

The Design Education Myth

There are not many former Handicraft departments that have not changed their names into something that implies a new emphasis.

Using various permutations of currently used words like 'Design', 'Craft', 'Technology', 'Technical' and 'Creative', each school has carefully tried to present its particular interpretation of the kind of education their title implies.

Yet when one tries to see the extent to which the title gives a true indication of what is happening in the school, it becomes clear that the ones that have tended to avoid, or be reticent about using the word Design in their Departmental title, will probably be the ones who, in a dozen or so years, will have been seen to have got it about right.

For the chances are, by then Craft and Design and Technology Education, or Design Education for short, will have all but died. In spite of huge investment and a massive propaganda campaign to get it going in the schools, it has hardly even begun to establish itself.

Educational change, like all social change is invariably characterised by swings like that of a pendulum; action and reaction, from one extreme to another. Dodd's¹ historical analysis of the development of Manual Training, Handicraft, Craft and Design and Technology, shows evidence of swings from one extreme to another throughout the whole period of development.

However, it is only when the historical pattern reveals itself that this kind of movement or pattern of movement becomes perceptible, and it is in the nature of the way we see current change, that we tend to assume that the change being experienced is the one to break the pattern, and that there will be no going back.

Also there is an assumption that if the push in the one direction is sustained long enough the tendency to return and oppose the thrust will be overcome.

It is this faith which has sustained those who believe, in spite of very slow progress, that Design Education will eventually become accepted and indeed practised in most schools.

The truth is, and this appears to be the case in so far as the analogy applies to Craft Design and Technology Education, the forceful determined push may well be matched by an equally strong inertia inherent in the system, the net result of which is a lot of huffing and puffing, but very little real change.

If this is true, it can only accelerate the insidious disappearance from the curriculum, of any kind of practical education. It is in this sense that I predict the possible death of Design Education, for the pendulum will not simply return to the status quo position but will swing back to the point where schools will cease to offer at all, any practical education of any consequence.

The Design and Technology examinations offer only a glimmer of hope, for the numbers being entered for them in relation to the total numbers being entered for all exams usually taken by Craft

Design and Technology pupils, is very small indeed. An analysis of the figures relating to numbers being entered for Design and Technology since 1973 show that its share has only increased from 5.1% in 1973 to 7.0% in 1976 and is still probably well under 10% in 1979, although the full figures from the DES are not yet available.

The figures in Table 1 cannot be said to indicate any significant positive swing. Indeed when the plus factors, which should be operating in favour of these exams are weighed against those for the traditional exams, it is difficult to escape the proposition that the figures represent evidence of a 'de facto', overall net resistance, which is only marginally overcome in a small number of instances.

After all, the concept of 'design' in education is by no means new. Dodd shows that many of the early educational thinkers had argued forcibly for it, and even Boards of Education, in every report since 1915, recommended in strong terms its proper inclusion in schemes of work.

Also, the rationale for Craft Design and Technology education is difficult to refute on philosophical or social grounds, and I know of no counter argument being articulated.

These new exams enable teachers to make strong claims for the subject's academic rigour and its provision for intellectual challenge, whilst retaining its emphasis on the value of practical thinking, doing and making. These exams have currency in that Universities accept them for entry, and employers see their relevance.

The Schools Council has commissioned no less than three major research projects into Craft Design and Technology education, and the Royal College of Art has a substantial and continuing programme of research into it. An M.A. course in Design Education is also run by the Royal College. Other key organisations have been set up to develop it such as the National Association for Design Education: the Standing Conference on School Science and Technology: SATRO's Schools Technology Forum and the National Centre for School Technology at Trent Polytechnic.

The Design Council is very active in supporting it and organises design competitions sponsored by companies.

Many Local Education Authority Advisors have promoted it vigorously through conferences, in-service courses, discussion documents, and in-school advice etc., and Her Majesty's Inspectorate has put considerable weight behind it.

It cannot be disputed that this all adds up to a massive campaign. What do the other, craft-based, exams have going for them, in comparison to this kind of backing? What kind of psychological mechanism prevents all this getting through to the consciousness of those who are responsible

for entering pupils for exams? The figures in Table 1 show that the numbers entering Technical Drawing, Woodwork and Metalwork remain largely unaffected, and no account is taken here of the craft-based C.S.E.'s which are offered.

Seen in this light the figures are alarming and need further explanation. Some of the reasons put forward for them are discussed later in this article.

The campaign has clearly produced only a marginal lift in people's awareness of what it is about and, if anything, has stimulated as much negative response as positive, and these responses tend towards a rigorous defence of the status quo.

It is my job to prepare students to become teachers in this area of education but I see very little evidence of any change in curricula in the lower years of the school, even where Design and Technology is offered at 'O' level. Indeed, when it comes to giving students experiences which demonstrate the value of Design and Technology education it is difficult to find more than 4 or 5 schools in all of North London, Hertfordshire and parts of Essex where the features of an education based on the notion of design, are exemplified in anything other than a token or superficial way.

Yet Eggleston² implies in his latest book that Craft Design and Technology education is established in most if not all schools in the country. In the first

chapter he writes 'The aim of this book will be to define the new identity of Design Education and to show how it *has been* (my italics) achieved'. He goes on to illustrate what he thinks is the general case by references to specific case studies which would appear to be quite atypical.

What he says has great prescriptive value but it is a distortion to imply that Craft, Design and Technology education has a broad base of acceptance; still more that the will exists to put it into practice.

The DES has put out a film and is currently making a publicity booklet called 'Good Practice' and they have selected twelve schools from all those in the country to use as exemplars of what good Craft and Design Education should be. I challenge them to say whether they could have even doubled that figure comfortably without weakening their message, and to reveal just how typical these twelve schools are.

Where there has been a perceptible positive shift in some schools, it has in many cases resulted in situations which achieve the worst of both worlds; bad design and bad workmanship. People with good intentions have tried to introduce design and technology, but have themselves lacked, or their members of staff have lacked, any real understanding of experience of designing. Very few teachers were in fact up to it, and given the overall problems of shortage and rapid turnover of

Table 1

<i>G.C.E. 'O' Level Entries</i>						
	1973	1974	1975	1976	1978	1979
Technical Drawing	47707	48496	50139	48947	(Figures for London and Oxford D & T exams only)	
Woodwork	14003	14567	15148	14611		
Metalwork	10876	11220	11445	11679		
	<u>72586</u>	<u>74283</u>	<u>76732</u>	<u>75237</u>		
Design & Technology	3916	4473	4895	5721	5657	6405
TOTAL:	<u>76502</u>	<u>78756</u>	<u>81627</u>	<u>80968</u>	% age of '76 total	
D & T as % age of Total:	5.1%	5.6%	5.9%	7.0%	6.9%	7.9%
<i>G.C.E. 'A' Level Entries</i>						
		1974	1975	1976	1978	1979
Technical Drawing		3650	3291	3345	—	—
Woodwork		545	478	1022	—	—
Metalwork		621	545	—	—	—
		<u>4816</u>	<u>4314</u>	<u>4367</u>	—	—
Design & Technology						
a) London		136	—	—	386	418
b) Oxford					243	269
					<u>629</u>	<u>681</u>
D & T as % age of Total:		2.8%			14.4%	15.7%
					% age of '76 total	

staff in the early 70's it must have been difficult to get a good team together at all, let alone keep one. Anyone with any ability at all moved on for promotion. Consequently, besides not achieving much worthwhile in design terms, it also led to a decline in standards of, and attitudes towards quality and value.

But the resulting conclusion of many who tried it was that design and technology equaled poor standards of work. Naturally enough, and I will show why this was inevitable later, many of these teachers reverted to teaching what they knew best, and could teach best. The results they were able to achieve from formal operational 'craft' work restored their confidence and integrity with regard to their professional self-image, and having at least tried Craft, Design and Technology education and found it not to work, felt suitably qualified to dismiss it as unworkable.

This does however show a certain measure of honesty and conviction, whereas what one sees most often in schools are approaches which lack any kind of integrity at all. Where it is claimed that the work is design based, what the pupils actually do shows that in fact little has changed except for the worse. The old 'jobs', sometimes even written up as briefs, masquerade as projects though nowhere is there any commitment to thoughtful enquiry, creativity, problem solving or to anything other than 'the processes to be learned' which are inherent in the job, and the sole real justification for doing it. What token design element exists receives no teaching input in terms of how to approach it, nor is time allowed for it. Commonly, one period out of about six or seven is allowed for design work in relation to straight forward bench-work. In most cases, design means 'the freedom to shape the bit that doesn't really matter, if there is time at the end'. When, as in making the ubiquitous pendant, the pupil is asked to design a shape, no teaching is offered by way of giving insight into the development of shapes and how they relate in terms of line, pattern, movement etc. Commonly one shape is extracted from a two second, random scribble on a scrap of paper, and that is the extent of the designing. Today's pendant is yesterday's tea-pot stand.

Seldom is any connection made between Technical Drawing and design, and pupils are rarely taught to sketch, draw or model ideas; mainly I suppose, because they are not expected to have any.

Technological design is rarely taught from first principles, nor is it allowed to grow out of genuine enquiry.

In short, it is in most schools, a sham.

The teaching practice experience for teachers in training confirms for most of them what many of them suspect; that their college lecturers are theoreticians, out of touch with reality, and much given to flights of fancy. The difference between what really exists in school and that which we try to persuade them ought to be, is so enormous as to create a severe credibility gap in our relationship.

They are unable to see a direct connection between what they do at their College and what they perceive will be their role on becoming a teacher.

The student brought up in the 'Handicraft' mould and who finds the design based approach difficult and trying, is heartened by what he finds in schools because it matches his own learning experience, which has, after all, given him a certain degree of 'success'. He quickly reverts to that mode, accepts the values of teachers in the schools, and treats the course with some cynicism thereafter.

The student who comes to this subject via a route other than school Craft/Design/Technology departments, perceives the nature of the real situation and becomes very disheartened. Many of these are women and it is especially upsetting to see them alienated, because we desperately need more women teaching this subject.

But why is it so bad, after all the effort that has gone into its promotion and development? After all, the philosophy of Design Education has been steadily evolving since the late 1950's and it seemed to gather a substantial momentum during the expansive years of the 60's and 70's.

The strength and unitary nature of the resistance to Design Education suggests either, that there is a counter philosophy which logically opposes the arguments for change, or that it is a mass reaction to the imposition of change from above, borne of anxiety, prejudice and fear.

Although the resistance is strong, it is quite inarticulate and there is no evidence of a counter philosophy as yet.

If the latter suggestion is accepted, it has to be explained in terms of some factor or experience, sufficiently significant to, and largely shared by, the majority of Craft Design and Technology teachers in the field.

The shortage of teachers over these years and the instability this has caused has been a severe impediment to the development of good practice, but this alone cannot explain the strong attitudinal resistance which is proving to be so strong.

The single most significant common factor to the majority of teachers is their training experience. Prior to the 1960's before the so called Wing Colleges really began to have some influence on the way a significant number of our teachers were being trained, virtually all the teachers in the subject had been to one of two Colleges; Loughborough in the Midlands, Shoreditch in the South.

Shoreditch was exclusively Handicraft while Loughborough trained both P.E. and Handicraft teachers. Both colleges took only male students. Their position was a natural extension of the situation to be found in schools and it reflected and confirmed all the prevailing attitudes about its value in academic terms. It reinforced feelings of separateness, difference and inferiority even, from other teachers in training and future professional colleagues. Their subject orientation was different from all other school subjects, most of which had academic bases within universities, or other Schools of Higher Education.

In their case it was the precepts of the Trade Schools which were the dominant formative influence on them, reflecting the prevailing ideology of early industrial society, class and work structure. While Loughborough shook itself free of them when it became part of the University, at Shoreditch they remain for the most part central to their approach even today. At both colleges educational objectives for students, and the pupils they were to teach, were firmly tied to the values inherent in the process of production of an artefact.

For a long time there was little to choose between the two colleges and they had a virtual monopoly. This created a comfortable self-perpetuating cycle of supply and demand between school, college school; which left them feeling self-satisfied, complacent and quite without any felt need to look beyond their own traditional approach for any other model of teacher training. Not only did these colleges fail to initiate any moves to improve the subject, but for a long time continued to ignore the logic of change even when others pointed it out to them. They had control over the examinations that were set in Woodwork, Metalwork and Technical Drawing and these hardly changed at all over the years in spite of the fact that the Universities which validated them had no intention ever of recognising them as valid for purposes of entry into themselves. The initiative for the London University Design and Technology exam represented a direct challenge to these exams which had remained virtually unchanged for 30 years. Hicks from Goldsmiths' College initiated and structured the change in emphasis, and was helped in launching the exams by Rose, a practising teacher. Since that time the examination has become respected in all fields, and the Standing Conference for University Entrance has formally recognised Design and Technology as being an acceptable 'A' level for entry into University.

The Colleges had no competition from graduate and PGCE trained teacher training routes and, perhaps more importantly, they represented the only route into Higher Education for students studying Craft in Secondary Schools. Had they realised the opportunity this represented in the expansive post Robbins era, they might well have liberated the subject from its strict craft imperatives, and engineering drawing B.S.308 straight-jacket, and developed it into a form of higher education with an intellectual rigour and challenge that could be articulated through the manipulation of material and the solving of practical problems. Had this happened we might now have some 3+1 trained teachers in the field.

Anyway, the point is that the climate in which students studied and became professionally trained was one that looked back towards craft traditions rather than towards new educational priorities based on the real needs of individuals growing up in a rapidly changing society. It was for most, a closed, almost contemplative, introspective experience where all that was problematic was

their own skilful performance in their craft, relative to their peers.

Any long course of training based for the most part on an unchanging tradition and with little built in motivation to search for new perspectives, knowledge and values, is bound, especially when it has already exercised a great deal of prior influence over its students in the more formative secondary school years, to produce at the end, a large proportion of inflexible people with all the signs of having been indoctrinated rather than educated in the liberal sense.

Given that we have in our schools a large number of people who were inflexibly trained and steeped in craft tradition and who have very little experience of designing, it is hardly surprising that they avoid like the plague educational change which involves a switch of emphasis away from traditional craft practice towards creative design and technology.

Even if we accept however that an anti-pathetic training experience is a basic cause of resistance; and that having to make do with facilities that rarely reflect the ideal will inhibit moves towards it; and that having to work with very little money and a continuing shortage of teachers is bound to frustrate efforts to work towards a sound design approach, it still requires that we ask whether the rationale implies too great an expectation of the average person who trains to become a teacher of it.

On the face of it, if one lists some of the essential characteristics which seem to be demanded by the rationale of Craft Design and Technology, the answer must surely be that we expect some kind of super-human to be teaching it. We might expect for instance:—

- 1) A thorough grounding in the techniques of manipulating at least either wood or metal, perhaps both, and some plastics, and a substantial amount of technical knowledge to back up workshop practice.
- 2) A width of understanding of the industrial methods of working these materials, with which to explain to young people the nature of the contemporary product and the material culture.
- 3) A wide knowledge of the various forms of technology which make contemporary products available, plus the ability to explain them in simple terms and to reveal some of the basic principles underlying these developments.
- 4) A general mechanical and technological intelligence and capability to think across the spectrum of materials, processes and techniques, so that design problems remain open to any one or more of them.
- 5) An understanding of the social, political and moral implications of technological change.
- 6) A sensitivity towards aesthetic factors in design and the ability to help young people make considered and mature judgements based on an understanding of the dynamics of visual form and principles of basic design.
- 7) To be able to see and demonstrate the

inter-relatedness of knowledge and to make real the connection between things.

- 8) To be able to generate, record and model ideas on paper and in three dimensions, and to be graphically fluent and accurate in a variety of media.
- 9) An ability to make, present and interpret working drawings to several British Standards.
- 10) An ability to organise information and general resources in a way which supports high level project work.
- 11) An ability to look at a topic or project and to see how it can be presented to young people in a way which will be exciting, revealing, and challenging, and to know how to get good resource material for this purpose.
- 12) An ability to act as principal resource for design ideas, back-up information and research procedures.
- 13) A width of vision and perspective on the material culture in general such that he is able to lead pupils into the exploration of specific aspects of it through projects.

This is not to dramatically overstate the case at all, for all of these teacher competences are implied and even assumed, by most of the statements which enumerate the aims and objectives of Craft, Design and Technology education. Consider the appendix on aims and objectives in Schools Council Working Paper 26³, for example.

The current courses of initial training cover only a few of these, and in reality concentrate heavily on the first. Also, a number of the others are of a kind which are best acquired through real and direct experience with the technological realities of life. This is a powerful argument in favour of a strong policy bias in favour of recruitment of mature experienced people, though I am not optimistic about the possibilities of attracting them.

Bearing in mind the likely school experience of the average school leaver who comes to take this subject, the chances of transforming him into this 'guru', able to lead others into a systematic investigation of the material culture, are very slim indeed. If there were the experienced people already in the schools with all the attributes and competences required, to whom the newly qualified teacher was attached, then things might be different. There never was a course of initial training in anything which produced a person other than one qualified sufficiently to begin learning how to proceed in the real world.

He really needs to be in the care of an experienced man who could help him build on his college experience and consolidate his understanding of the role which the rationale of Craft, Design and Technology education suggests for him.

But this kind of back up does not exist and the students know that it does not exist. They are acutely aware of the exact reverse kind of influence which they will be subjected to upon joining a school staff.

In view of the inertia and resistance that exists in the schools and colleges, and given the prevailing assumptions and circumstances, it must be difficult

to sustain any other view than that it is quite unrealistic to expect that practice will bear any resemblance to the theory.

The first step towards dealing with the situation, if there is anything that can be done at all, is to recognise the facts and to stop deluding ourselves in the way that we have over the last few years.

We have reached the point where we must take stock of the situation and ask some fundamental questions about ourselves and our role in relation to the realities of schooling.

It is a good time to do this anyway for no doubt secondary schooling is about to change due to the falling rolls and general contraction.

The institutions which train our teachers are also at a stage of significant change and development.

The time is therefore ripe for debate, and for going right back to fundamentals. I have to admit that I am not optimistic about whether there is sufficient will existing to face the realities and to make the changes which I see as necessary, but I would suggest the following starting points for debate, since they seem to arise directly from the foregoing analysis of the present situation.

1) That we have to accept that the teachers in school are resistant to the change and largely without the basic competences to deal with the new role. The kind of questions which might follow from this are, for example:—

a) What kind of in-service training would make any *significant* difference and can it be made available to enough people?

b) Should we abandon all hope of achieving a change of emphasis and go back with a view to strengthening and improving basic craft work in schools?

c) Would it be best to leave the 'craft' teacher alone, to carry on in the way in which he was trained and with which he is comfortable and begin afresh, creating a new hybrid subject, taking in graduates in Art and Science for example? Some ATC courses already have a Design Education option within them, and our own Re-training courses are taking people from a variety of backgrounds. Why not then make it a highly interdisciplinary subject, with a practical bias, but not craft based? The Middle School might be the one place where such innovation might be acceptable, for there is a movement within some of them to make their courses highly interdisciplinary. If a team leader of an integrated studies course was a designer, and the staff all understood the value of the design process as the means by which children integrate their knowledge and experience, could this be an acceptable way of doing things?

d) How can we effect a situation where people with different competences can come together to work as teams, which might be one solution? With smaller schools, and smaller departments likely in the future, is the team approach tenable? What more might be done to foster understanding and real co-operation between Art/Craft, Design and Technology/Science? Are the examinations the key to this?

There is obviously a great deal of thinking to be done on this question alone, but there are other related questions which follow on from these, and all of the following statements which embody the kind of action I think is required, if any real appraisal is to be made.

- 2) That there should be a complete re-examination of the teaching roles and of our assumptions about what children ought to be doing in this subject at school.
- 3) That there has to be a complete re-assessment of priorities in terms of teacher competences, and an analysis of how and where they originate, and the ways in which they can be fostered in individuals and constructed in teams.
- 4) That there has to be a thorough overhaul of all courses of teacher training in this subject, in the light of this debate.
- 5) That there needs to be a whole new strategy for recruiting people of much higher calibre and experience than we are used to having, into the profession.
- 6) That there has to be developed the means of providing the necessary support and resources for the teacher who, it must be recognised, cannot do it alone.
- 7) That urgent discussions should take place with Industry and Commerce to find ways in which they can become actively involved with the development of Design Education and the resources to make it work.
- 8) That there should be a great investment in the production and distribution of good learning and teaching resources:— films, books, work cards and learning programmes, video tapes, access to computers, Ceefax and other electronic information storage and retrieval systems, etc.
- 9) That the rationale has to be clarified in terms of, for instance, its use of the central concepts such as design, technology, function, creativity, and to make what distinctions exist between them more meaningful to teachers. It also has to be much clearer about the kind of content implied by the rationale and to suggest work more easily adopted by the ordinary teacher than what has been suggested in a number of books and magazine articles up to now.

By way of exploration, and to further the debate, let me develop some of the possible arguments which underlie some of the above statements.

Take for instance the question about whether all teachers of Craft, Design and Technology should be highly competent craftsmen, or whether it makes sense even, to base the pupil's work on benchmark and working principally with wood and metal.

It is the case at the moment, that Design and Technology is being taught almost entirely in the same context as Handicraft was taught: if there is no sound rational basis for doing so, this could represent one major and crucial factor in preventing Craft, Design and Technology developing from its Handicraft origins.

It is by no means easy to sustain an argument in favour of using wood, metal and plastics in a

constructional way, as a means of bringing about beneficial educational results in young children.

Wood and metal are intractable materials. Working them in the ways that they have to be worked, in the main, in schools, requires physical strength and control, and a fair degree of skill for the achievement of reasonable results. In metalwork, machinery helps out more than in woodworking, but this creates as many problems as it solves in terms of children getting fast and good quality results. The restrictions on the meaningful use of machines because of safety considerations and the requirement for actual training on the machines, amount to impediments to much achievement.

Could it be then, that the use of wood, metal and, lately, plastics, for realising design ideas in the cause of education is ill-founded and more the result of historical factors than of considered rational judgement?

It has always struck me as odd, for instance, that we confront children with tasks requiring strength and muscular control precisely at the point in their physical development when they are least able to perform well or consistently in psycho-motor terms.

It is sometimes argued that the kind of practice gained through working with these materials aids their neuro-muscular development, but there is very little in this. Woodwork and metalwork are slow processes which, in the forms in which they have to be done in schools, give very little in the way of repetitive action which would amount to practice. Skill acquisition is founded on the need for repetitive action (practice), so that the sensory feedback system becomes ever more sensitive to smaller margins of error. No 'job' ever gave that kind of practice. Planing or filing could be cited as repetitive and qualifying as relevant practice, but it assumes great motivation in the case of the latter while the former requires the kind of strength and body weight not possessed by the average 12/13 year old. Most often they are given prepared stock anyway.

Any claim that Handicraft taught skill to young boys is largely spurious. The fact that it gave a person a taste for working with tools and materials such that they went on to acquire skill at a later stage is rather more tenable, and we are all aware of the opportunity it gave for perhaps limited, but relative success for the boy who had experienced nothing but crippling failure everywhere else in the curriculum.

It seems then, that it might be a waste of time to spend two or three of the least appropriate of their years, getting children to a very mediocre standard of workmanship which a physically more mature person could attain in a few well spaced hours of practice.

Indeed one might go so far as to say that we invite failure in every sense by basing our work on wood, metal and plastics in the first 2/3 years of secondary schooling. We virtually rule out the possibility of a very high standard in workmanship terms, and mostly preclude the possibility of working on anything with a decent design dimension

to it, because of all the difficulties involved with working the materials. It creates the expectation of poor standard and worse, the acceptance of it as the norm. Early experience of trying to work these materials, in a constructional way, more often than not with blunt or badly set tools, establishes in the minds of many people for ever, that it is very unpleasant, non-gratifying and difficult work which is definitely not for them. 'I was hopeless at woodwork at school', is a declaration often heard made in defence of an overall incapacity to be practical about anything.

In short, the case being made here is that the early introduction to craft work in wood, metal and plastics is largely wasteful and counter-productive.

It is certainly counter-productive in terms of giving good design experience, for designing is also an activity which requires a lot of practice. The very concept of creativity stresses the need for fluency of ideas. Using wood and metal in the accepted sense of designing and making is far too slow to provide much practice of this kind. One, or perhaps two projects per term gives little design experience and can hardly be said to be fostering fluency of ideas at that rate. It is true that many ideas may have been generated in the process of concluding two projects, but in reality, the proportion of time given to the problems of working the materials far outweighs the time given to genuine analysis of a problem or for any broad exploration and modelling of a number of ideas.

Looking at the situation in terms of the developmental stages which these children have reached, we can broadly say that what pre-pubescent children lack in strength and psychomotor control, they make up for in their capacity to be fluent with ideas, their enthusiasm for exploration and for finding out about things, and their willingness still to use their imagination. These characteristics tend to become suspended during adolescence in favour of more self-orientated concerns, and a psychological need to come to terms with the strict realities of life.

It would seem, therefore, more sensible, on all these grounds, to spend these formative years on developing design capability and awareness; establishing sound work patterns and confidence in approaching practical problems; fostering the ability to generate and communicate ideas fluently and effectively; developing a widening perception of the world of materials and technology, in preference to trying to make things in wood, metal or plastics of dubious value in either their intrinsic or educational terms.

This might be achieved through a carefully planned and structured programme of experiential 'hands-on' practical thinking, using as many materials as possible. In a foundation course such as this, there would be a commitment to developing an awareness of the nature of these materials, their origins, variations, properties, etc., the ways in which they are manipulated and fabricated which would reveal principles of structure and other basic

technological factors; procedures of production, and so on. It could be extended into investigations into the products of technology, determining how they work and why they look the way they do; and evaluating them as products against criteria, including aesthetic ones, which the children should have had experience with through basic design work. While the pupils would be engaged in practical activities with all sorts of materials, the objectives would be knowledge centred, through guided experience, rather than skill centred in the craft sense. The experiences would be short and illustrative or proving of something, and the projects arising from the work would be short term and susceptible to quick methods of working and early conclusion. Difficulties of working materials ought not to slow down the process of learning about things. Good attitudes to workmanship and quality can be fostered in more easily worked materials like card, wire, balsa, aluminium, cloth, clay, plaster, etc., and through the graphic work which would be an important element. Their whole approach to using materials and tools would also foster sound thinking attitudes.

This could be done at varying levels to suit all abilities. A glance at many of the books written for very young children would show how these topics are susceptible to simple clear and interesting treatment. They also give endless ideas for topics and projects, such as you will never find in the books which are supposed to be written for the secondary school pupil.

This kind of a foundation course could be the basis for work in the late 3rd and 4th years which then begin to demand much deeper treatment of design topics which might then include the use of the more intractable materials and the building up of expertise of different kinds. Some prescribed courses in such areas as metal turning, electronics, etc. could be offered as options which might lead into projects in these areas.

It could also, of course, lead on to many different kinds of higher level courses for 4th and 5th year students, but all of this requires a very different kind of teaching expertise to that which we are used to. This brings me back to the kinds of teacher competences listed above and the examination of the ways in which teacher training courses need overhauling.

It is clear that if the philosophy requires all these competences to be displayed by all Craft, Design and Technology teachers it expects too much, especially given the training experience of those already in the field.

All recent innovation in education has added greatly to the role responsibilities and expectations of teachers. Besides general increased responsibility in terms of pastoral care, record keeping etc., our specialist teachers have had their job made much more difficult by the introduction of multi-media work, individualised design projects, mixed ability groups, integration and so on.

But no-one will say what can now be left out to make way for all this, and this is quite unrealistic.

We have got to cut down on what we expect from individual teachers and encourage perhaps a greater diversity of training and teaching ability.

The difficulty with proposing a contraction of our expectation more consistent with what is actually possible, is that this appears as a move to make people more specialist precisely at a moment when, because of rapidly falling rolls in secondary schools, teachers will have to be more generalist than specialist. This is in addition to the problem of shortage which has anyway conspired to prevent the formation of balanced teams, though the falling rolls situation may well cure the shortage.

The specialist/generalist problem is however usually expressed in terms of whether a teacher should have a craft competence in wood and metal or in one of them.

I think we have to look at the importance and type of craft competence we wish to have in all our teachers as a minimum requirement, in relation to other basic competences, and then to suggest where specialisms would be especially useful. These may or may not relate to craft skills in particular materials.

There is little doubt in my mind that the concept which is central to the philosophy of Craft, Design and Technology education is that of *Design Awareness*. As such it ought therefore to be the concept which is central to the education and training of teachers of Craft, Design and Technology, but as yet it is not. It is quite subordinate to the acquisition of executant skills and techniques and is not prior to, nor fostered by, those kinds of design acts that, in the main, students get involved in. This is because the projects are firmly located in the design field prescribed by the materials wood and metal and therefore do not encourage a broad critical and searching attitude towards the material culture which would lead towards an awareness of contemporary, past and future design.

I would propose therefore that any Core Study central to a course should seek to foster this design awareness, and that design projects should be geared to objectives related to this concept rather than craft objectives. Similar argument used to sustain this view of school work applies here. In crude terms this core part of the course would attend to the development of competences 3, 5, 6, 7, 10, 11, 12 and 13, on the above list, all to differing degrees, of course, since many of these only really develop through maturity and relevant experience. But this is initial training and the raising of one's perception of these problems is an important starting point.

This core, besides revealing to the student much about the nature of the material and technological culture, should seek to foster creative responses to problems thrown up by design study and perceived by the student. Most design projects need to be short term so that a wide experience of designing is gained, though at least one project should be attempted at length.

If one part of the course is devoted entirely to the development of creative responses and

awareness of design, I don't think that it is totally wrong to teach pure technique and materials processing quite separate from any design context. I would even go so far as to suggest that efficient techniques of training can be applied to necessary parts of a student's course which concern technique acquisition. Programmed learning and self teaching systems could be used in many instances to save staff/student contact time and to save the student's time and energy for more 'broadly educational' tasks relevant to the development of the above competences.

To connect these two aspects of the course the student should be encouraged to see materials manipulation in terms of basic principles and broad categories of action which would be the starting points for any decision about whether one method is more applicable than another. An analysis of all manipulation in terms of casting, forming, wasting and fabrication would foster an awareness which would inform their design understanding and help them apply the techniques in which they were trained, in the most appropriate way. Basic graphic communication competence is another essential component though it clearly ought for some to become a specialism.

Many teachers will want to become a specialist in something within the broad spectrum of Craft, Design and Technology education but even this need not necessarily be delineated by a material. While one student would wish to see his role in any department as one related to being the wood expert another might wish to be seen as the one who is 'good at' jewellery, or sculpture, or 3D Design or computers, or archaeology, or architecture, or electronics or graphic communication.

What the specialism actually is doesn't really matter for the purpose of education so long as it is apparent as being a developed specialism within, and exemplifying, the total design approach, and that when used as a teaching vehicle in the school situation it is presented in this way. Its purpose would be defeated if it was used and taught in an esoteric isolated way, and an end in itself rather than a means to an end.

A course model might offer 4 separate but inter-related strands of equal weight. See Table 2

This is a schematic idea which refers more to the balance of expertise which a teacher ought to have than to any structure of a course which might achieve it.

But if it is to make any sense at all there has to be a widespread acceptance that the secondary 'specialist' Craft, Design and Technology teacher needs to develop a very broad and secure competence in these aspects of his professional training. Since the profession has become graduate the emphasis in B.Eds has been upon the theoretical study of education at the great expense of the 'main-subject'. For secondary specialists at least, this has to be reversed and more time must be given to the study of what they will teach. There is a trend in new submissions to propose four years to Q.T.S. which

is now clearly necessary but the fight to win back the main emphasis in training must continue.

The point behind opening up this kind of debate is that many courses of teacher training are coming up for review with C.N.A.A. quinquennials; mergers are taking place, and more critically, opportunities are opening up for Craft, Design and Technology teachers to qualify through the graduate and P.G.C.E. route, or the Dip.HE plus two years B.Ed route. Combine all this with the greatly changing situation in educational logistics throughout the country and the failure of Craft, Design and Technology to become established in spite of all the bally-hoo, and the debate begins to look long overdue.

But even if these courses change there still remains the problem of inertia and resistance to change existing in the schools, which was the early concern of this article. It might seem to be an odd strategy which proposes more radical, even heretical, change as a response to resistance, to that which is already proposed. Although I am not at all optimistic, I do suggest that the development of school curricula courses which play down or even exclude woodwork and metalwork as such, might help those who want to change and have found it difficult in the context of craft-work to do so. It would also sort out those who really were serious about the need to teach design. It would challenge them to make the change or refute the arguments that I have put forward for leaving woodwork and metalwork in design until much later. Finally it would identify those who really wish to teach crafts largely without reference to design, outside of that specifically related to that craft.

A revised teacher education programme which gave real support to the new teacher in terms of giving the right competences to match the commitment to design education, would help, in that the teacher would be better trained for the job and therefore more resistant to the pressures to revert back to the old way. Also these people, in the situation of scarcity that exists would only be attracted to situations where they would be encouraged, or allowed to teach design in this way.

But this still leaves us with the need to develop a good strategy for recruiting into the profession, people of high calibre and wide experience who could, given suitable training, go on to take a strong lead in the development of this subject.

There is no doubt that the kind of knowledge, understanding and awareness of design and the material culture that we want in our teachers is only really developed in people with first hand experience of working with it over a period of time.

There are people like this in industry and commerce, but understandably they are not persuaded to join the teaching profession to turn out pendants and plywood boxes. Conversely many of those we do attract are disappointed to learn that Craft, Design and Technology is not the same as training apprentices in bench fitting or machining. I cannot see us attracting the architect, designer, the engineer of experience and the best of the skilled

men while the image of the subject remains so dreadfully low. Pay is a critical factor of course, and there is no doubt that teachers' pay compares very badly with the kind of rewards that such people can expect in industry and commerce, and the gap is widening. However, the desire for job satisfaction, early voluntary retirement and redundancy are factors which may help.

One alternative might be to stimulate industry and commerce to 'second' people for certain periods of time, or exchange with teachers. Companies might even be persuaded to 'adopt' schools in their locality and work in collaboration with the teachers of design, offering support, services, money, specialist staff, ideas, materials, etc., so that students and teachers become involved in the real world of design and manufacture, making worthwhile things, while industry and commerce begins to understand the problems of education.

It is certainly time that industry and commerce took a much more active role in Craft, Design and Technology education, especially now that technology is a significant factor in almost all jobs. They have to see that their investment is in a good education at the right level, but they have to recognise, at the same time, that teachers need a great deal of active support if they are going to give any real qualitative preparation to their pupils for the world of work. Many more companies ought to sponsor projects and competitions; to sponsor promising students through University or a design training of some kind; to provide funds and staff for collaboration with teachers in the preparation of learning packages and general teaching resource material, and so on.

If there were this kind of collaboration and interchange of staff and ideas, leading to high level work being undertaken by the most talented of our students, the chances of highly competent and experienced persons deciding to become professional teachers would be greatly enhanced.

However, a more immediate and realistic solution which builds on a measure of reported success and general optimism about the quality of teachers being produced this way, might be to extend the idea of the 'conversion course for qualified teachers'. For instance, if a two-year 'course, an MA in Design Education, was offered to senior and experienced secondary school teachers who wished to change their subject, or at least to use their expertise in a more practical and inter-disciplinary way, this might attract some very good people, with a wealth of diversity in both experience and background. This would appear to be a very good way of breaking the vicious circle of supply which has bedevilled this subject. There may even be strong justification for an overall strategy of teacher training which gives these kind of courses priority over those giving initial training to school leavers. Such courses would also be timely in that in the climate of falling rolls and general contraction, many teachers will be looking to make fresh initiatives in their careers.

Indeed it could be argued that Craft, Design and Technology education will get nowhere unless there

Table 2

GENERAL UNDERSTANDING OF MATERIALS PROCESSES AND TECHNIQUES	DESIGN AWARENESS AND	ELECTIVE SPECIALISM
CRAFT DESIGN AND TECHNOLOGY RELATED TO EDUCATIONAL GOALS		
DEVELOPMENT OF WORKMANSHIP AND 'CAPABILITY'	DEVELOPING CAPABILITY IN DESIGN	HIGH LEVEL SPECIFIC EXPERTISE

is a massive programme of in-service training and education for existing teachers. The Advisors are continually pressing for all sorts of courses, but the Polytechnics and Colleges are failing to provide them. There are many teachers who want to upgrade their qualification to degree standard if that qualification was rooted to their subject rather than as in the case of most In-service B.Eds., in general educational theory.

As far as initial training is concerned, there are problems ahead because all Certificate courses will soon be at an end, including the One-year Certificate for industrially qualified students. The number of students coming out of Brunel/Shoreditch will be much smaller and the new regulations from C.N.A.A. requiring all applicants for B.Ed. to have 'O' level Maths and English from 1980 are bound to bar a certain number who would otherwise be eligible. The final irony is, of course, that there are so few people who have an 'A' level in Design and Technology who come forward to teach, because they find themselves able to get into a University, and those with craft based 'A' levels only are considered quite unsuitable for most degree courses of initial teacher education and training.

The idea of a two-year shortened B.Ed to Ordinary level with a possible option to achieve Honours in a further year on a part-time tutorial basis with a project, needs looking at. It could replace the present One-year Certificate in Education and provide the end-on training for a student with a Dip.HE in which Craft, Design and Technology had featured strongly. This 2+2 structure has much to commend it as an alternative mode to 3/4 years concurrent training and it would probably recruit well. At Middlesex Polytechnic we are planning for the future in terms of a four-year concurrent B.Ed Honours, a Dip.HE, a 2-year shortened B.Ed and an in-service one-year full-time B.Ed for certificated teachers, while continuing our retraining course for as long as the D.E.S. require us to do so. We can only hope to do this in a viable way through a lot of common teaching across these courses, but we believe it can be done while maintaining the integrity of each of them. The development plan is only at the first stages and depends on many other factors than its relevance to the particular problems of Craft, Design and Technology.

As well as high level courses, a great number of short courses are needed on a variety of topics and specialisms within the subject. But they are not being provided, not because the people concerned with Craft, Design and Technology education do not care, or are ignorant of the need, but because they are being prevented from taking any new initiatives which make demands on resources, especially staff.

Indeed most of the ideas and proposals which could do so much to improve the subject and the way that it is taught in schools have cost implications, which in today's climate and given prevailing attitudes about materials and facilities required, suggests that they will

probably never happen. After all it could be argued there is very little reason to expect much progress in these times of economic stringency, when little headway was made during the expansive sixties and early seventies.

But we have, for too long, assumed that better means 'more of', rather than 'alternatives to' and that to increase expenditure leads automatically to improvement.

I have tried to show that in reality, Design Education is largely a myth and that the inertia in this system is preventing real progress. It is difficult to sustain any other view than that the will to make Craft, Design and Technology education into something really worthwhile and central to the curriculum does not exist in sufficient strength to overcome the many problems that face those who would try.

It really is not therefore money that it stands in real need of; rather, a conviction that the rationale is right, the creativity to generate the content suggested by the rationale and the strength of mind to make it work.

The one hope might be that as schools change rapidly, as they are bound to do in the near future, the situation might get to the point where the virtue of change for the sake of survival, will be realised by those with the strength to carry it out, and that the will to change might, at all levels, be generated out of necessity.

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