

WHAT IS THE CONTRIBUTION THAT DESIGN CAN MAKE TO SUSTAINABLE DEVELOPMENT? AN EXAMINATION OF THIS IN THE CONTEXT OF SMALL SCALE TEXTILE PRODUCTION

Angharad Thomas,
School of Art and Design,
University of Salford,
Salford M3 6EQ
a.thomas1@salford.ac.uk

ABSTRACT

This paper examines design in the context of sustainable development, asking the question, what can design contribute to sustainable development? Given the continued need for development that improves quality of life and reduces poverty in both developed economies and those now developing rapidly such as India and China, the need is urgent for this to be sustainable in all aspects, economic, environmental and social.

The paper reports on doctoral work examining the relationship between design and sustainable development within a selected part of the Welsh textile industry. Wales has been chosen for the work as it has a legal governmental remit for sustainable development, making it one of a very small group of countries in the world to do so (Welsh Assembly Government 2004a). A case study approach has been taken to the research question (Langrish 1993, Yin 2003) with the work taking place in three stages. The second stage of the work is reported and discussed in this paper.

The methodological approach is a qualitative one (Denzin & Lincoln, 2000) as this enables the researcher to build knowledge and theory during the course of the work in an iterative, reflexive way (Rossman & Rallis 1998). An essential feature of the methodology is a systems approach to the research and the reasons for this choice of approach and the insights gained are discussed (Naughton 1984, Checkland 2000). A further tool used in analysing the data is situational analysis (Clarke 2005). Both approaches use visual methods, employing diagrams and the appropriateness of this to a design research question is noted. These are judged to be suitable tools for the research question bearing in mind that the question has been asked as to whether sustainability requires a new research approach (Tilbury 2008).

Findings from the first two stages of the research are reported including the use or otherwise of design in the textile production and the contribution of the producers to the 'three pillars of sustainable development – economic, environmental and social. The planned third stage of the work is discussed and the methodological approaches that will take allow this relationship to be explored further including a reconceptualising of sustainable development.

The paper is concluded by a brief examination of similar types of textile production which could contribute to sustainable development and the ways in which this could be enhanced by a design input.

INTRODUCTION

This paper examines the relationship between design and sustainable development, particularly looking at the contribution that design can make to the process of sustainable development. It does this in the context of the Welsh textile industry, Wales being part of the UK where the devolved government has a legal remit for sustainable development. The part of the textile industry selected for study is the Welsh Woollen Industry which makes woven and knitted goods from wool and other similar natural fibres.

DESIGN AND SUSTAINABLE DEVELOPMENT

The two concepts central to this research, design and sustainable development, are both contested concepts; both are complex and can be taken to mean many different types of activity. In this context design is taken to be the process of decision making about the manufacture of products or artefacts (Zeisel 2004). Sustainable development is a term that came into use following the report of the Brundtland Commission in 1987, *Our Common Future* (WCED 1987). This gives the definition of sustainable development as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (p 43).

Sustainable development is therefore that sort of development that would allow all of the world's population to have an adequate standard of living in a way that would not damage the world's environments. It has come to be conceptualised as having three interlinked elements – economic,

environmental and social. However, further ways of conceptualising it are discussed at the end of this paper.

Design in the context of sustainable development

Design, as the term is being used in this research, i.e. the design of artefacts or products, is not mentioned in most texts on sustainable development or in discussions on sustainability. However, the few references that have been found are now discussed.

Purvis, writing about Business, Capital and Sustainable Economic Development (Purvis 2004) within a geographical approach to sustainable development, makes the point that design can contribute to the environmental element of sustainable development within manufacturing firms:

Some products can be redesigned to increase their eco-efficiency; others must be replaced with environmentally sound alternatives. In both cases, environmental considerations should be integrated into the design process, ...

Design for environment stresses not only resource efficiency and clean production technologies, but also recycling at the end of its lifespan (Purvis, 2004, p.161 – 162).

So design, of a particular sort, is identified as a tool that could aid sustainability. However, the sustainable development literature shows little awareness of design as an activity and even less of its potential to contribute to enabling sustainable development.

Possible reasons for this apparent lack of connection between design and sustainable development could include the fact that design is a broad term and can be omitted in discussions of the manufacture of goods and artefacts. An example of this is in the book, *Factor Four*, in which the implications of resource use are discussed with respect to many different aspects of production and material culture including transport, energy generation, building design and agriculture. Design, however has only one mention in the index and yet much of the book is actually about the design of things – the materials they are made from, the way they are used, the way they look and the way people behave in relation to them (Von Weizsacker et al 1997). That none of the authors have design backgrounds could be the reason that design is not identified as a potential contributor to the solution of these problems?

A second factor in this lack of linkage between the two could be that the culture of each activity and discipline has contrasting values and priorities. The mainstream design world is focused on the material world, with an emphasis on the appearance and style aspects of it. These are fast changing and in high income economies, are driven by fashion and trends that demand frequent change and high consumption. In contrast, sustainable development has its roots in the search for a more equitable society and the environmental movements. People involved in sustainable development are from disciplines including politics and economics, the social sciences and the environmental sciences. This is an area of debate and action very different from that of the design world. People involved in the world of design would not be likely to be involved with the world of sustainable development and vice versa, and so there could be suspicion and disinterest between the two.

There are however, some writers who embrace the two concepts and these that are now discussed.

Sustainable development in the design context

Spangenberg (2001) examines sustainable development in a design context. He discusses sustainable production and consumption as concepts, arguing that all environmental issues are production and consumption issues (p. 32). Discussing supply and demand within an economy and the need to change to a more sustainable model he says 'The role of design is vital to both spheres, but very different in each' (p. 33). He argues that structural changes are needed to move markets towards more sustainable development and continues to say that

ecodesign can contribute to most of these goals, be it in terms of promoting eco-efficiency and resource productivity or in terms of the production of environmentally and socially sound attractive goods and services (Spangenberg, 2001, p 45).

He concludes by stating:

If identifying the patterns of consumer preference and perception and the shaping of goods and services to make them digestible to citizens are some key qualifications, designers might have a key role to play. Thus designers would act as a translator between disciplines, as the spider weaving the sustainability web (Spangenberg, 2001, p.47).

Spangenberg has been quoted at length being one of the few writers to discuss design and sustainable development. It is probably relevant that he is German and has worked extensively in both Germany

where issues of sustainability are given priority often with legal and institutional backing (Charter and Tischner, 2001, p. 459).

Walker has written about many aspects of sustainable design (Walker 2006). He gives an overview of the development of the concept of sustainable development (2006 pp16-27):

I also suggest that sustainable development can be understood as an important but nevertheless limited, mythic story that attempts to give meaning to some of our principal modern-day uncertainties (Walker, 2006, p. 15).

He then however, argues against it as a mythic concept, as, in his opinion, it fails to embrace the artistic and imaginative aspects of human nature arguing:

It (sustainable development) is largely bereft of ideas that nurture and develop the inner person – the inspirational, the imaginative, the transcendent and the struggle for self-knowledge. These are aspects of our existence that fuel the artist, the composer, the musician and the poet ... Sustainable development must embrace these vital aspects of human culture of it is to make a meaningful and lasting contribution (Walker, 2006, p26 – 27).

This author argues however, that the idea of sustainable development itself, is inspirational and a vital contributor to human life. If implemented globally, the world's population would be able to live good quality lives in thriving natural environments.

Design, as a discipline, and designers in practice, therefore, have made and continue to make a contribution to sustainability in various ways. A contribution to 'true' sustainable development needs an approach that keeps the three pillars of sustainable development, environmental, economic in a dynamic equilibrium with each other.

Design and sustainable development, by its definition embracing economic, environmental and social factors, presents design and the designer with a more complex challenge than that of green or eco design. The relationship between design and sustainable development is at the centre of this research and ways of exploring this relationship are founded on these discussions about the nature of both design and sustainable development.

CONTEXT

The research into the relationship between design and sustainable development is located in Wales, a part of the UK with a devolved government, see map, figure 1, within a particular part of the textile industry there. The reasons for this are now discussed.



Figure 1. Map of Wales <http://www.walesdirectory.co.uk/maps/index.htm> accessed 8 May 2008

Following devolution in 1997, the National Assembly for Wales (NAW) and the Welsh Assembly Government (WAG), have taken forward a sustainable development agenda, having a legal duty placed upon it to do so, one of the very few state governments in the world that has this obligation. In the introduction to The Sustainable Development Action Plan this statement is made:

The National Assembly for Wales is required by law to make a Scheme stating how it will promote sustainable development in the exercise of its functions (WAG 2004a, p3).

The Welsh Assembly Government then has to implement the Scheme.

Sustainable Development in the Welsh context is defined as follows:

The National Assembly for Wales will promote development that meets the needs of the present without compromising the ability of future generation to meet their own needs. By this we mean the needs of all human life, within the carrying capacity of supporting ecosystems, without compromising the ability of future generations to meet their own social, economic, environmental and cultural needs (WAG 2004b P3).

This incorporates the most often quoted part of the Bruntland definition, i.e. 'development that meets the needs of the present without compromising the ability of future generation to meet their own needs'.

The textile industry in Wales

Some products of the manufacturers studied are shown in figures 2 and 3, below.



Figure 2. Example of woven goods



Figure 3. Example of knitted goods

Textile production was selected as the area in which to study the relationship between design and sustainable development because Wales has a textile industry with many different constituent parts, from individual craft manufacture to industrialised production. Textile manufacture is a fundamental human activity – evidence of textile manufacture is found in pre-historic sites globally. In a development context, the textile industry is a key sector as it moves from domestic production to industrial production through the process of development. Textile production is also a prominent part of post industrial craft production (Crafts Council 2004, p 26) and the creative industries.

The traditional Welsh woollen industry as described and documented by Jenkins (1969, 2005) now consists of about a dozen mills throughout Wales which weave woollen cloth, which is then made into a variety of products, clothing and household textiles. However, historically, there was also the production of knitted goods. The defining features of the Welsh woollen industry in this research are the use of wool, or similar fibres and the techniques of knitting and weaving for production. That included the remaining mills of the traditional Welsh Woollen Industry along with newer producers who use the techniques of knitting or weaving and raw materials including wool or similar and related fibres such as cashmere and mohair. In summary, the criteria used for selection in stage two and three of the study were:

- Manufacturing using weaving or knitting
- And manufacturing from wool or other similar natural fibres
- And manufacturing in Wales

This selection gave a reduced number of producers across a wide range of types from factory production to individual craftspeople. The producers were located throughout Wales, urban and rural, and included any size of enterprise from one person upwards. Some producers were professional full time workers, while for others textile production was part time or provided a supplementary income.

Producers of textiles who fulfilled the criteria above were selected for study of the research question i.e. the relationship between design and sustainable development including economic, social and environmental sustainability.

METHODOLOGY

Findings from the second stage of the work are reported and discussed in this paper. The methodological approach is a qualitative one (Denzin & Lincoln, 2000) as this enables the researcher to build knowledge and theory during the course of the work in an iterative, reflexive way (Rossman & Rallis 1998).

The case study approach (Langrish 1993, Yin 2003) enables the researcher to collect data from a wide variety of sources and of many types. A feature of the case study approach to research is that multiple methods are used. According to Denscombe:

One of the strengths of the case study approach is that it allows the researcher to use a variety of sources, a variety of types of data and a variety of research methods as part of the investigation. It not only allows this, it actually invites and encourages the researcher to do so (Denscombe 2003 p31).

A systems approach

An essential feature of the methodology is a systems approach to the understanding of the research situation (Naughton 1984, Checkland 2000). A systems approach was selected because of the complex nature of the two central concepts to the research i.e. design and sustainable development neither of which can be understood in isolation and both of which have multiple elements. The systems way of thinking, and the tools associated with it such as soft systems analysis and systems diagrams (Open University 2005) were also used as an analytic tool both in the exploratory phase of the work and in data analysis. The key quality of systems diagrams is that they enable a holistic, systemic approach to be taken, one which was felt to be essential for understanding the research situation consisting as it did of the relationship between design and sustainable development, both of which, it could be argued, are best understood in a holistic way.

Situational analysis

A further tool for analysis of the data is situational analysis (Clarke 2005). Both situational analysis and systems theory use diagrams as tools for understanding the research situation and /or analysing aspects of it including data collected. This visual aspect of the tools make them particularly attractive to the researcher whose background encompasses academic disciplines that make use of visual data; i.e. geography with maps and other diagrams, and design, with its concern for the visual.

Does sustainability make new challenges for the researcher?

It is argued that researching sustainability presents particular problems for the researcher (Tilbury 2008) who says 'sustainability challenges the way we live, work, travel, educate as well as the way do research'. She outlines ways in which researchers into sustainability need to challenge their worldviews and rethink how research institutions and researchers engage with sustainability research. It is thought that using the approaches and tools described above might address this challenge.

FINDINGS

The findings discussed here are from the second stage of the research in which all the textile producers satisfying the criteria discussed above in a rural county of West Wales were used as case studies. This gave eight producers of differing types from small scale factory production of woven goods to domestic scale production of knitted goods. The two mills, M1 and M2, are discussed first then the six smaller producers who are discussed together, P1, P2, P3, P4, P5 and P6. Their use of design is discussed followed by a discussion of it in relation to the 'three pillars' of sustainable development i.e. economic, environmental and social aspects.

The two mills

The two mills are identified as M1 and M2. Both produce woollen textiles on mechanised looms capable of producing plain, striped, checked or textured cloth. Both are tourist attractions, having 15 – 20,000 visitors each annually.

Their approach to design is very different, M2 being very design driven. M2 is using design in a 'text book' way to drive sales and to place goods at the top end of the market (Thackara 1997). Colours are chosen with care and with consideration of the colour forecasts including those produced by Design Wales, the Welsh Assembly funded design advice service (Design Wales 2006). A full time designer is employed and design students have worked there on placement. The owner is a trained architect and brings a design sensibility to the publicity, signage and web site, all of which he designs. The design aspect is linked to customer service meaning that customers can have exclusive fabrics and colours in

relatively small quantities and this is also a key part of their strategy. Prices are high and an overall message of tradition with a modern twist is given through the products and through all communications from road signs to paper and web based material.

At M1, the design of products is done mostly by the owner and his wife, neither of whom are designers. The owner knows that a design input could benefit his sales but for various reasons, including expense and the expense of having special yarn colours dyed it is not used in a formal or professional way. Most of the production is made from redundant yarn from the UK carpet industry and therefore the choice of colours is limited. The mill produces striped and geometric floor coverings that are sold in the shop at the mill. There is no overall design theme to publicity material, signage and so on; these are being updated constantly but there is no consistency in the graphics used. These have become more attractive during the course of the study however.

Taking the component parts of sustainable development in turn, in economic terms both make a contribution in the local area, being in business since 1907 and 1912 respectively. M2, the one with the clear design agenda, is a major employer locally, employing about 20 people, a significant number of people in a rural area. M1 is also an employer but not at such a size, having a workforce of about four, mostly family members. Another aspect of the producers' economic impact is that of the visitors they attract to the area. This is difficult to assess as it is unlikely that many visitors come exclusively to either of the woollen mills. A visit to the mills is likely to form part of a day out during a holiday in the area and both mills are part of the range of attractions, having brown tourist signs, tourism being important locally.

Turning to the environmental impact of the mills themselves, they are both relatively small factories and care is taken at both to re-cycle machine oil, packaging and waste. Both have water wheels, one recently re-placed, and these could be used for driving machinery. The placement of the 'system boundary' is important in assessing environmental impact as the manufacture and dyeing of the yarns used has an environmental impact, but not locally. Assessing the environmental impact of the many visitors arriving by car is another difficulty and again, dependent on where boundaries are drawn around the mills. Design can have contribution to make in ensuring that goods have little environmental impact but in these cases the use of wool as a raw material, a renewable source and one that is easily recycled (Blackburn 2008) and the small scale manufacturing mean that environmental impact is low. The type of goods produced and sold by both mills is of the sort that would be kept for a long time, becoming a treasured possession or heirloom, rather than being worn and disposed of quickly as in 'fast fashion'.

Continuing with the 'three pillars' model of sustainable development, the mills' social impact and the effect that design could have on it is apparent in the case of M2 which has been involved with design competitions for Welsh students. Social effects are not easily separated from economic ones and the potential link between design and increased economic activity has been drawn. The social effects of the mills employing people locally and the effect of the continued production of traditional Welsh textiles on intangible concepts such as society or community are hard to quantify but are socially and culturally significant. The role that design could play in ensuring the continued existence of these forms of manufacture with their heritage and cultural significance is again most likely linked to its role in economic sustainability and a contribution to the tourist economy in the area. Both mills emphasise their long history, one having a leaflet on its history in the mill shop and both having their history on their web sites.

The smaller producers

The second stage of the work being reported also involved six rural producers of textiles in the same county. Two were designer maker weavers who have been in business over 20 and 30 years each, P1 and P4; two were small holders or small farmers with flocks of goats and sheep, P2 and P3; and one P5 is no longer trading, although the premises were still intact at the time of the visit. P6 is in business intermittently, producing woollen goods and selling in a small shop and café in a village. All fall into the 'new Welsh Woollen industry' classification, as already discussed; making products in Wales, in knit or weave with wool or similar natural fibre.

The place that design played, as an identified process, varied. The designer – maker – weavers, P1 and P4, were both strongly design driven as they make individual pieces, sometimes to commission, often as pictures or wall hangings, so there is a strong design input adding value to their work. One of them has a textile design degree and the other holds that 30 years as a designer maker gives him design expertise, as he does not have a formal design qualification. The smallholders, P2 and P3, saw design as a minor part of their business although they both produced ranges of garments, see Figure 3, and domestic textiles, rugs and throws etc. They also selected goods for sale in their shops or workshops. Design is not considered an

important aspect of what they do although there was some acknowledgement by one of them that being able to employ a qualified designer would be advantageous. They defended this position by saying that their customers were not interested in fashion, they just want good quality garments that will cover their 'lumps and bumps'. For both of them, making decisions about the design of their goods was a minor part of their activity as they also produce fibre, and run farms. They dye the yarn themselves, in one case offering 50 colours so that there will always be something that will appeal, while the other is guided by what sells. One is a main dealer for textile equipment and teaches spinning, and the other has a bed and breakfast business. The fibre and garment production is therefore only part of how they make a living. There is no consistency or obvious design element in any of their visuals, publicity material or signage.

The fifth in this group, no longer in business, P5, produced organic fibre and garments and sold other ranges from a showroom occupying a former milking parlour on her farm. Although with no design background, the owner had a good understanding of the use of design in enhancing sales, and employed a knitwear designer to produce a range that 'would give the yarn more appeal'. These designs were available as yarn and patterns for home manufacture or as completed garments. She understood the value of design in marketing the yarn and other products and had had discussions with Design Wales about the design of publicity material and packaging. Cost prevented her from taking up the ideas for designs that were put forward, apart from at a very small scale. She also realised the importance of good quality images for a web site and the lack of these held up its development. It is important to note that the business ceased trading because of external, rather than business, circumstances.

The sixth producer, P6, has a textile design degree and works to themes and particular colour palettes. She has found it hard to stay in business despite this and operates intermittently from a café – showroom-workshop premises and her home.

The discussion of the role of design in sustainable development with respect to these six producers, is broken down again into economic, environmental and social aspects. However, it must be emphasised that these are inextricably linked in the concept of sustainable development and should be seen as interdependent.

The findings from these producers are now discussed in relation to their contribution to sustainable development in its economic, environmental and social aspects.

Four of the producers have been in business as textile producers in their current location from 17 (P3) to 32 (P4) years. The fifth producer is currently working away from the business, but plans to return to it on retirement from waged work, currently necessary while the sixth varies according to the level of business. The producers are largely economically sustainable, but they do not aim to earn large amounts of money. The fact that craft producers make an economic sacrifice to follow their craft has been documented (Crafts Council 2004) and is reiterated by one producer who says 'It's never going to make me rich, you know' (P4). Their economic durability is strengthened because they are diverse in what they do, including making, teaching, providing tourist accommodation and farming.

The economic contribution to the local area is seen to be important by all the interviewees and a source of pride that they are self supporting from their textile businesses. Three of them also provide employment for outworkers who hand make garments for them (P2, P3, P5). Those that run courses and attract visitors point out that these visitors make a contribution to the local economy too (P4).

The environmental impact of these producers is minimal, due to their micro scale and their type of activity. They all minimise their environmental impact and re-cycle and compost waste. In one case the farm is certified organic by the Soil Association meaning that all inputs have to be closely monitored and controlled (P5). Others have areas of land that are designated as of special interest for wildlife (P2, P4), including a site of special scientific interest (P3). Five out of the six producers dye yarn, either for use in their own work (P1), for sale (P2, 3 and P5) or as part of running courses (P4). All are conscious of the potential harmful impact of dyestuff waste and all cope with it by using a technique in which the dye is all taken onto the yarn leaving clear water. As one says; 'You couldn't put anything toxic on the land and therefore we are careful' (P2). However, in attempting to assess environmental impacts, all of the rural producers are tourist destinations so the comments made with respect to car transport of visitors to the mills also applies. In terms of the environment and design, one of the producers specifically sees the local landscape as a design inspiration. Some use undyed fleece and yarn in their work and this reduces the environmental impact of it (P2, P3, P4, P5) although this does not seem to be a conscious decision to reduce environmental impact.

The social impact of the producers on the communities where they live is significant and includes learning the Welsh language, taking an active part in agricultural shows and societies and volunteering

and running activities for local schools. However, the link with design and these aspects of the producers' lives is tenuous. Overall though, the fact they have all moved into a rural area and run businesses with a minimal environmental impact, and contribute to social aspects of local life would indicate that they are contributing to a vital part of the sustainable development of Wales.

DEVELOPING THE ANALYSIS AND FURTHER WORK

Other conceptual tools for enabling understanding of the relationship between design and sustainable development are needed to examine this further. These conceptual tools could include structure and agency taken from social theory (Barnes 2001) and the use of social arena maps taken from Clarke's situational analysis (2005, pp 110 - 125). When studying design as a decision making process done by individuals, a micro 'thing' and sustainable development, as a government policy, a macro 'thing', a problem common to many research situations is found:

... the question arises as to how the properties and propensities of 'macro' things are related to those of 'micro' things, and how the enquiries of fields studying the one should be related to enquiries in fields that study the other (Barnes 2001 p339).

When studying the macro i.e. sustainable development, against the micro, design, the sociological concepts of structure and agency are useful tools. The structure and agency debate in social theory examines the role that structures play in determining how people behave, that is elements of their lives such as social class and political and economic institutions, as against their individual ability to make their own decisions about their actions and life choices within these structures, i.e. their agency.

The debate revolves round the problem of how structures determine what individuals do, how structures are created, and what are the limits, if any, on individuals' capacities to act independently of structural constraints; what are the limits, in other words, on human agency (Abercrombie et al 1988, p6).

Sustainable development is one part of the policy framework within which the case studies as producers exist and is therefore a structural element in the situation. Other parts of this include the legal framework, the markets within which the producers operate and so on. Government policies such as the specific remit for sustainable development may not be understood or appreciated by individuals, and this was in fact found to be the case. In the initial interviews, when direct questions were asked about the Welsh Government remit for sustainable development there was an understanding of environmental issues but not one that embraced the wider sustainable development remit embracing economic and social elements. The agency that individuals have in the situation being studied could include the conscious use of design in their work but that then would depend on their expertise and opinion of the value of it to them and the enterprise, which was variable.

There is a gap therefore between structures and agency of individuals and while theorists such as Giddens attempt to bridge this gap with the concept of structuration (Barnes 2001 p345 – 346), the most useful tool here seems likely to be one part of the situational analysis tool kit offered by Clarke (2005) that is a social worlds/arenas map. These she says 'allow the fluidities and actions among structures and agencies to become visible and, thus, theorized and memoed' (2005, p110). She describes the use of social worlds/arenas maps thus:

We can (also) see individuals acting both as individuals and as members of social worlds; we can see social worlds, arenas, regimes of practice, social formations, and discourses produced and circulation in them (2005, p110).

These have been used to analyse the data collected and also to enable decision making about further work.

A reconceptualising of sustainable development

For the purpose of the first two stages of this research, the idea of sustainable development has been taken to be the 'three pillars' model. However, further work has led to a broadening of this model. Other ideas of sustainability (Spangenberg 2001, p31) include the institutional as a part of the measurement of sustainability and it is worth noting that important early work about sustainability for instance Agenda 21 (UNCED 1992) used the two terms interchangeably. UK government documents outlining the principles of sustainable development give five: these are:

- Living within Environmental Limits
- Ensuring a Strong, Healthy and Just Society
- Achieving a Sustainable Economy
- Using Sound Science Responsibly
- Promoting Good Governance (UK Government 2005, p 8).

Other authors argue that sustainable development is an impossible idea and that the two parts of it are in irreconcilable tension. (Luke 2005, Robinson 2004). Bell and Morse argue that an understanding of real

sustainable development depends on a fundamental change in human values away from the 'reification of monetary value' (Bell and Morse 2003 p165).

Dale (2000) says:

Although this story has been framed in terms of the ecological, social, and economic imperatives, in the long run it is the personal rather than the economic imperative that most demands our attention. The personal imperative involves personal reconciliation on many levels – individual, professional, and relational (p 166).

For the third and last round of data collection sustainable development will be conceptualised as an idea that has several elements – the economic, environmental and social, with the addition of the institutional, the temporal and the personal. These are conceptualized as inextricably connected in a state of constant tension.

Other contexts

There are many small scale producers of textiles whose activities might be analogous to those studied in Wales. Producers of Irish Tweeds and knitted goods, the Harris Tweed industry in Western Scotland, the production of traditional Basque fabrics in the Basque region of France and Spain, much artisanal textile production in India would all benefit from study to establish their role in sustainable development and the contribution that a design input could or does make to this.

REFERENCES

Abercrombie, N, Hill, S and Turner, B (1988). The Penguin Dictionary of Sociology. London, Penguin Books.

Barnes, B., (2001). The Macro/Micro Problem and the Problem of Structure and Agency, in: Ritzer, G and Smart, B., eds. Handbook of Social Theory, Thousand Oaks, London, New Delhi, Sage Publications, pp 339 -352.

Bell, S and Morse, S (2003). Measuring Sustainability Learning by Doing London, Earthscan.

Blackburn, R (2008). A Sustainable Future for Textiles, Lecture to the Huddersfield Textile Society, 14 January 2008. Huddersfield Textile Centre of Excellence.

Charter, M and Tischner, eds. (2001). Sustainable Solutions; Developing Products and Services for the Future, Sheffield, Greenleaf

Checkland P (2000). Soft Systems Methodology: A Thirty Year Retrospective, in Systems Research and Behavioral Science 17, pp 11-58.

Clarke, A, (2005). Situational Analysis: Grounded Theory After the Postmodern Turn, Thousand Oaks, London, New Delhi, Sage Publications.

Crafts Council, (2004). Making it in the 21st Century. A socio-economic survey of crafts activity in England and Wales, 2002-03, London, Crafts Council.

Dale, A, (2001). At the Edge: Sustainable Development in the 21st Century, University of British Columbia Press, Vancouver.

Denscombe M, (2003). The Good Research Guide for Small-scale Social Research Projects, 2nd ed., Maidenhead, Philadelphia, Open University Press.

Denzin, NK, and Lincoln, Y, (2000). The Sage Handbook of Qualitative Research, 2nd ed., Thousand Oaks, London, New Delhi, Sage Publications.

Design Wales <http://www.designwales.org.uk> accessed 28.2.06
http://www.designwales.org.uk/version2.1/design_futures.html accessed 14.4.2008

Jenkins, JG, (1969). The Welsh Woollen Industry, Cardiff, National Museum of Wales, Welsh Folk Museum.

Jenkins, JG, (2005). The Flannel Makers. A Brief History of the Welsh Woollen Industry, Llanrwst, Gwasg Carreg Gwalch.

Langrish, J, (1993). 'Case studies as biological research process', Design Studies, 14, (4), pp 357 – 364.

Luke, TW, (2005). Neither Sustainable nor Development: Reconsidering Sustainability in Development in Sustainable Development Vol13, Issue 4, pp 228–238.

Naughton, J, (1984). Block IV The Soft Systems Approach. Soft Systems Analysis: An Introductory Guide, Milton Keynes, Open University Press.

Open University, (2005). Global Programme in Development Management. Mapping Toolkit. CDR0939. Open University UK.

Purvis, M, (2004). Business, Capital and Sustainable Economic Development: in Purvis, M and Grainger, A (eds) Exploring Sustainable Development. Geographical Perspectives, Earthscan, London.

Robinson, J, (2004). Squaring the circle? Some thoughts on the idea of sustainable development in Ecological Economics 48, pp 369 – 384

Rossmann, GB, and Rallis, SF, (1998). Learning in the Field. An Introduction to Qualitative Research, Thousand Oaks, London, New Delhi, Sage Publications.

Spangenberg, J, (2001). Sustainable Development: From catchwords to benchmarks and operational concepts: in Charter, M and Tischner, Sustainable Solutions: Developing Products and Services for the Future, Sheffield, Greenleaf, pp 24 – 47.

Tilbury, D 2008 Rethinking sustainability research. Presentation given at seminar 25.11.2008, University of Gloucestershire. Available from Prism Archives at <https://www.jiscmail.ac.uk> accessed 18.12.08

Thackara, J, (1997). How Today's Successful Companies Innovate by Design. European Design Prize Winners! Aldershot, Gower.

UK Government, (2005). One Future Different Paths, available at <http://www.defra.gov.uk/sustainable/government/publications/pdf/SDFramework.pdf> accessed 20.12.2008

UNCED (United Nations Conference on Environment and Development) (1992). Agenda 21, Rio Declaration, Statement of Forest Principles. Rio de Janeiro. United Nations.

Von Weizsacker, E, Lovins AB, Lovins, LH, (1997). Factor Four: Doubling Wealth - Halving Resource Use. The New Report to the Club of Rome, London, Earthscan.

Walker, S, (2006), Sustainable by Design. Explorations in Theory and Practice, London, Earthscan.

Welsh Assembly Government (2004a) The Sustainable Development Action Plan 2004 – 2007, Cardiff, Welsh Assembly Government.

Welsh Assembly Government (2004b) Starting to Live Differently. The Sustainable Development Scheme of the National Assembly of Wales, Cardiff, Welsh Assembly Government.

World Commission on Environment and Development, (WCED) 1987, Our Common Future. (Brundtland Report), Oxford, Oxford University Press.

Yin, RK, (2003). Case Study Research: Design and Methods, 3rd ed., Thousand Oaks, London, New Delhi, Sage Publications.

Zeisel, E, (2004). Eva Zeisel On Design. The Magic Language of Things. Overlook Duckworth, New York, Woodstock, London.