

# Managing Changes in Technology

Michael Shepherd

*Biddick Comprehensive School, Sunderland Authority*

The National Curriculum is the most radical innovation to affect our schools in recent times. There is no 'right' interpretation of any National Curriculum syllabus [as yet]. We are at a time of response where each authority, and each school is reacting independently. No one can tell what implementation will be successful. However, this is a good time to examine the implementation process and the management of change.

This article is concerned with school based research in 150 schools within six local authorities in the North East of England. The sample area included inner city schools as well as rural institutions. 52% of questionnaires were returned. There are three research questions concerning schools:

1. To what extent are schools changing their organisation strategies to facilitate the implementation of the Design Technology National Curriculum. What is the nature of any changes made?
2. Will individual teaching styles change to facilitate the implementation of the Design Technology National Curriculum.
3. Are there or are there not, strategies to effect integration between the five main areas responsible for delivery of the Design Technology National Curriculum?

## Organisational Changes Co-ordinators

The majority of respondent institutions have appointed a TNC co-ordinator. However there are still a fairly large number who have not. A high proportion of these co-ordinators were 'new' appointments to the institution to enable TNC 'to get off the ground'. A large percentage of the co-ordinators have experience of one (or more) of the five main subjects concerned with the delivery of the TNC. One third of the co-ordinators who have a Technology background were, or still are, head of a CDT department. A minority of

co-ordinators are either deputy headteachers or headteachers. In many institutions the co-ordinator has been awarded a scale D. However there are also a fairly high percentage of scale C and E co-ordinators. (See Figure 1).

## Funding

Just over half of the respondent institutions have allocated separate funding for TNC. There is a large variation in levels of funding, from £150 up to £11,000. (See Figure 2). However, a fairly large proportion of institutions are funding year 7 only and with about £500. When TNC is applicable to year 7, 8 and 9 a possible budget of £1,500 could be a typical minimum with a maximum of £19,500.

## Subjects Activity involved in TNC

There are 26 combinations of subjects which are going to be actively involved in teaching the programmes of study for TNC. The majority of which included both CDT and Home Economics. Information Technology, Art & Design and Business Studies also have an important role to play. The inclusion of Science in a minority of replies perhaps demonstrates that there are other disciplines interested in playing an active role in TNC.

Technology as a cross-curricular subject became evident mainly because of the diversity of disciplines offering to take

part. Helping to deliver the programmes of study are some 'surprises'. For example: PSE, Humanities, Media Studies and Music. Not all are within the same institution, but they do all feature.

However almost half of the respondents have indicated that they will be attempting to deliver this new innovation to their students through just 5 subjects:

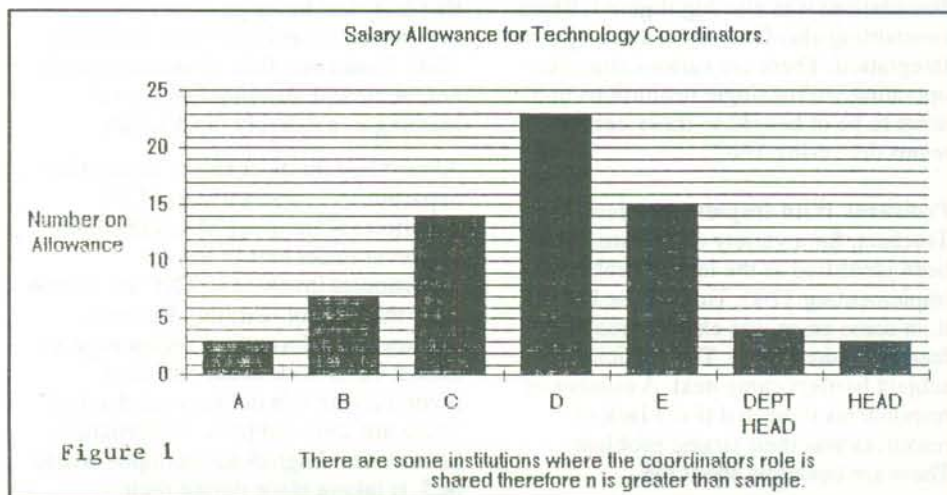
CDT, Art & Design, Home Economics, IT and Business Studies.

It should be noted that almost 60% of institutions altogether, included the 'five main server subjects' along with others in some cases.

There are a number of institutions who are 'doing their own thing' They are tailor making Technology to fit their own set of unique requirements.

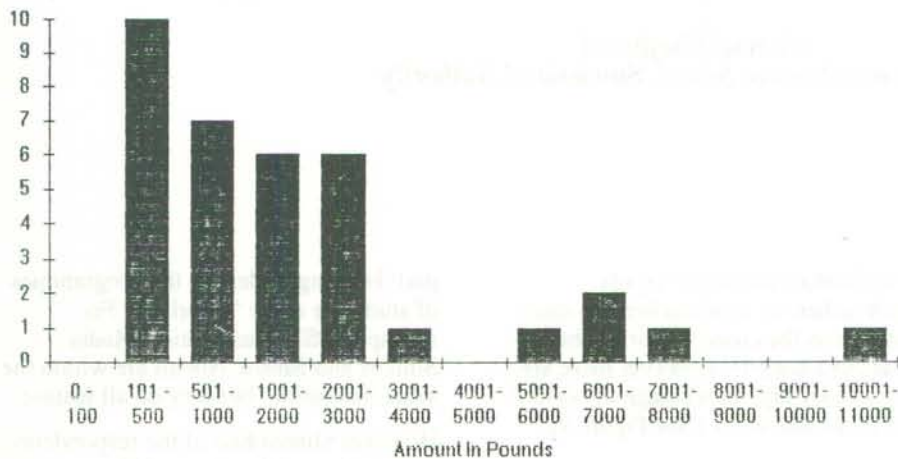
## Organisational Changes.

Just over one sixth of all respondents indicated that it was not necessary, within their institution, to make any organisational changes to facilitate the implementation of TNC. However, over three quarters of respondents did make one or more changes. 50% of all returns included changes in timetabling. 25% of all institutions are moving towards block timetabling. Just over one sixth of replies indicated that a move towards team teaching was an organisational change within their institution to facilitate the





Funding Within Individual Establishments To Enable T.N.C. To Be Implemented



implementation of TNC. The inclusion of a common theme/scheme of work or common syllabus was also a change because of TNC. Over 60% of all changes were in the teaching approach itself.

There were a number of institutions where room reorganisation has been necessary. The inclusion of a resource area has also had a fairly high priority. Technology faculties are on the increase as are the appointment of co-ordinators. Meetings, both in school time and at other times have also been necessary for organisation of TNC. Inset is also on the increase.

#### Strategies For Integration

The most common strategy for integrating the main subjects who are to deliver TNC was clearly setting work around a common context, a thematic approach. Team meetings and working parties link in quite well with training days and various inset provisions. The pilot project is a fairly popular strategy and the work of NDTEF (National Design & Technology Education Foundation) was also highlighted. Block timetabling also features as a strategy for integration. There are various strategies operating within single institutions that seem to be of benefit to those unique teams delivering TNC.

#### Problems With Implementation

Teachers, for a variety of reasons, have been identified as the largest problem in implementing TNC. Time or the lack of it, in some cases was also an area that featured quite highly. The artificial subject barriers came next. A number of respondents indicated that a lack of resources was their largest problem. There are concerns about the

geographical layout of the departments who are supposed to be collaborating in this new initiative.

#### Heads of Departments

Almost all Art and CDT departments had a HOD in 1990. This figure is expected to reduce to three quarters for Art and under two thirds for CDT by 1993. Two thirds of institutions had a HOD for Business Studies and IT in 1990. This figure is also set to reduce for both departments by over one fifth. Just over nine tenths of Home Economic departments had a HOD in 1990 this figure is expected to reduce to under two thirds by 1993. It must be pointed out that these are projected figures only.

#### Teaching Styles

##### Student Centred Learning (SCL)

(SCL a working definition offered to individuals who were completing the questionnaire: Students taking responsibility for their own learning. Students owning their work. Students the decision maker).

Almost two thirds of returns indicated that SCL was being practised in departments concerned with delivering TNC. Under one fifth of institutions are not, at present, offering this type of learning as a delivery mechanism.

Almost two thirds of Home Economics departments and slightly less CDT departments are using SCL techniques. However under half of the Art departments involved in TNC are able to offer this type of learning. Business Studies and Information Technology are almost equal with under one third involved with this delivery mechanism. There are some subjects, Mathematics, Science and English for example, where SCL is taking place during their

involvement with TNC. However, it is not possible to comment on these subjects as a whole because this study is only concerned with those departments who are actively involved with teaching the programmes of study for TNC. Some institutions are developing this type of learning together with year seven.

Just under two thirds of returns indicate that SCL will continue in 1993. A minority of institutions are not teaching using this method and have no plans to do so by 1993. Another minority are unsure of what will happen by 1993. A larger proportion thought that more subjects would be involved in TNC than there are at present in their institutions. Again a minority indicated that perhaps more year groups would become involved in SCL by 1993. However, it is interesting that not one single institution has indicated that they are at present using this type of learning technique and plan to stop doing so by 1993. The trend is definitely towards student centred learning as a delivery mechanism.

##### Student Initiated Projects (SIP)

(SIP a working definition: Students themselves identifying an area of study).

Almost half of the returned questionnaires confirmed that SIP is a method of delivery being used in institutions at present to enhance the implementation of TNC. This figure is set to rise to over four fifths by 1993. One third of the returns indicated that SIP was being practised within subjects delivering TNC in 1990. However, the returns indicate that by 1993 every institution will have gone some way down the path towards this type of approach to TNCA. A number of CDT departments are currently using SIP to enhance their teaching and will continue in the future, CDT was the only subject which featured regularly. This perhaps indicates that SIP are a more familiar teaching/learning method for CDT specialists than for those in other disciplines within TNC.



### Student Negotiated Contracts (SNC)

(SNC a working definition: Students setting their own targets, discussion with teacher, agreement on target together).

One third of responses indicated a familiarity with SNC at the present time. However, to balance this just over two-fifths indicated that this type of approach was not a delivery mechanism being used in their Technology programme in 1990.

By 1993 the prediction is that just over half of the institutions who responded to this questionnaire are intending to enhance their TNC package with SNC. Approximately one eighth of respondents indicated that by 1993 this type of teaching/learning would not be a delivery mechanism being used in association with TNC.

Just under one quarter of CDT departments are familiar with SNC. No other department featured to any large degree. Perhaps the NCC have offered more guidelines than one would at first think. One respondent would possibly think so:

Difficult to say — The NCC Technology prescribes levels of attainment and negotiation must occur when a student moves levels.

### Process Led Curriculum (PLC)

(P.L.C. a working definition: Problem-solving process being used as a skeleton for learning. Emphasis on process rather than product).

Over three quarters of respondents indicate that the subjects responsible for delivering TNC were using a PLC in 1990. However, by 1993 this figure is set to drop by 5%. There were a number of returns indicating indecision about what might happen with PLC by 1993. There was also a slight increase in blank responses from 1990 to that of 1993. The picture for individual departments within institutions is interesting: For CDT and Textiles departments there is a forecast of a decrease in the use of a process approach. However, Home Economics,

Art, Business Studies, Information Technology and Science departments are all set to increase their involvement with a process approach and TNC. There is an indication that more disciplines may become involved both in PLC and TNC. The indicators are that PLC as a delivery mechanism, especially in CDT, is on the decline. However the reduction of 5% is not large enough to speculate on future trends.

### Co-operation From Teachers

A four point scale was offered on the questionnaire. Points 1 and 2 being positive. Points 3 and 4 negative. Co-ordinators were asked to indicate the level of co-operation that they have received from individual departments currently involved with TNC. Three quarters of CDT and Home Economics departments have offered a 'good deal' of co-operation in the planning of TNC. Only a minority of CDT departments and a smaller percentage of Home Economic departments have offered 'very little' co-operation concerning the planning of this initiative. Information Technology departments also come out quite positively with 50% offering a good deal of co-operation. Only a minority offered very little help. Less than half of both Business Study and Art departments offered a 'good deal' of co-operation when planning TNC. However, when it comes to offering very little help in the planning stages, more than one sixth of Art departments fit into this category.

### Enthusiasm From Teachers

Using the same four point scale as in the last question with points 1 and 2 being positive and points 3 and 4 being negative. Two fifths of both CDT and Home Economics departments have demonstrated a 'good deal' of enthusiasm for co-operating in the delivery of TNC. Just under two fifths of both Business Studies and Information Technology departments fit into the same category. Only one third of Art departments, it was indicated, showed a 'good deal' of enthusiasm. On the negative scale. One

sixth of respondents indicated that their Art department have shown 'very little' enthusiasm for co-operating in the delivery of TNC. Just over one tenth of IT departments showed little enthusiasm. Less than one twelfth of returns showed that both Business Studies and CDT departments are not very enthusiastic within their establishment. However, the returns for Home Economics departments indicate that there is only one department in eighteen that has not shown enthusiasm for co-operating in the delivery of TNC.

### School Development Plans

Less than half of the respondent institutions have a school development plan which includes any statement concerning TNC. Of those who have such a document there were very few overlapping statements. The only theme was that of 'Delivery of Technology as required by National Curriculum'. After this initial overlap there were a number of valid and interesting statements. There were a number of comments offered, by respondents, concerning the lack of representation, within the development plan concerning Technology. There was evidence to suggest that development plans were not available to Technology co-ordinators.

### Senior Management

A four point scale was offered on the questionnaire. Point 1 and 2 being positive. Point 3 and 4 negative. Co-ordinators were asked to indicate the level of co-operation and enthusiasm that they have received from senior management concerning the implementation of TNC. Almost 75% of returns indicated that their senior management offered either 'a good deal' of enthusiasm or were quite positive in their enthusiasm. Less than 20% were concerned about the level of enthusiasm from senior management. Over 75% of respondents indicated that the level of co-operation was very high from senior management. A minority indicated that the level of co-operation was poor. From



the figures offered it is obvious that senior management, within the survey area, are both enthusiastic and co-operative with individuals and teams who are planning to deliver TNC. It is interesting that senior management are supporting this initiative to this degree especially when they have to consider other elements of National Curriculum. Science, Mathematics and English at present and many more to follow. Other concerns for senior management are also evident e.g. LMS.

#### Issues For Discussion

There are a number of organisational changes that have been made in institutions to facilitate the implementation of TNC. It is interesting that there are not two institutions who have responded to TNC. in exactly the same way.

This innovation has created a climate for change to traditional subjects. This change is perhaps threatening but it is also inevitable. Some respondents are not wholly behind a few of the decisions that have been made: Perhaps a little tongue in cheek:

Creation of three (Ha Ha Ha) faculties.

There are issues concerning funding that need to be highlighted because they are affecting TNC as well as other initiatives.

For example:

Funding — not usual amount — greatly reduced to less than 50% due to LMS.

TNC in one institution has received £11,000. There is no indication whether this amount is for year 7 alone or for the whole implementation of TNC. However £3,000 of this money has been allocated by TVEI. Perhaps TVEI is funding a lot more initiatives concerning TNC?

It is evident that there are a number of institutions who are at the beginning of a complex learning curve concerning delivery mechanisms generally and

Technology National Curriculum specifically.

The Technology process will lead to student centred learning (ideally). But the teaching process will include all approaches i.e. (at least) the years 7-9.

This is possibly an indicator as to how difficult the co-ordinators role is:

...When you bring together teachers from varying disciplines it is inevitable that they will bring a variety of teaching styles — all of which are appropriate at some time. All styles below will be used and each member of staff will hopefully extend their range of teaching skills and styles.

Teachers themselves have been identified as the largest problem for co-ordinators.

For example:

Persuading staff to break down subject barriers.

Encouraging communication between four departments whilst avoiding any feelings of 'under threat'.

The position of Art and Design within Technology has given cause for considerable comment:

Art say they are getting their own document and therefore haven't time to devote to Technology.

There are the purists in every field and it is important that their opinion is highlighted.

The different starting points of the different subjects + a very real danger that our Technology will become *low* Technology.

School development plans are an issue that provided a mixed response. The following example is typical of a comprehensive addition to the school development plan:

We see Technology as a whole school responsibility *but* separate departments need to exist while separate GCSE/A levels continue.

Therefore co-operation in year 9 but at present, independence in years 10 and 11.

A minority were perhaps simplified by the respondents:

Get your heads together.

Che sera sera!

The demonstration of support for TNC, from senior management is a credit to their professionalism.

It is evident from this school based research that teams within institutions are developing unique experiences for future students. But what has also become evident is that individuals must co-operate as one team. Technologists!

#### Continued from page 160

decisions about resource allocation. As was made clear in the PCFC report, this means the resourcing not only of the research activity itself but the departmental and institutional environments in which research is seen as being a critical element.

The Polytechnics and Colleges Funding Council. (1990). *Research in the PCFC Sector*. Report of the Committee of Enquiry Appointed by the Council.

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Brian Allison is Emeritus Professor of Education, Leicester Polytechnic and Editor of the *Index of British Research in Art and Design*.