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Is Mickey Mouse technology the way to beat the Japanese?

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Abstract
This is a polemical paper which is critical of what is an increasingly common interpretation of the teaching of technology in schools. "Technology" in this case will be defined as that which is concerned with the design and production of products or systems associated with the manufacturing industries.

"Mickey Mouse Technology" will be defined as design tasks given to pupils which involve cartoon type images and in which little attempt is made to use design tools such as mathematical modelling or scientific principles. It will be argued that the image promoted by such topics is erroneous, that it trivialises technology and is counter-productive to the stated aims of the subject.

The pathology of this situation will be located in the lack of an adequate paradigm. It will be shown that attempts to promote paradigms have resulted in polar shifts which have left many teachers confused and demoralised.

The paper will conclude by arguing that if we are to achieve the aims of teaching technology, one of which is to ultimately strengthen the manufacturing base of this country and to make it more competitive with countries in Europe and East Asia, then a clearer paradigm needs to be articulated and clearer guidelines for interpretation offered. Some examples of 'non-Mickey Mouse' technology will be offered for illustration and discussion.

The motivation for writing this paper is a deep sense of concern about the quality and content of technology being taught in many schools, particularly in Years 7 - 9.

The image is the message

Teachers involved in stimulating awareness about design should not need reminding about the importance of presentation - and presentation not simply concerned with the styling of a product but with the overall sense of identity a product has in the broad consciousness of our culture - often referred to as "the image". In the last few years individual politicians and political parties have been working on the development and projection of a "new image"; rarely are the policies completely new but it is the way the "image" is marketed which is deemed to be important in terms of presentation.

What sort of "image" does school technology project?

A firm of marketing consultants charged with the task of improving the image of school technology might well consider this a tough assignment. There are still strong historical links to "handicrafts", to a negative view of industry and engineering and of a vocationally orientated activity more suited to "less able" pupils (and mainly boys). On the positive side there is a lot of support from
agencies in government and industry which have considerable power to legitimise and promote the subject area. The publications produced by such agencies show a strong support for the development of technology as a core subject of the curriculum.

What concerns me is the subject image which is being promoted, either deliberately or inadvertently by some teachers, authors of books, advisers and inspectors. The image seems to be based on the idea that technology must be fun, which I agree with, but where I disagree is in equating the "fun" element with cartoon characters. Cartoon characters then become the basis of projects on "mechanics" which is the means by which parts of the anatomy of a face or figure are made to move; similarly "electronics" becomes the means by which the eyes or other features are made to light up. The majority of text books published in the last three years include many such examples. Many teachers on courses (including initial teacher training) undertake such projects and these form the basis of many county policy documents on the teaching of technology.

I object strongly to the kind of image of technology which such projects promote and I characterise it as "Mickey Mouse Technology", and I use the term "Mickey Mouse" pejoratively to mean trivial and banal. Apart from a weak model of technology 3 (which is still limited to structures, materials and electronics), such projects, rarely in my experience, deal adequately with a sound model of designing 4 and a sound understanding of the theory which informs decisions to be made about technological systems. "Designing" in such circumstances is often a desultory process of sketching out some cartoon characters from memory ("Draw out three ideas and select the best one"). and the mechanisms or electronics is provided by example (".. the moving parts must be operated by cams or cranks"). Not surprisingly most of the designs look remarkable similar. Rarely do I find evidence of awareness of the use of mechanisms in related mechanical devices (say for example a sewing machine), nor do I find any use made of graphical or mathematical modelling to predict the amount and range of movement. In short, such projects patronise the interests and abilities of most pupils and demean the subject.

If such projects were only to be found in primary schools my objections would not be so strong but I regularly come across similar examples in Years 7 - 9 when supervising students on teaching practice.

I speculate on the image of technology being promoted; I believe it to be one of a trivial activity in the eyes of pupils and parents and not at all well related to the part that technology plays in the culture of our society; I believe that it has the more potential to prevent than to promote the development of "technological literacy." 5

The procedural model for teaching technology, used for these and similar topics, appears to be based on the interests of the child and of trying to make the theory "fun". The ideological roots of such a procedural model are clearly
related to "Child Centred Education" which has been influential in many of the curriculum development projects in technology education. In the following section I attempt to explain why this is so attractive to teachers and to highlight the weaknesses of it.

**Why is such a procedural model so widespread?**

The procedural model for teaching technology does appear to be in a fluctuating "pre-paradigm state." The reaction against the instruction based teaching of craft skills resulted in the "Design" and "Project Technology" movements of the late sixties and early seventies - and both of these, in spite of significant differences in style and content, show strong links with Child Centred Education. These can be seen in the relegation of the teaching of skills and knowledge to one of being subservient to project work - that is the skills and knowledge were taught as and when the progress to complete a project required them. A reaction against this approach in the seventies and eighties resulted in the "Control Technology" and "Modular Technology" courses which placed an emphasis on the teaching of a sub-structure of knowledge and skills which preceded the application of these to a tightly controlled project. Such differences of approach have never been fully resolved and are still evidenced in the contrast of styles between the A Level Oxford Design and A Level Cambridge Technology syllabuses. Not surprisingly teachers are confused and, having no clear procedural map to guide them, are likely to seize on ideas in an uncritical manner. It was perhaps a similar syndrome which produced the outbreak of fishes on sticks in the seventies.

In "Mickey Mouse Technology" we can identify the weaker aspects of both approaches, namely a procedure based on requiring pupils to make some arbitrary decisions about a design which is assumed to relate to what they are interested in and to crudely weave in some activities loosely related to structures, mechanisms and electronics. But, this does appear to the uncritical to be a compromise; teachers brought up in the "Design" model can still flirt with aesthetics and claim that they are teaching some "hard" technology; teachers brought up in the "technology" model can claim that they make the theory more accessible and palatable. Having swung between "classical humanist and progressivist ideologies", the teaching of technology appears, in parts, to be stranded with a silly compromise.

Other factors, of course, contribute to unsatisfactory models of teaching - such as lack of resources, the constraints of "circus" timetabling and larger groups of pupils taught over shorter periods of time - but I believe that the major factor causing this situation is the confusion resulting from the lack of an adequate procedural paradigm.

**What might the basis of a procedural paradigm for teaching?**

Denis Lawton characterises the ideology influencing recent successful curriculum development projects as "hard nosed progressivism"; it is based
on a close linking of a skill taught and the skill being used in a relevant human context. The role of the teacher is to create new interests and not merely to pander to the interests that pupils are perceived to hold. The basis of this is "learner centred" rather than "child centred".

The human context of technology has been identified to be of importance to pupil's motivation and interest, by research done by both the APU and GIST projects. The findings show that making the link between technology and the potential to help people is likely to create new interests and an optimism about the part which technology plays in our culture.

Starting points for projects have been hampered by simplistic models of the design process which conflate innovation and invention. The belief that pupils must come up with three ideas before starting practical work results in many bored and frustrated pupils. Starting points where pupils can examine a system or a product, set up tests, analyse information and begin to visualise how these might be made to work better (and to question what is meant by "better") are a more sound basis for getting pupils interested and involved. In procedural terms, AT4 is often a better starting point than AT1.

Pupils (and teachers) need to appreciate the power of modelling as a design tool - and in particular the power of iconic and symbolic modelling. Both of these give the opportunity to examine what existing skills and knowledge can be applied to the task and to identify new skills and knowledge which needs to be learned; for example most pupils in Years 7 - 11 already have a useful maths and science base for analysing situations and practical skills for making mock-ups. At present too much reliance is placed on pictorial drawing as a tool for modelling - and which pupils find very limiting - and not enough on other forms of modelling which give opportunities for more immediate involvement and better results.

**Why do we need to beat the Japanese?**

There is strong evidence that we need to strengthen our manufacturing base in order to maintain our present life-style and culture. There is also evidence that the teaching of technology has the potential to influence the ambition of pupils to make, in their future working lives, a direct contribution to the development of our industrial base. This has always been one of the broad aims of school technology and, in common with many others, I believe this to be coterminous with the aim of providing the technological awareness which will enable people to influence the style and level of technology with which they will wish to live. I believe "Mickey Mouse" technology to be inimical to these aims.

I call then for a discussion on, and the development of, a procedural paradigm for teaching technology which will meet the broad aims of teaching technology in schools, provide pupils and teachers with an improved quality of learning experience and provide this county with the competitive edge it requires to compete in world markets.
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