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Values to make the future work : the role of the appropriate technology approach in design and technology education

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Abstract
Teachers and educators have a responsibility for encouraging their pupils to consider the human and environmental implications of the products of design and technological educational activity.

The appropriate technology approach, which has people and the environment on which we all depend for our survival - at its centre, has much to contribute to this debate. Applying the criteria of 'appropriateness' to technology - for example using renewables sources of energy, using materials which are environmentally sound, providing means of meeting human needs, rather than creating wants - can provide educational challenges which bring the concept of sustainable development into the classroom. It is hard to exaggerate the urgency of education to take account of this crucial issue.

Within this context, this paper will also explore related issues, such as those multiculturalism and gender in a global context, and will introduce classroom strategies and materials for dealing with such issues.

It is in the interests of all of us that we should create a future that works for all inhabitants of the planet.

Design and Technology education now has the scope and opportunity to explore a whole range of issues which have not traditionally been tackled in D and T, in particular those to do with values.

In particular, questions can be asked about the role of technology in sustaining or damaging the environment, and how appropriate technology can contribute to a sustainable future for all the inhabitants of the planet.

The ‘appropriate technology’ approach can provide the framework for asking such questions, and for highlighting some of the value issues that are integral to technology education. It is important to make values explicit, rather than allow them to be implicit. Values are omnipresent in the entire technological field.

The appropriate technology approach
Frances Stewart, in her introduction to the AT Reader, published in 1985 by IT Publications, defines an appropriate technology (AT) as “a technology which is suited to the environment in which it is used”. Although much of the AT development work that has been carried out has been with people in the Third World, she explains its relevance for the First World: that an AT should be “job creating, producing more satisfying work; the ecological damage caused by the productive process would be less with AT, as a result of the greater use of renewable resources, so that a productive system based on AT would be sustainable over the long term”.

In brief, the appropriate technology approach has at its centre the needs of people and the custodianship of the planet.

Needs and Wants
All people need to eat, have clean water to drink, have appropriate housing and clothing for the climate in which they live. All people need to earn a living for their families, in safe, secure and just conditions. All people also have - to provide a good future for their children and to live a life of quality, in harmony with their culture and environment.

It is impossible to think clearly and understand about values and about what makes a technology appropriate unless we first are clear about the concept of human needs and wants. A ‘need’ is something that is ‘necessary’ for a particular purpose: a ‘want’ is much more subjective. Consumerism leads to the development of a ‘want’ creation industry. It is useful to remember what Gandhi said - “the world has enough for everyone’s need, but not for everyone’s greed”.

Technology education
What has all this got to do with what happens in the classroom or workshop? A good deal.
Highlighting the values that are embedded in a technology 1 enables teachers and their pupils to examine critically the role of technology. Similarly, holding up the criteria for an appropriate technology - see below - against any technological exercise provides a useful evaluation technique.

In a society where value is laid on long-term benefits, and where sustainability is accepted as of overriding importance, the AT criteria have huge relevance.

So, if we accept the validity of the AT approach - a technology should:

1. meet the needs of the users
2. rely on locally available materials
3. be affordable by the community
4. build on local skills and ingenuities
5. help create means for a living to be earned
6. encourage self-respect and self-reliance
7. use renewable sources of energy
8. fit in with the cultural framework of the society
9. not damage the environment
10. be part of an overall, sustainable, economic framework.

In respect of each of these criteria it is, of course, necessary to ask “why?” Part of the answer to number 7, for example, comes when we remind ourselves about the reality of global warming, and its primary cause of fossil fuel consumption by the FirstWorld. In number 4, for example, concentrating on getting the benefit from the skills and products that are produced locally cuts down transport costs, and breathes new life and power into a community.

Moreover, it will be apparent that such criteria have implications for the whole world. That is why the somewhat narrow definition of an appropriate technology can be widened into the ‘appropriate technology approach’ where, as was said above, the needs of people and the environment should be paramount.

The Consumer Society

In our society we have surrounded ourselves with material goods, and we have been seduced by a way of life which esteems and indeed demands consumption. As I write this (May 1992) politicians and economists are hoping for a ‘consumer-led recovery’. ‘Shopaholics’ are not that rare, and we live in a throw-away society which values things which are new and fashionable, and disdains the old. A Minister of State in the current government perverted Descartes’ maxim “I think, therefore I am” into “I consume therefore I am”. One of the results of our consumer society is a vast industry which is devoted to the creation of new ‘wants’ and therefore to the development of technologies to satisfy those wants.

All consumer goods have ‘technological’ aspects, whether they are consumer durables (incidentally, not so ‘durable’ as they were, with planned obsolescence built into the design, and inadequate spare parts and repairs available - in order to make us consume more), fashion textiles, fast food, cars or computers. They reflect both the values and attitudes of their society, and the economic system that drives it. Technologies can only be adequately studied within the economic structure and the environment within which they operate.

The effects of inappropriate technology

Inappropriate technology has played a devastating role in damaging the environment - in pollution of air and water, in endangering the ozone layer and in bringing about global warming. It could also be argued that many technologies have put many people out of work, and are therefore inappropriate on that score. Likewise the consumption of resources needed for much technology to satisfy these artificially created wants requires exploitation of the finite resources of the world on a massive scale.

That word finite is crucial. The predominant value system of the rich world has, conveniently for its short term benefit, chosen to ignore the fact that resources are finite, and has been lulled into a belief that technology would always provide the answers. But that belief begs all sorts of interesting questions: can ever more high-tech solutions extract us from the environmental mess in which we now find ourselves? And what role does justice play in such discussions?

This brings me to the next issue: what role does technology have to play in the Third World - or Majority World as we prefer to call it (after all 75% of the world’s population do live in Africa, Asia and South America)?

It was thought that the simple transfer of technology from the Minority World to the Majority World would bring about the economic development that was accepted, without question, as being beneficial. Such economic development, which brings with it hugely increased consumption of resources and pollution in order to support a materialistic way of life, is now being widely questioned.

So we are left with the challenge of what kind of development is right for the world as a whole, and what function does technology have in a vision for
a world without exploitation, a world in which all people can survive and thrive, and a society in which the protection of the planet, on which we all ultimately depend for our survival, is held as the single most important concern.

Sustainable living
It can be argued that people, all over the world, need to find ways in which a sustainable way of life, that suits local cultural traditions, conditions and climate, can be established. Such a way of life would probably concentrate on a more local way of life to which we in the Minority World are now accustomed.

There would be emphasis on re-using, repairing and recycling. ‘Make do and mend’ would, once more, be a guiding principle, but this time bearing status and even glamour. The economy would be structured to long term benefits, instead of short term gains. Trade would be more justly organised, with proper rates being paid for resources which are limited. There would be an environmental component in the costing of all goods, and the use of all technologies, so that a more realistic price was being paid. The value system would be focused around quality, rather than quantity.

Design and technology in schools
The discussion above has, finally, brought us to consider the implications for what is taught in schools.

Clearly, one useful ‘toolkit’ is the appropriate technology checklist. SATIS 16-19 has a unit (no. 54) which indicates how this technique might be used. Opening up the debate of what constitutes appropriateness is a good place to start.

It might be hoped that the criterion of environmental sustainability might also be introduced for evaluating all D and T activities. The requirement to examine technologies ‘from other cultures’ also provides a stimulating challenge, which enables pupils and their teachers to examine more critically the technologies that surround them.

The following questions might be posed:

1. What is the status of Majority World technology - how does it compare with the status of Minority World technology? What values underpin the image of the Minority World that is presented to the Majority World?

2. How appropriate are the criteria for an appropriate technology? What compromises have to be made, and defended?

3. What is the role of women in the design and development of a technology? How much is women’s technological knowledge valued - in both the Majority and Minority Worlds?

4. What weight and value are given to local skills and knowledge in the Minority and Majority Worlds, particularly in relation to knowledge of the local environment?

5. What lessons from the Majority World are there for the Minority World to learn?

6. What parallel examples, in the Majority and Minority Worlds, can be identified? (It is useful to look for similarities, rather than differences.) A starting point might be to ask whether the bicycle is appropriate urban transport, all over the world.

These last two, in particular, bring us into the sphere of development education. There are many excellent resources, listed in appendices in “Make the Future Work”, from development agencies and commercial publishers, which provide both source material and classroom activities to help tackle such challenging and stimulating ideas.

Gender in technology education
This has been alluded to above, but it is worth emphasising that technological processes which focus on people often, on the one hand, lead us to examine case material where women are the technological ‘experts’, and on the other hand, appeal to girls, in terms of classroom activities.

Multi-culturalism in technology education
Examining technologies from other cultures inevitably offers the opportunity to value the knowledge and expertise of people from other cultures. The images of the Majority World which dominate our televisions are predominantly negative, and serve to reinforce prejudice and racism.

Finding out that people from the Majority World are real people is valuable, through studying a context of technological activity which is likely to be unfamiliar to teacher and pupil alike. Discovering that they have the same aspirations and desires for themselves and their families as inhabitants of the Minority World is enormously useful in bringing about some measure of empathy and understanding among young people, which can help to encourage a less parochial view of the world. “Thinking globally, and acting locally” might be a maxim to underscore technological activities.
In a multi-cultural school, also, an opportunity may be provided to value the knowledge of pupils and their parents who have their origins in other countries and cultures.

Exploring the appropriate technology approach is only possible with suitable resources. This brings me to explain briefly the context of our educational work.

Intermediate technology

Intermediate Technology (IT) is an international development agency (a charity), founded in 1966 by the economist EF Schumacher, the author of “Small is Beautiful”. IT works in countries in Africa, Asia and South America, with local organizations, to develop appropriate technologies and technological processes. Such activities take great account of how people define their own needs. IT employs about 230 people worldwide, with offices in 6 countries managed by people from the country concerned.

Educational Resources

Intermediate Technology has an Education Office which is continually publishing resources to support the issues referred to above. So far there are two major project packs for Design and Technology Key Stage 3, with another planned for early 1993. These packs provide material for a term’s work, and because they offer opportunities for technology across the curriculum, and certainly for all the contributing subjects of Technology, an additional dimension is possible.

Before introducing the packs here is a WARNING:

It is all too easy, with ‘problem solving’ at the heart of so much of technology education, mistakenly, to think that examining a technology from the Third World is to do with ‘solving Third World problems’. It is not. If it were so easy for the problems to be solved by 13 year olds, there would be no problems!

The problems of the Majority World are extremely complex. One main reason is to do with a world economic system which benefits rich countries at the expense of poor countries. Another is to do with a history of exploitation of the ex-colonial countries, which, from the point of view of the colonial power concerned, existed solely to meet the needs of that power - for raw materials in the first place, and for markets for manufactured goods in the second place. The ‘problems’ are rarely of a purely technological nature.

It is therefore crucial that by using these packs, increased sensitivity to the context described, and some level of empathy with the community concerned is brought about. The packs have two slide sets (one to describe the context, and one for evaluation purposes, to be used at the end of the project). They contain teacher’s notes, strategies and guidelines, a case study and a country profile - the last two for pupil use. All the material can be photocopied.

The first two packs in the series “Global Contexts for the National Curriculum” are:

Stove Maker, Stove User - fuel efficient stoves in Sri Lanka;

Rural Blacksmith, Rural Businessman - making and selling metal goods in Malawi.

The third pack “Creating Art, Creating Income” will focus on a women’s textiles co-operative in Bangladesh.

As well as these packs, there are small scale assignments, available from the Education Office, for the cost of post and packing.

We now have a Primary Specialist on our team, producing materials for Key Stage 2. These, rightly, have a different character to the secondary materials, and extend the appropriate technology approach to a younger audience.

“Make the Future Work”, is a collection of essays from a wide range of educationalists, with a preface by Professor Paul Black. It provides a theoretical framework to the issues raised in this paper, and in the second part, provides ideas for practical activities.

Conclusion

If we are all to have a future that works, then we have to examine the value system that underpins our society. As technology educators we need to be critical and indeed constructive in the consideration of the role of technology in that future: as Schumacher said, we have to “redirect technology so that it serves Man instead of destroying him”.

Such a ‘redirection’ provides exciting challenges, not apathy and compromise. Incorporating the needs of the environment and of people into technology education can bring previously unconsidered stimuli into the classroom and workshop.
References

