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Lessons for technology education from social, ethical and environmental audits

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Abstract
Design and Technology education has a crucial role to play in preparing young people for responsible citizenship. Technological literacy will be needed in order to evaluate and influence what is happening in societies dominated by globalisation and its technological underpinning. Companies are increasingly taking seriously their responsibility for sustainable development (sustainable for the life of the planet and for human communities). The social, ethical and environmental audits that are being conducted can bring to life for students the human and environmental context of technological projects, and highlight the criteria for quality that might meet the demands of sustainable development. Furthermore, students can be inspired by the people-centred details contained in the audits to examine and debate the fundamental perspectives and commitments on which the pursuit of sustainable development is based. This can strengthen their own values, skills and aptitudes which are needed both to make value judgements in the course of designing and making products, and to handle their responsibilities in the future.

Keywords: audits, contexts, criteria, critical reflection, environment, ethics, quality, values

Responsible citizenship in a technological society

'The key aim of design and technology education is to enable pupils to learn how to contribute towards and intervene creatively and constructively to improve the made world in a rapidly changing technological society' (DATA, 1999:5).

This goes far beyond teaching pupils how to design and make saleable products. It is suggesting that technology education can help prepare young people for the kind of evaluating, priority-setting, and ethical judgements that will be demanded of them – whether as those directly concerned in technological innovation, or as users of products, or as citizens of societies heavily shaped by the outcome of technological activity. The heart of the design and technology curriculum is 'Designing and Making to create quality products' but also to 'prepare people for citizenship in a technological society' (DATA, 1997:8). Indeed,

'The Design and Technology National Curriculum has the potential to help create imaginative, thinking, tolerant and responsible adults better able to adapt and cope with day-to-day problems and aware of the effect of their actions with sufficient knowledge and confidence not to abdicate their responsibilities' (Jarvis, 1993:65)

The aspects of technological capability that contribute to responsible citizenship have been described in a variety of ways. A position paper of the Scottish Consultative Council on the Curriculum asserts that one aspect is *technological sensitivity*: 'This means a caring and responsible disposition, a habit of mind which asks and reflects on questions about social, moral, aesthetic and environmental – as well as technical and economic – aspects of technological activity undertaken by oneself and others in a variety of contexts.' (SCCC, 1996:9). For John Olson the crucial educational goal is *technological literacy*:

Literacy is often associated with cheer leading for technocratic development and for individualistic consumer savvy. We need to return it to its more humane, more socially orientated role - promoting insight into our collective problems and futures in a technical world. …

The word technology itself refers to more than machines. It refers to whole systems of social organisation. ... But more than that, it refers to an understanding of those machines and systems - it means thinking about them critically. It is another domain of inquiry - another "logos" like, for example, the eco-logos - thinking about living systems. ...

It is literally a literacy we are talking about - an ability to talk about modern industrial society with some knowledge. Getting at the meaning of the built world - understanding what it means to live and die by the automobile system and so on. (Olson, 1998:13-14)

Examining curriculum documents for their potential to encourage technological literacy, Olson concludes:

In the Pan Canadian science document, technology is given a very limited meaning - what is designed and made. There is no mention of assessment of what is made, only the hint that making is a very rational process and that good things come from it. Again the idea that there is more to be said at the level of logos or reflection and evaluation is left out. Technological literacy is not fully realised as a goal of the curriculum. (Olson, 1998:15)

David Layton has also drawn conclusions about technology curricula given the moral judgements required in a technological society:

In an attempt to exercise greater control over the effects of technological developments, a new branch of study called Technology Assessment has come into being ... But charting the possible outcomes of technological innovations is of limited use without a means of deciding on 'good' or 'bad'. ... Technology is now inextricably linked to an ethics of responsibility.

It is vital that representations of technology in school curricula should incorporate value considerations both as a reflection of what is happening in 'real world' technology and in order that the future practice of 'real world' technology should not be able to ignore them. (Layton, 1992a:11)

Environmental, social and ethical audits are increasingly being conducted by companies, some of whom are at the forefront of technological developments. Much can be learnt from these audits about what is "happening in 'real world' technology" and the value judgements that are being made. They provide a wealth of information on needs, impacts, processes of consultation, assessment procedures, criteria and constraints. These can be reflected back into technology education in order to prepare young people to operate responsibly in that 'real world'.

Corporate responsibility for sustainable development

The audits are a sign that companies are keen to demonstrate that they are socially and environmentally responsible, and supportive of the communities in which they are placed. Although sometimes no more than a public relations exercise, they are an acknowledgement that the pursuit of sustainable development is now imperative. John Elkington, writing in *The Shell Report* about sustainable value creation and how it might be measured, gives this assessment:

If sustainable development is to become a global reality rather than remain a seductive mirage, governments, communities, companies and individuals must work together to improve their 'triple bottom line' (economic, social and environmental) performance. ... We must find accurate, useful and credible indicators of economic prosperity, environmental quality and social justice. ...

A company must acknowledge and manage the full range of relevant economic, social, ethical and environmental costs associated with its activities. (Elkington, 1998:46-47)

Alan Knight, the B&Q Environmental Policy controller, discusses the challenge by

proposing that environmentalism be considered synonymous with *'being a good neighbour'*:

There is now only one trading neighbourhood and that is the entire planet. All communities, however remote, are potentially helped or threatened by other members of the global trading neighbourhood. ...

The 1960s saw a focus on quality. ... The 1980s saw the establishment of environmental management. Companies became accountable for the wider implications of what they made and how they made it. This included the pollution from their factory and the life cycle of their products.

Today environmental impacts are overlapping with social responsibility. Companies are auditing their supply chains to ensure that child labour is not being exploited and workers are receiving fair wages....

I have suggested an alternative to Brundtland's [definition of sustainability]: 'Improving our quality of life in a way which helps our local and global neighbours improve theirs without compromising the ability of future generations to do the same'. (Knight, 1998:21,23,32)

In this climate of growing recognition of corporate responsibility, a variety of methods of accounting and auditing of the 'triple bottom line' have sprung up. Common components are:

1 Clear statements of purpose and values. For example:

Shell companies recognise five areas of responsibility: [including] ... to win and maintain customers by developing and providing products and services which offer value in terms of price, quality, safety and environmental impact, ... to provide their employees with good and safe conditions of work, ... to promote the development and best use of human talent and equal opportunity employment, and to encourage the involvement of employees in the planning and direction of their work, (Shell, 1998:10-13).

Our reason for being: ... To creatively balance the financial and human needs of our stakeholders. ... To courageously ensure that our business is ecologically sustainable. ... To meaningfully contribute to local, national and international communities in which we trade, by adopting a code of conduct which ensures care, honesty, fairness and respect. ... To passionately campaign for the protection of the environment, human and civil rights, and against animal testing within the cosmetics and toiletries industry. (Body Shop, 1996:4-5)

Following extensive consultation with our customers, the Bank's position is that ... It will not finance or in any way facilitate the manufacture or sale of weapons to any country which has an oppressive regime. ... It will encourage business customers to take a pro-active stance on the environmental impact of their activities, ... It will not support any person or company using exploitative factory farming methods. (Co-operative Bank, 1998:23)

2 Issues and priorities are decided in open dialogue with stakeholders – those who in any way have a stake in the business (shareholders, staff, the suppliers, the local community, ...):

Any meaningful social audit will generate a set of indicators including both quantitative and more qualitative measures. Both have their uses: in Rajastan, villagers used a set of highly subjective measures to judge their quality of life. On the other hand, managers need robust indicators to benchmark their organisations over time. ... Good results can be obtained by involving even the most unlikely stakeholders in deciding issues,

generating data, and communicating the results. (New Economics Foundation, 1999:4)

3   Key performance indicators, benchmarks and targets are therefore identified:

In January 1997 we met the key wallcovering suppliers to discuss their environmental issues and actions to tackle them. From this we produced a product focused action plan with benchmarks for improvement. (B&Q Environment Team, 1998:67)

4   The procedures for monitoring, recording and reporting performance are established.

5   The process and the records are verified by an independent third party and the 'account' / report published. A 'Quality Scoring Framework' has been developed to assess progress towards a 'regular, externally verified Sustainability Statement or process with linkages of financial, environmental and social data' (Pilling, 1999:5).

The drive for sustainable development reflected back into technology education

A report commissioned as part of the National Curriculum Review emphasises the following entitlement:

All pupils need to be equipped with the knowledge, values and skills in the area of citizenship and sustainable development that will allow them to participate as full members of society and work towards solutions to sustainable development problems and issues. (Panel for Education for Sustainable Development, 1998:3)

Taken together with the key aim quoted at the beginning, this highlights the importance of incorporating into design and technology education the experience of those who are pursuing sustainable development in 'real world' technology.

Criteria and constraints

One way of doing this is to take note of the targets and benchmarks emerging in audits.

These can suggest to pupils some of the 'criteria that help them to judge the quality of a product', whether 'their own products at different points in their development' or when considering 'the impact that the making, use and disposal of a range of products have on their users and others, and on the environment'. (SCAA 1995:24) For instance, criteria could be inferred from these extracts:

No unnecessary or excessive packaging, such as that purely for product promotion, is acceptable. … Any glues or inks used on the packaging must be waterbased and inks should not contain any heavy metals. We are in the process of ensuring that all our packaging is designed to be recycled. … Plastics should have the SPI symbol to identify the type of plastic. (B&Q, 1998:92)

It is our target that after the end of 1999, we will only buy wood and wooden products which have been certified by the Forest Stewardship Council (FSC). … using agreed standards covering social, environmental and economic aspects of forest management drawn up by professionals in forestry as well as in ecology and in rural and social development. (B&Q, 1998:99,107)

We are sourcing fruits for our new sorbet line as much as possible from organic producers. (Ben & Jerry's, 1996:4)

The main principles of fair wages/prices and good, safe working conditions were met by all suppliers. (Shared Earth, 1996:8)

One answer to the challenge of achieving sustainable economic development in the face of fast growing populations is the development of locally-based renewable energy sources, supplying local markets. … Technologies to exploit renewable energy sources, such as wind, sun and biomass (plant matter), are developing fast. (Shell, 1998:44)

In 1993, Shell Gabon set about returning an area surrounding 26 disused sites to a condition where the environment could

recover naturally. … The experience underlines the need to include rehabilitation in the planning of new exploration ventures. (Shell, 1998:43)

It is technically possible to reduce urban emissions by reducing the content of some of the potential pollutants during the refining process. Low-sulphur diesel, for instance, has been introduced in a number of markets. … Shell companies have also pioneered methods for measuring the local impact of exhaust emissions from various types of vehicles. (Shell, 1998:11)

The Durham Partnership … is finding local solutions to global problems. The 50 projects being promoted include a school's wind turbine and a village tackling minewater pollution. The Bank supports seminars on issues concerning business such as integrating quality and environmental management, waste minimisation, energy conservation, and clean technology. (Co-operative Bank, 1998:63)

The dialogue with stakeholders

In judging the quality of a product, pupils will also be considering 'what needs a product is intended to serve, how well it meets them, and whether the resources invested match the outcome, suggesting alternatives'. Also 'its impact beyond the purpose for which it was designed.' (SCAA 1995: 24). These considerations are best explored directly with those most affected - the various stakeholders. Company audits supply instructive examples:

In 1992 a visit to our (Indian) brassware factory caused us grave concern, particularly in relation to health and safety in the polishing units and casting areas. At that time we used our own health and safety consultants. We took no account for fair wages or other social issues, nor were we spending any time with the workers, learning their concerns or identifying their needs.

Production has now undergone independent social and environmental audits by a locally based, social

development charity committed to developing fair trade to combat poverty. Being local, they speak the right languages and understand what is relevant and appropriate. This avoids our western values being imposed on another culture. (B&Q, 1998:77)

[After the controversy over the plans for the deep-sea disposal of the Brent Spar] a two-year dialogue process started with a series of meetings in [several countries] to help identify a solution. Shell UK consulted with non-governmental organisations, opinion formers and experts… This unique consultation exercise has helped to promote a different approach to decision making in the Group, and has shown new ways in which Shell companies can be more open and accountable. (Shell, 1998:41)

There are lessons here for students undertaking projects, and also exercising responsibilities as stakeholders in the future. They learn the importance of wide-ranging and inclusive consultation, of careful listening, of respect for other people's concerns and culture, of responding to needs rather than creating wants. They are also being helped 'to think critically, systemically and creatively about sustainable development issues, solutions and alternatives, through study of examples' (Panel for Education for Sustainable Development, 1998:10).

Critic competence

Information documented in the audit reports can help students put technological products into a realistic context, highlighting the interaction with people and the environment. This is crucial information if students are to 'develop skills in product analysis and evaluation and combine this with associated values related to social, environmental, spiritual, moral, aesthetic and economic aspects of products and systems.' (DATA 1999:5) It is as the details of the context are brought vividly to life that it becomes possible 'to bring values up into the light of day … and make them the subject of deliberation and critical reflection' (Layton, 1992b:53).

The critical reflection is, however, more than an exercise in 'trading-off' conflicting values in the hopes of finding a 'balance'. It involves unearthing the unspoken priorities, the implicit perspectives and hidden passions that lie behind the values. It demands a readiness to debate underlying ideological principles such as an emphasis on individualism and competition, or faith in the inevitability of technological progress, or 'compassion for all humanity and concern for social justice globally, now and for the future'. It could lead to learning outcomes similar to those the Panel for Education for Sustainable Development went on to envisage - typically that by the end of KS 4 pupils should:

be aware of the role of advertising, product innovation and popular culture in promoting different lifestyles and be able to critically consider choices and alternatives in the context of defining needs and wants;

evaluate the benefits and drawbacks of the application of scientific and technological developments for individuals, communities and environments in relation to sustainable development;

understand the tension between sustainable development based on local production and consumption and the globalisation of trade and finance. (Panel for Education for Sustainable Development, 1998:5,9).

This would indeed be encouraging the component of technological capability which has been called *critic competence*: 'the ability to judge the worth of a technological development in the light of personal values and to step outside the 'mental set' to evaluate what it is doing to us.' (Layton, 1993:61) It is this competence which lies at the heart of technological literacy.

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