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Equipment Demand Changes in the UK Technology National Curriculum

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Abstract

The introduction of the UK National Curriculum in Technology produced many changes of emphasis, including that concerned with the type of work to be done in the area formerly designated as CDT. Some schools interpreted this as a reduction in the range of equipment required for delivery of the CDT craft skills content. A detailed survey of 16 schools in the Greater Manchester conurbation revealed the sell-off of equipment by some schools, shortages reported by others and a general imbalance of provision of some items of equipment for the delivery of the Technology National Curriculum. The observations flag warnings for curriculum changes in the allocation of teaching spaces, on specific equipment for curriculum delivery and on increases in the number of pupils compulsorily following a new scheme of work.

Introduction

The Order introducing the UK National Curriculum in Technology was accompanied by Attainment Targets, Programmes of Study and exemplar material (DES, 1990). This was supplemented by the non-statutory guidance material from the National Curriculum Council (NCC, 1990). The amalgamation of material from Home Economics, CDT, Art and Design and Business Studies into a Design and Technology Capability has led many schools to set up integrated approaches. Some of these represent a major change in the way in which the craft skills element of CDT has been viewed. These changes have met with criticism from some quarters (Beadle and Prais, 1991; Smithers and Robinson, 1992; NCC, 1992; Bierhoff and Prais, 1993). Notwithstanding the gradual changes from craft-focused to design-focused courses over the preceding years many schools, prior to the introduction of the National Curriculum, had maintained the use of certain pieces of equipment which illustrated their commitment to particular levels of engineering workshop practice. Such equipment included lathes, shapers, milling machines, grinders, etc.

The situation is complex and it is difficult to dissociate changes consequent upon the specific demands of the content aspect of National Curriculum Technology from indirect effects such as the increased take-up in Technology subjects (and increased resourcing difficulties) resulting from the compulsory nature of the Technology National Curriculum and from changes in the educational philosophy of the subject among the participating teachers.

This research looks at the changing use of major items of Technology equipment, primarily in the CDT area, but one must be careful not to extrapolate

too strongly from this in interpreting teacher attitudes towards skills training.

We have investigated the extent to which schools (using a sample of sixteen) now regard such equipment as redundant, and the extent to which they find themselves short of equipment as a result of the National Curriculum changes. This work was done in terms of the current (first version) of the Technology National Curriculum. The Dearing Report (SCAA, 1994) and subsequent draft proposals for amendment of that National Curriculum may have changed the viewpoint of the schools.

The Schools

The schools were selected mainly from those directly involved in the Manchester University teacher education programme at that time. These were inner-city, urban and suburban. No rural schools were involved. All schools who were asked willingly participated in the enquiry.

The sample comprised thirteen maintained secondary schools (eleven 11-16 co-educational, one 11-19 all-girls and one 11-19 all-boys) and three 11-19 independent schools (one co-educational, one all-girls and one all-boys). The mean school size was approximately 900, over a range of some 600 to 1100.

The list covered one grant maintained (co-educational, 11-16), twelve local authority maintained including four 11-16 co-educational denominational voluntary schools, as well as the three fee-paying independents.

The total sample of 16 is small, but sufficient to illustrate some aspects of what is happening in the schools. Quantitative extrapolation from this sample

to attempt to describe the full national situation would be unwise.

The Questions and Replies

The list of equipment thought most likely to be surplus as a result of the changes introduced by the National Curriculum was constructed. This was based on observations by a group of four students whilst doing their teaching practice in schools and following discussion within a group of teachers. This was supplemented by certain items of equipment from the Home Economics and Art and Design areas, which were included as a comparison.

The final list included woodworking lathes, metalworking lathes, pillar drills, band saws, routers and various milling machines and grinders from the 'traditional' CDT section, and conventional ovens, microwave ovens, sewing machines, pottery wheels and kilns from the Home Economics and Ceramics sections.

Specific questions were then asked regarding the sufficiency or otherwise of the present stock of these major items of equipment. For each piece of equipment there were recorded the present number of each of the items, the number sold by the schools (or otherwise disposed of), the present excess to requirements, present shortages and recent purchases to meet National Curriculum requirements. Each estimate was the considered professional opinion of the Head of Department or other equivalent responsible person in the school.

Opportunity was given to the respondents for free comment regarding the area of research and the addition of other equipment excesses or shortages applying to that school.

Data was collected by visits and by telephone discussions with known persons, in most cases the Head or Coordinator of the school Technology Department.

Observations of CDT Equipment Requirements

Most schools had just one wood lathe, some a few more, with five schools having sold or willing to sell surplus. There was evidence that the disc sanding facility provided on most models was the main attraction to having the lathes, with very little wood turning being done. Two schools had retained surplus wood lathes just for the sanding facility, in one case with the tailstocks removed.

With regard to the metalworking lathes, seven schools had disposed of, or were willing to dispose

of, surplus machines (and one school had sold seven). The number of metalworking lathes regarded as desirable by the Heads of Department questioned ranged from satisfaction with the one possessed up to a need to retain six. One LEA maintained 11-16 co-educational school did not have a metalworking lathe and wished to obtain one. This variation is perhaps surprising and may reflect major variation in teachers' perceptions of the type of workshop activity envisaged in the National Curriculum.

The continued usefulness of pillar drills was indicated by the fact that only two schools had sold or planned to sell surplus (one drill in each case) leaving what they clearly regarded as an adequate number.

The motivation for sale of (or wish to sell) equipment seemed to vary. This information was obtained by individual discussion with a few of the schools. Both financial reasons and the better use of space seemed relevant.

The response regarding bandsaws was, perhaps, surprising. Clearly, in the new kind of making activity being pursued in most schools there is a need for cutting small pieces of wood, plastics, etc. This can conveniently be done on a bandsaw. All schools had at least one, but six schools indicated a need for more. This may represent a particular change in emphasis, with small scale cutting activity being mechanised for speed.

Routers were explicitly stated by two schools as too dangerous, in their opinion, for use in 11-16 schools. Six schools, however, had one which they regarded as sufficient. One indicated a wish to purchase, and the others did not have a router and did not want one.

Ten items of equipment in the category of milling machines and grinders had been sold or were surplus, leaving 16 items in the schools.

Observations of Other Specialised Equipment Requirements

The inclusion of other equipment was for purposes of comparison, but it yielded some interesting data.

There was only one recorded sale of equipment in these areas (nine pottery wheels), though attention was drawn to the practice of hiring some equipment for food work. Four schools wished for more microwave ovens, and two for more conventional ovens.

Equipment for textile work was extremely variable

though the position was not fully clear because, in some schools, this work was seen as being outside the brief of the teacher concerned (eg. by location in an Art and Design department). Six schools saw a need for more sewing machines, with some commenting on the need to move to computerised equipment in this area.

Most schools seemed to be satisfied with the small number of pottery wheels and kilns available for ceramics work, though three required a kiln additional to the one possessed, an area of development that might not have been immediately obvious.

Additional Observations

All schools were given the opportunity to comment further on the area of research, regarding the need for further capital equipment or to note disposals of capital equipment not listed by the researchers. All responded, some at length.

Importantly, nine of the sixteen schools commented on computer provision, mostly relating to shortages. Four of these were specific to the need for CNC lathework; some referred to the need for more computers in the Department for CAD work. A small number of schools made comments on the need to update provision, though several seemed content with the control systems available on the BBC machines.

Three schools commented on a need for more equipment for plastics work, two of these including vacuum forming equipment. This again would seem to indicate the emphasis of work being done under the National Curriculum in these schools.

Other comments included needs such as additions to the stock of small tools and equipment (two schools), drawing facilities (two schools), more bench space, jig saw, etc. The girls schools both recorded a need for considerably more equipment; one was likely to get that in the building of a new centre.

The inspection of the individual data also revealed the following features.

One LEA 11-16 co-educational school considered that it had a surplus of engineering workshop equipment. In the same local authority, and only a few miles distant from that school, the LEA 11-19 all-girls school found it hard to meet, what it regarded as reasonable, the constructional side of the Technology National Curriculum because of equipment shortages. There was no formal method of communicating that opportunity for equipment

transfer following the reduction of that LEA Advisory Service.

No independent school has disposed of CDT equipment surplus to requirements, except for the nine pottery wheels. The lack of sale of equipment may be associated with the fact that the independent schools have not been required to follow the National Curriculum, though most do so, and the approaches taken in the three independent schools in the sample in CDT have not needed major changes.

All the maintained schools recorded the disposal (or intended disposal) of some equipment. This was perhaps the most surprising finding of all. The financial freedom resulting from the introduction of the Local Management of Schools and Grant Maintained status, coupled in some with shortage of money to run a practical subject, clearly made disposal of the equipment desirable. In some schools the money realised had been fully allocated to the department concerned for the purchase of more appropriate equipment. In others this was not so.

A surprising number of schools (six) found a conflict in their perceived need for more power sanding equipment and the implications of the COSHH regulations. Clearly, within their interpretation of what constitutes good modern National Curriculum practice, the use of such power aids is desirable, but serious worries about the legality of the position were expressed by some teachers. Other comments on COSHH related to fumes from heat treatment equipment.

Several schools proffered information about finances, generally to make the point of the generosity or inadequacy of provision. In particular, one school noted that the next logical stage of equipment provision would require substantial expenditure well outside the capitation provided to the Department by the school. This may signal a particular problem likely to arise in the longer term of LMS in schools which have fairly uniform year-to-year departmental allocations and inadequate variability of provision or internal banking schemes. Another school was rejoicing in its extensive purchases made possible by a TSI grant. A third Head of Department complained that two-thirds of money raised by selling surplus CDT equipment had been 'creamed off' for general school purposes, the one-third arriving in the department being spent on materials.

The maintained all-girls school had no tradition of CDT and was in a very poor way as regards equipment for delivery of resistant materials work in the National Curriculum.

Conclusions

It was not the purpose of this research to make a major quantitative investigation into equipment provision with the changing National Curriculum, but to seek to identify some of the factors which are currently impinging on the equipping of Design and Technology areas. This it has done.

The freedom to dispose of unwanted major items of equipment appears, on the face of things, to be a good opportunity to create additional space and raise money. But to attribute this entirely to a wish to downgrade technology is not supported in this small sample. Accusations of 'Blue Peter' technology have been common. The desire to obtain more modern equipment (CNC equipment, computers for CAD work, etc.) and for mechanised processes for small scale production methods (disc sanders, vacuum formers, band saws, etc.) indicates, perhaps, not a change of philosophy regarding quality of work, but a realignment of the type of work in the light of the increased opportunities for pupils to realise their own designs using equipment which is more appropriate to the task. We need further information to identify whether or not that is true.

Though the sample is too small for valid statistical interpretation, there appears not to be a strong correlation between the schools with the high-tech shopping lists and those doing the disposal.

There would therefore appear to be a case for further research in this area, once a pronouncement has been made of what the future will be. There has been considerable uncertainty of what is the long term state of the subject, and the financial implications for schools are major. The national figure of expenditure on school Technology is very large, even not counting expensive special initiatives (TVEI, TSI). Getting that expenditure well targeted is important.

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