1999). Physical forms are like ripples created from dynamic change, chimeras which may be relatively

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stable, but which are derived from the maintenance of self-organisation in a state far from equilibrium.

The dynamic nature of systems, and the role of process in shaping form, is emphasised throughout the DesignWays process. Using the 'Analysis of Flow' charts, participants are asked to consider all of the flows of resources and energy through the area under consideration (e.g. the Irk Valley), and through various subcomponents of the area (e.g. a factory, a school, a housing estate). These flows are traced back to their origins, and the outputs are traced to their eventual 'disposal'. Speaking of this process one participant said:

> *"I liked [thinking about an ecosystem], especially the flow bit and the changes and the way things connect. … when we were doing the flow to your house I found that hard to start with and when I finished, I thought well hang on, is it that hard? You think about what come in, the changes and what comes out" (Community Liaison Officer at City Council 2003a).*

The concept of flows developing form is further discussed in the stage of design, 'Landscape Analysis'. Looking at the long-term development of landscape patterns, and attempting to understand how human infrastructure on the landscape affects flows of energy and materials, gives a better understanding of the dynamics that shape landscapes than a simple focus on static arrangements in space.

7.7.3.3 Holism and Networks

> `"Relation is the stuff of system. Relation is the essence of synthesis" (Beer 1980, pg. 63).`

The study of ecology has led to an understanding of ecosystems as networks of relationships, including the relationships of food webs, bio-geological nutrient flows and species interactions with habitat. It involves understanding hierarchies of networks, in which an organism (a network of relationships of cells and organs) cannot be seen as a separate entity from the ecosystem in which it is embedded, which is a part of the larger network of relationships of the biosphere. Hierarchy theory is concerned with the relationships between different levels of scale, and in particular similarities and differences between one level of complexity and another (e.g. Allen, A. D. and Hoekstra 1992; Koestler 1969). This is related to

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the concept of emergence, or the appearance of characteristics from a relationship of parts that is not merely an additive property of the characteristics of the lower parts, but is a new, or emerging property of that particular level of organisation. This relationship of parts can be conceptualised as a network.

Thus, each 'whole' in a system has to be seen as embedded in a larger whole, nested in a higher level of complexity, in which it is a part. But each system is itself made up of smaller systems, for example the nested hierarchy of organelle, cell, organ, organism, population, community and ecosystem. Koestler (1969) suggested that when looking at complex systems, neither parts nor wholes in an absolute sense exist, they are conceptual categories that we use to divide the world. He coined the term 'holon' to describe these intermediary structures, from the Greek word 'holos' or whole, and the suffix –on, such as in proton or neutron, reminiscent of 'particle or part'.

A central tenet of systems thinking is that 'the whole is greater than the sum of its parts'. This has emerged from a realisation of the limitations of reductionism, an endeavour that attempts to increase understanding of systems by breaking them into smaller and smaller components, and then analysing simple reactions between those components in controlled experiments. This approach has produced much valuable knowledge, but comes across serious limitations in terms of understanding the properties of complex systems. As Rosner (1995, pg. 108) suggests,

> "*to understand the whole complexity of the issues we face, we can no longer rely on the analytical approach, which attempts to understand all the details, but we have to take a look at the broader picture*".

To help meet this challenge of integration, the DesignWays process encourages participants to literally make connections between different elements. One participant reflected on the process:

> *"This holistic approach is key to it. It's key to a lot of work really. It can be very intimidating to have everything put on the table in front of you but you have to do that to see how it fits together because people can get entrenched in little areas. You can have little camps within these*

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community groups that have their own interests" (Creative Director of Countryscape 2003a).

The fact that the design process is applied at more than one level of scale at the same time helps participants to understand the essential embeddedness of their area and concerns in a wider context. This, combined with the use of the 'Analysis of Flow' charts, helps participants to understand the many ripples of environmental effects our actions have across scales. An aim of this process is to help participants to understand the many ways in which they are reliant upon the natural world.

One of the main ways that participants are encouraged to think in terms of networks is through the use of the 'Nodes and Networks' Template (Figure 7-26). In this exercise different resource and energy flows are considered. Participants use arrows to show possible connections between elements in the design, looking to maximize re-use of resources, and to meet as many of the inputs of the system needed from within the local area as possible. Network charts are built in several layers, showing flows and connections between elements. This exercise uses the information collated in the 'Analysis of Flow' exercise.

Figure 7-26 'Nodes and Networks' Template in use

The 'Nodes and Networks' exercise is a further way to promote the building of requisite diversity into the system. It encourages participants to think of many different ways of supplying the needs of each element in the system, and many uses for each output. Speaking of the 'Nodes and Networks' templates, one participant commented, *"It's like a food web isn't it? There is so much information there*

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and you follow the lines and you can come out with a lot of information" (Project Officer at IVP 2003a).

Through encouraging an understanding of underlying patterns and the processes that inform them, it is possible to develop design solutions that integrate ecological principles and develop beneficial synergies between elements. The use of ecological design principles and attention to the patterns of relationship between the elements gives a higher probability of developing solutions that behave 'like an ecosystem'.

Participants commented that the DNA templates helped them to understand the concept of ecological design. They were also seen as useful for communicating abstract concepts: *"I thought it was good, not just from the practical point of view, but the DNA, the visual tools, were quite catchy and it wasn't jargonistic. I thought it was great. A lot of people commented on' thinking as an ecosystem' at the [final] presentation and thought it was great" (Creative Director of Countryscape 2003a).* Several of the quotes above illustrate the value of the systems thinking metaphors in making the ecological design ideas practical for participants, both in terms of dealing with complex information and in terms of trying to find alternative ways of achieving a desired outcome.

7.7.3.4 Self-similarity and Links Across Scales

The concept of self-similarity has emerged from fractal geometry, which has become the 'poster child' of chaos theory. Capra (1996, pg. 138) describes self-similarity thus: `"characteristic patterns are found repeatedly at descending scales, so that their [fractal shapes] parts, at any scale, are similar in shape to the whole"`.

The attempt to find principles that can be applied at multiple scales has been central to the development of systems thinking. This endeavour aims to reduce the duplication of effort and to promote improved communication between people working in different fields (e.g. Checkland 1991; Maiteny and Ison 2000). The ecological design principles and the systems based metaphors used to communicate them are used in the DesignWays process at each level of scale. They are transferable because they are based on general principles of dynamic systems. As one participant commented:

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"All the time we were making links by using symbols and you realised that was the same. And the arrows, the networks, that was a good way of seeing and linking everything together. Having the arrows was really good and joined everything up" (Programme Coordinator at Red Rose Forest 2003).

Using these similar concepts in design not only furthers communication, it can also promote creative insights. In discussing the application of systems principles to eco-industrial planning, Moser (1996, pg. 119) states:

`"One of the great advantages of the systems approach`
`is the fact that the same concepts can be applied at`
`different system levels… the problem solving capacity`
`is greater."`

Some participants said the tools were a bit abstract and hard to follow, but most agreed that even though at times difficult, they were *"a good way of getting people to think differently and it was quite useful" (Environmental Strategy Officer at City Council 2003a).* One participant commented on the way the systems thinking tools helped him to better understand how to apply sustainable development principles, *"the idea of forming the links and trying to keep things within the cycles, again it is a concept that I was aware of when I knew what sustainable development was, but I wouldn't know how to do it, but now I do, so that has been useful" (Creative Director of Countryscape 2003a).*

7.7.3.5 Patterns and Self-organisation

`"The natural world around us really has this general`
`systemic structure and therefore is an appropriate`
`source of metaphor to enable man to understand himself`
`in his social organization" (Bateson 1972, pg. 484).`

Patterns are configurations of relationships, which are expressed as repetition and similarities in space (form) and time (development). An understanding of patterns provides an essential link between insights into the interconnected nature of the world and design (e.g. Tippett, J. 1996, 2000a). A pattern language, or set of organizing principles, can act as a tool for thinking about sustainability.

There are three aspects to the use of patterns in DesignWays:

1. developing a pattern language as a toolkit for design, building an understanding of the links between processes and patterns in a way that is easy to remember;

2. using natural patterns as templates for understanding flows of resources and exchange between elements;

3. and looking at natural patterns in the particular landscape as the foundation for spatial planning and consideration of location of elements in the design process.

Patterns found in nature are used in the beginning of the course to introduce the process of Mind Mapping as a way to start participants thinking about patterns and the relationship between form and function (literally using natural materials, e.g. branches, flowers and leaves). One participant commented on this process, *"even when we started doing a mind map and looking at the patterns in nature, so even when you are linking on your map, you are using ways of linking that spark off other things" (Programme Coordinator at Red Rose Forest 2003).*

The trend of applying systems thinking to organisational management was seen in early work of Beer (1980; 1995) and de Geus (2002), and popularised in books such as *The Fifth Discipline* (Senge 1990; Senge et al. 1994), and the work of Wegner (e.g. Wegner, McDermott and Snyder 2002). The concept of self-organisation plays an important role in this work. Management is seen as an arrangement so that people can self-manage, creating learning organisations through their dynamic interactions.

In this design process the DesignWays Flow and the components of the toolkit are seen as providing a generative structure that facilitates the self-organisation of different groups of participants. As one participant reflected:

> *"Seeing it work is one of the most exciting things. It was chaotic but exciting as well at the same time. But I was really keen to see how it would come together. I couldn't really see how it was going to come together, not that I thought that was a bad thing, but when we got there, that was really exciting" (Creative Director of Countryscape 2003a).*

7.7.3.6 Cognition Characterises Living Systems

"Could it be that the "integrity, stability, and beauty" of nature is the wellspring of human intelligence? Could it be that the conquest of nature, however clever, is in fact a war against the source of mind? Could it be that the systematic homogenisation of nature inherent in contemporary technology and economics is undermining human intelligence?" (Orr, D. 1994, pg. 51).

In keeping with the proposition that we can only see ecosystems as socio-ecological systems, in that our interactions with ecology are part of the system, the development of ecological principles for planning requires a '*human-in-ecosystem perspective'* (Davidson-Hunt and Berkes 2003). The ecological principles used in DesignWays are 'judged' in as much as they help to increase participants' understanding of sustainability.

The principle of edge, embodied in the DNA concept of 'Designing Edge', helps to clarify the relationships between design options and the 'whole system'. Volk (1995, pg. 86) gives these examples of edges: "*Terrestrial plants are a skin between earth and sky. Culture is a skin between humanity and nature".*

Every element is embedded in a whole; it cannot exist without the whole. Each element, however, does have an edge, which defines it as an entity through an active process of interacting with the larger whole of which it is a part. Capra (2002, pg. 7) talks of the '*foundation of cellular identity'* the cell membrane,

"*which discriminates between the system – the 'self', as it were – and its environment. Within this boundary, there is a network of chemical reactions (the cell's metabolism) by which the system sustains itself".*

Participants are encouraged to think about the identity of the various systems they are designing, to ask what characteristics in this do we wish to preserve? This involves thinking of the historical development of the system and the inputs and

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outputs to the system. The contemplation of dissipative structures helps to spark thinking about sustainable economics and resource flows, based on what Daly (1993, pg. 267) terms an understanding of the difference between quantitative change, necessitating growth; and qualitative change, implied by a view of development that is not predicated on growth.

He discusses the value of the metaphor of an ecosystem for human development. An ecosystem develops in intricacy and potential for biodiversity whilst running off the same basic throughput of sunlight and water. Thinking of the edges of systems, and the way that these are constituted through networks of relations, can help participants re-conceptualise desirable flows of resources and money, and their impacts on the structure of the system.

The DesignWays process encourages participants to think about their goals and aspirations, and to develop several different visions of what is possible for their area. Participants are encouraged to explore alternative models of development, which could work more like an ecosystem developing and changing in quality, rather than being predicated on constantly increasing throughputs of resources. This process encourages participants to realise that the current development trajectory is not inevitable; it is possible to actively promote a sustainable future.

Maturana and Varela coined the term 'autopoiesis' to denote their understanding of the organisation of living beings. It is derived from the root 'auto', or self, and the Greek word 'poiesis', which means making, and shares the same root as the word poetry (Capra 1996). Thus autopoiesis can be seen as self-making, and living organisms can be characterised by the process of self-reproduction in a particular biological and cultural context (Varela, Thompson and Rosch 1991). The DNA concept of DesignWays was influenced by the theory of autopoiesis. It aims to help participants 'think like an ecosystem' and create designs that 'behave (more) like an ecosystem'.

7.7.4 Summary

In the endeavour to develop a process for 'planning for sustainability', it has to be remembered that 'laws of nature' which are used to develop these templates and ecological design principles are only constructs. As Bateson (1972, pg. 481) reminds us:

> *"There are, in a sense, no facts in nature; or if you like, there are an infinite number of potential facts in nature, out of which the judgement selects a few which become truly facts by that act of selection".*

Professor Rayner from Oxford University's Saïd Business School suggests, however, with regards to using scientific knowledge to attempt to move towards sustainability, *"We know enough".* He calls on scientists to cease calling for more research into precise effects of actions, but rather to advance sustainability politics based on our current understanding, ethics and aesthetics. He suggests:

> *"While better knowledge is generally a good thing, what we already know ought to be sufficient to start taking decisive steps to protect the planet and address the needs of its poorest citizens. Knowledge deficit does not seem to be the key obstacle" (Rayner 2002para. 8).*

Whilst accepting inherent uncertainty and difficulty in predicting precise outcomes from actions, it is still possible to say what is unsustainable in broad terms, and to derive principles for action which are much more likely to lead to sustainable outcomes. In the TNS model, for instance, it is accepted that it is not possible to predict exactly what the threshold for negative effects of synthetic chemicals, but we can predict that a systematic build up is likely to be unsustainable at some point in the future. To refer to the metaphor of the funnel Figure 5-4 The walls of the funnel on pg. 157, different people may disagree about the slope of the funnel, or the rate at which demand on living systems is increasing, or the quality of living systems is declining.

In the DesignWays process, the combination of the TNS framework and ecological design principles, made coherent through systems thinking metaphors,

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is seen as providing a useful framework for action. The metaphors and principles used are not claimed to be absolute truths, or a description of how nature *is*, but rather to represent a shift in understanding of how we interact with the environment. The underlying principles of this process are, however, based on recent empirical science, and strive to incorporate what Lakoff and Johnson (1999) term *'stable truths'* in a context of social construction of meaning.

A design process needs to be seen as a learning system, with an inbuilt process to allow for changes in response to reflections upon action. There needs to be a continuous process of questioning the underlying models of systems thinking both from learning through application, and from advances in systems thinking in theoretical discourse and in other fields of application.

7.8 Conclusion

The components of the DesignWays process have been analysed in this chapter. Table 7-3 shows participants' responses to the question of the utility of each of these components. These results were gathered from an anonymous survey sent to participants on the Irk Valley Planning process.

Table 7-3 Summary of response to anonymous survey – 'Components of DesignWays Toolkit'

Components of the Toolkit - Usefulness	Essential	Useful	Average	Could remove	Not useful	Don't know
Simple EASEL template	4	2				
Full EASEL templates	5	3				
Different coloured leaves for brainstorming	4	3	1			
T/EASEL icons (e.g. yellow tick for advances goals, red exclamation mark for importance)	2	4	1			1
Analysis of Flow Charts	1	6	1			
Nodes and Networks Charts	2	4	2			

This table shows that all the participants found components of the toolkit at least average, and many found the components essential. As discussed in this chapter, the components of the toolkit help to express the key attributes of DesignWays. Table 7-4 shows a summary of participants' perception of the usefulness of the stages of the DesignWays process, summarised from the anonymous surveys.

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Table 7-4 Summary of response to anonymous survey – 'Stages of Process'

Stages of the design process	Essential	Useful	Average	Could be removed	Not useful	Don't know
Site visits and walks	3	2				1
Envisioning the Future – mind mapping and brainstorming new ideas	4	4				
Context: Existing Resources – introduction to the EASEL and mapping existing assets	5	3				
Quality of Life and the Environment The Natural Step & Analysis of Flow	4	3	1			
Integrated Decision making – Problem tree analysis and developing goals	2	5				1
Ecological Design - Nodes and Networks, application of ecological design principles	3	5				
Landscapes – mapping historical and ecological resources	2	5	1			
Design Synthesis – making connections, where do the ideas go?	3	2	2			1
More Design work and Discussion of the process	1	5	1			1
Final presentation to wider stakeholder group (June 19)	6					1

As can be see from this table, all of the stages were seen as important, and each of them had at least one participant say that they were essential. None of the stages were seen as expendable.

This chapter has explored the key attributes of DesignWays through qualitative analysis of participants' experience of the process in the action research in the Irk Valley. Results from this analysis have been positive, indicating a marked increase in participants' understanding of sustainability, and their capacity to design creative solutions to move towards the goal of sustainable development. Interviews with participants indicate that they were made more aware of the importance of underlying processes in shaping and influencing two-dimensional plans. It was considered important that elements of ecology, social capital, the built environment and the economy were considered, as this helped participants to broaden their perceptions, often looking outside their area of expertise and interest. They felt that they developed skills in forging links amongst these different areas, becoming more able to develop solutions embedded in the local context.

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The following chapter assesses these findings and the outcomes of the process against the challenges of the WFD elaborated in Chapter 4. This includes a discussion of the limiting factors experienced in applying the DesignWays process.