

Technological Awareness through Craft Work

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1. The Challenge

How have *you* reacted to the statements by the Prime Minister, Secretary of State for Education and Science, Director General of the Confederation of British Industry and many others about standards in school education and about the need in this country for engineers and technologists working in industry? Have you said or thought it irrelevant? Or not their business? Or 'I've heard it all before' or 'I cannot do anything with the youngsters I get in the craft room'? Or have you wondered if you should actually *do* something? You may have heard or read about school technology before and may have rejected the ideas for very good reasons – THEN. The author suggests that the situation in which we all work has changed and so, with great humility and sincerity, the author wishes to share some thoughts with you about where craft education might be changed. Naturally, the author hoped you will agree with him but much more important is that you decide what you do think and not just reject the ideas without thought. This is the challenge – if you agree with what follows, will you join with others in changing craft education in schools; if you disagree, will you write to say why you believe the author is wrong – please?

2. Nature of Technology

Technology is a word which is very difficult to define like love, happiness, greed and anger. We know what it means to us but the more precisely we try to define it the more difficult does it become to include all the aspects one normally associates with that word. The author submits that 'technology' has two specific areas of meaning. As far as outside school is concerned, technology is usually more concerned with large scale science-based industry and the effect that that has on the lives of ordinary people. The author has shown that it is possible to analyse technology under six headings to make into a three dimensional model as

shown in figure 1. The third dimension, not shown, is that of time. Each of the cubes can contain many examples of which just a few are shown to illustrate the ways in which technology can be considered. For example, under the political/technical section the decisions about the provision of electric power are taken partly on political grounds and partly on technical grounds; the decision about whether to build nuclear power stations or whether to burn oil, coal or gas fall into this category. Similarly, political/economic decisions are this category. Similarly, political/economic decisions are taken about the choices of energy and materials, whether one changes from an oil-fired system to a coal-fired system etc. The Author is most definitely not trying to limit discussion to just those topics that are mentioned in the diagram, but to suggest that these may be starting points for further discussion.

The other area of meaning is 'school technology'. In this country, this is becoming a separate subject in the secondary school curriculum in some areas or is being deliberately promoted as a part of the sciences, handicraft, mathematics, history or environmental studies subjects. The essential parts are that a technological activity must be creative so opportunities are devised for pupils to design solutions to problems, where the problems relate to specific needs (i.e. have a social content) and to an understanding of the nature and methods of working materials (i.e. science and craft).

3. Need for Technological Awareness

(a) **Society's need for industry** – Most people accept that industry is a necessary part of society, but not everybody is aware of exactly why this is so. This is especially true in this country, with its Welfare State approach to the organisation of society which depends almost entirely on the wealth that is derived from industry. Industry provides employment for people and it

Figure 1

	POLITICAL	PHILOSOPHICAL	TECHNICAL	ECONOMIC	PERSONAL	EDUCATION
POLITICAL		Capitalism Socialism Communism	Power Programmes (Nuclear, fossil fuels, geothermal etc)	Choices re. use of energy/ materials etc.	Involvement. Local Government Government	Spread of information
PHILOSOPHICAL			Intermediate Technology. Use of fossil fuels etc.	Small is beautiful. Continued expansion?	Minimise Waste Use of recycl- recyclable items.	Spaceship Earth
TECHNICAL				Wider account- ing procedures. "Full" energy costing. More automation.	Bicycles. Methane Generation. Solar Power.	Nutrition. Family Planning.
ECONOMIC					Force of circumstances.	"Full" energy costing.
PERSONAL						Formal, via media etc.
EDUCATION						

provides the materials, goods, services and energy that people require in their normal lives and which in many cases they take for granted. The question arises, what part of this awareness can one try to get across to young people while they are still at school, and in particular should one be getting across anything of the nature of industry?

(b) Industry's need for technology — The prime purpose of industry is to take relatively useless raw materials and by the use of man's ingenuity and skills to turn these into artefacts and services which will be of benefit to mankind. It must do this in such a way that it sells its products for more than the total costs including the raw materials, manpower, energy and purchasing the capital. It is irrelevant whether it is a manufacturing or service industry or whether it is state or privately owned. In the last decade or so, the scale of industry has changed partly because of commercial pressures such as home or foreign competition and partly because of the impact of science-based technology. In addition, the conditions in which industry operates have changed; in the 150 years up to 1950 or so, the main criterion for industrial success was commercial. Now, there are extra criteria that society has introduced such as better working conditions for employees and environmental issues. All these changes mean that industry of the future will have to be highly technological to succeed and remain in business. The technology might be 'high' or might be considered as 'alternative' — it certainly will have to be 'appropriate'. It will also include the technology of management as well as the more usual technology concerned with the hardware of machinery and computers.

Exactly how one balances the need for new techniques or new technology with the, sometimes conflicting, requirements of customers, employees, the state, the local environment, shareholders etc. is not clear. There needs to be much discussion in public to sort out all the issues that impinge on

industry's need for technology. This means that Education, both in a formal sense in school and informal sense through the media, needs to be involved.

(c) Personal need for technology — Each one of us uses a great deal of technology, especially housewives in their homes.' One needs to appreciate this technology as well as one's reliance upon it and perhaps, referring back to the first section of this paper, one needs to be able to take definite personal decisions as to the degree which one is dependent upon technology. It is perhaps not unexpected that many people are rejecting high technology in their private lives and are trying to revert to some form of more simple living. 'Quality of life' is most definitely *NOT* the same as the 'standard of living'.

4. Place of Craft Work in Increasing Technological Literacy

(a) Personal skills — Craft teaching within a secondary school has an almost unique place in the school curriculum enabling the development of personal skills which the author submits have a great bearing on technological literacy. One set of skills are of course purely manual, but in addition craft teaching enables the pupils to see in very practical terms alternative solutions to problems that are posed. This depends upon a 'Design Approach' to craft teaching, but such approach does give pupils the direct opportunity for seeing these alternatives, for making these decisions, for using science and also for using their numerical, literary and spatial skills in presenting their work.

(b) Attitudes — Another advantage of giving pupils in secondary school experience of craft work is to help them to appreciate the necessity and the usefulness of working as part of a team. Unlike much schoolwork, virtually all work in industry is a part of a team. This implies that young people ought to appreciate the need for different skills

and the fact that success of the team as a whole would depend on a wide variety of people. One may also wish, in this context, to include ideas of attitudes towards industrial work in both the organisation of the work, the idea of foremen, supervisors etc. and in the nature of industry where the quality of the goods and the speed with which they are produced are of great importance.

(c) **Experiences** — Craft departments in schools have an enormous opportunity for giving young people a wide range of experiences; this can be in different materials, or with different apparatus and tools. It also is more educational biased in that it enables the children to achieve very direct personal satisfaction from work that is undertaken. Whether this work is of a traditional manufacturing type, or whether it is the design process does not particularly matter; the author is firmly of the opinion that an approach via design work to a realisation provides an excellent balance for most young people. Craft departments usually allow the pupils to use either projects or investigations as a means of undertaking their work rather than the more formal directed experiments which one finds for example, in a science department. The degree to which a question is open-ended obviously depends upon the age and ability of the young person, as well as his/her previous experiences. Lastly, the craft department enables young people to experience work as a team especially if, for example, the department decided to adopt the factor workdays as described below. With the reduction in the amount of formal sport, where young people previously learned how to work in a team, this is gaining in importance within the total curriculum.

5. Ways in which the general aims may be included in craft work

(a) **Design Approach** — A definition of

design in the context of this article would not be appropriate, but the Schools Council Design and Craft Education Project has indicated the way in which a mixture of divergent and convergent thinking can be formulated. The importance of this approach is that it is a practical way of showing young people how decisions are taken and how problems may be solved. Teachers of many subjects claim that they are interested in helping young people solve problems but here is a very practical approach to this objective whether the subject is practical or not. The author has developed a slight variation on the normal design approach, which is shown in figure 2. It is essentially the same but does include the cyclical nature of this work. There is now a growing body of experience in using this approach to craft teaching in areas such as woodwork, metalwork, needlecraft or cookery.

(b) **Factory workdays** — Several examples of ways in which it has been possible to simulate a production line within a school have been published in this journal elsewhere (see, for example 'Industrial Design and Production Projects in Secondary Schools', Douglas M.H., *Studies in Design Education and Craft* 1.) Similarly, experience has been gained in America with their Industrial Arts Curriculum Project. The educational objectives of such work need to be carefully thought through for it is questionable to use school pupils for the production of large numbers of items. The Schools Council Project mentioned above has reported on specific cases where this approach has been used in schools with very considerable success. The author was involved in a course for teachers at which this was used and the following brief was given:

'Design a construction toy for use by 4/6 year olds which could be mass produced in a school workshop. As an additional constraint, the toy had to be produced by the teachers on the five day course'.

This was a fascinating experience, partly because of the work itself and partly because the need for very careful preliminary planning became obvious to all. In fact the author, who is not a craftsman and had previously cast himself in the role of storeman and sweeper up, ended by having to undertake some simple critical path analysis of the various activities in order that the planning could be achieved!

6. Conclusion

A short article like this cannot but touch upon several very large questions. Education is the *only* organisation that is capable of helping young people to be prepared to live 'adventurously, wisely and well' (to quote Mr. Semper in 'Steering Wheel of Destiny') in our technological society. The author believes that craft education has an important part to play within comprehensive education to-day.

Figure 2

