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Science and Technology INSET in Devon Primary Schools

The Educational Support Grant Programme - 1986-89

The availability of Education Support Grant funds for Primary Science and Technology created an opportunity for a training programme in Devon which has proved to be particularly successful. This paper outlines the form of that programme, and, while the introduction of the National Curriculum currently requires a different approach which blankets all teachers, the ESG programme may serve as a case study for further INSET programmes when the National Curriculum is in place.

Devon is a large geographical area, 90 kilometres north to south and almost as much from East to West; it would subsume the combined areas of Bedfordshire, Hertfordshire, and Buckinghamshire if overlaid. Due to the nature of the population distribution with a third in one large conurbation (Plymouth), there is a total of 450 primary schools, many of them small and isolated, and therefore without any specialist teacher expertise in Science or Technology. Additionally, in the rural areas many of the teachers (three-quarters of whom are female) do not readily perceive how technology is important to the children, despite the hi-tec nature of much modern agriculture.

Technology was taken to include Home Economics and CDT activities, so that no separate INSET was offered for these, and it was emphasised throughout the programme that - while Science and Technology were inextricably interlinked at this level - it was important to identify the unique qualities of each before it was possible to provide a balanced integration.

The management committee therefore included the County Advisers for Science, Home Economics, and CDT as well as a Primary phase adviser, while representatives of the staff from the in-county University, primary teacher training college, and SATRO, were also invited to join the management meetings to ensure a common philosophy of INSET across the county. Four advisory teachers were seconded on the basis of their flexibility, imagination, and credible track record in the classroom rather than their Science expertise, and these were drawn from and based in the four administrative areas of Devon so as to make them known to and easily accessible to the teachers in their locality. The gender balance reflected by chance the balance within the county, that is, three women and one man, but had very different backgrounds. The man represented the greatest gamble as his first degree was in History, he then retrained for and was currently teaching in CDT in secondary schools, and had no permanent experience of teaching in a primary school. In the event, he was very successful, and subsequently took up a post in a primary school.

By geographical accident the only management team adviser based in County Hall was the CDT adviser, so it was he who was given responsibility for the co-ordination of the programme. However, it was a co-ordinary rather than a leadership role, and once the broad framework of operation had been agreed by the management committee the organisation, implementation, and detailed planning of courses and resources was undertaken by the team of four advisory teachers. This team gelled so well, each with their individual qualities, that when an incentive allowance became available they decided jointly not to accept it, but to use it to gain resource back-up from the Technology Centre manager.
The structure of the proposed course pattern was based on

1. Selection of groups of schools in close local contact.
2. Commitment from every headteacher involved.
3. Training of the school co-ordinator i. in the school context  
   ii. in-depth out of school
4. Extensive physical resourcing.
5. Long term planning provision.

This turned out to be a very powerful combination, as there was virtually no chance of any teacher falling by the wayside due to the petty difficulties which so often sabotage curriculum innovation. The course pattern extended over a complete academic year :-

**Autumn Term**
Select school groups
Visit headteachers to gauge expectations and support.
Visit target teachers in their classrooms to clarify requirements.
Spend time in school with teachers

**Spring Term**
7-day intensive course, operated in a local school.
Provision of documentation and £100 resource pack on 7th day.

**Summer Term**
Support teachers back in classroom
2-day follow-up course

The management committee was happy with the proposed structure, but understandably hesitant about the proposed staffing for the central courses: 4 advisory teachers to 12 class teachers. The argument rested on the need for quality rather than quantity and, when finally accepted, paid off handsomely. Once the first year was complete, the course presentation was so efficient that the number of teachers on subsequent courses was limited only by the extent of the accommodation available, so that over the three-year period half the primary schools in Devon gained a fully trained and very effective co-ordinator of Science and Technology.

This pattern was repeated four times in the year, once in each of North, South, East, and West Devon; the Spring Term was thus a very arduous period for the advisory teachers as - operating in teams for the main course - some or other of them would be travelling over 100 miles on each day of the course.

In more detail, the structure operated as follows:

1. The selection of groups of schools was made by the team of advisory teachers working with the Primary Phase adviser for the Area. In principle these were based on Academic Councils (the grouping of primary schools together with the secondary school which they feed) where these existed, but in all cases the schools were in a common geographical area so that they could maintain the impetus of the initial course by personal contact and support in the longer term. The unpleasant decisions of where to draw the line of exclusion had to be faced but the principle of quality rather than blanket breadth was never sacrificed.
2. The commitment of the headteacher of each school was given a very high priority, as so many INSET initiatives have failed due to the lack of support - often for good reason - given to the individual teacher when they return to the pressures of general school demands. The support of the headteacher was therefore gained by personal contact in the first instance, and reinforced by allocating the first day of the course specifically to headteachers, where they could be involved in practical activity without exposing their perceived weaknesses in front of their own staff. Every effort was also made to ensure that a representative from the secondary school also attended on one day of the course, as most secondary schools were and still are sadly ill-informed of the extent of the experience and understanding of children who enter the Science and Technology classes in secondary schools at age 11.

Fundamental to the success of the full-time course was also the provision of back-up information. After extensive examination of published textbooks, there appeared to be no option but to prepare a custom-built set of booklets, and a great deal of time and effort was put into the preparation, editing, and production of these so that they. They have now been revised completely, and will continue to be used to support INSET in Devon for some time to come.

3. The training of the school co-ordinator, the real target of the exercise, started as soon as the headteachers had given their commitment with a full day visit to the school by the advisory teacher for that Area. This provided valuable information about the school, the children, and the teacher's expectations which could not be gained in any other way, and enabled the Team to plan the main course accordingly, but also provided the opportunity of reassuring the teacher - often someone with very little science background - that they would not be placed in a vulnerable situation, and that the course would be geared to their personal level of knowledge and skill as a starting point. They were also able to ask questions direct about the briefing for the start of the course, so that they were able to come on the first day with perhaps not confidence but at least with little apprehension.

The intensive central course was sited, whenever possible, in one of the participant schools to avoid the "ivory tower" atmosphere. The first day, as already stated, was given over solely to the headteachers and allowed them firstly to unload any doubts or perceived problems so that these fears could be allayed by the Team or - as happened in most cases more effectively - by colleague headteachers; secondly, to experience the an example of the practical activity which their school co-ordinator would be involved in for the following six days. This allowed them to "let their hair down" without feeling vulnerable in front of their own staff, and ensured that they KNEW what it was like to cope with practical problems of science and particularly technology which may have appeared simple in principle but were quite different in practice. Few headteachers left these sessions without a feeling of satisfaction and increased self-confidence.

Despite very careful planning of the content of the courses to ensure in-depth coverage of both science and technology, every effort was also made to build on the great advantages of the integrated curricular approach of primary schools. The commonest starting point was therefore a story which could be read to the children (teachers) and which contained a problem which required a practical technological solution and involving scientific principles. As an example, a story which told of the lighthouse-keeper whose wife sent him his lunch from their clifftop house in a basket running along a wire to the lighthouse, but who often found the seagulls had eaten his sandwiches before they arrived, prompted an enormous variety of physical and biophysical solutions which gave great scope for practical construction and the exploration of scientific principles.
4. Extensive physical resourcing was placed as a high priority as there is nothing more depressing for a teacher of practical activity than to be thwarted by lack of materials. The importance of the booklets to the full time course was matched by equal emphasis on the materials and equipment provided at the end of the course. Again, this was prompted by the knowledge that so many INSET initiatives which involve practical activity had in the past foundered by the teachers returning to schools and having to plead for additional and scarce school funds for materials which the headteacher had never previously found necessary, were not easily available, and would certainly take some time to arrive - by which time the incentive and motivation would have dissipated and routine pressures of survival would have reasserted themselves. Each participant was therefore provided with a large plastic storage box complete with all the necessary materials and tools to make an immediate start in the classroom, while the incentive was still at white heat. At £100 each this may have appeared to err on extravagance, but experience has shown that this was far from the case and that this provision was one of the most effective aspects of the course.

During the early part of the summer term, within easy memory of the full time course, the teachers were again visited by their local advisory teacher so that they could raise all the minor difficulties which they could not foresee while detached from their classroom situation, and any problems of school administration could be overcome by a joint approach to the headteacher. It also provided the opportunity for initial evaluation by the headteacher which could be taken into account when planning and operating the final penultimate component of the course - the 2-day follow-up session at the same central venue before the end of the summer term.

5. Long term planning provision was not overlooked, and strategies were also established to ensure that developments continued at least for the foreseeable future. The selection of schools within a close geographical area was designed to ensure that teachers could keep in touch with each other and exchange ideas without major INSET organisation, and the co-ordination with the secondary school and access to their INSET funds also contributes to self generating progress.

Availability of materials and tools in quantities which were uneconomical for the County Supplies Department has been ensured by the establishment of a "shop" at the Technology Centre in Exeter, where the secretary is available during school time (including lunch hours) each day to take orders, which are then processed by a technician and packed for collection on delivery. There is as yet no formal delivery system, and reliance is placed on the perambulations of the advisory teachers around the county, but the centres in Exeter and Plymouth at opposite ends of the county cater for probably 50% of schools within collection radius. Plans are now being made to extend the service.

To summarise it is appropriate to examine the problems faced, the successes achieved, and the developments planned.

The problems were both physical and psychological: physical in the geographical spread of the area and in the need for equipment, materials, and documentation; psychological in the general lack of confidence among teachers in facing technological activity which was largely one of perception, but also the genuine lack of scientific knowledge and practical expertise needed to implement their requirements. These are points reinforced by susequent research from Ted Wragg, and at a more mundane but very practical level in the overwhelming demand from primary teachers for courses in basic constructional skills for CDT. One of the sadnesses, however, must be the fact that despite all attempts to demonstrate that it was an integrated course in Science and Technology, the majority of teachers still perceive it as a Science course and do not appear to understand the differences between the two areas of operation.
The successes may be measured locally and internationally. Locally, the
disappointment of the schools not accepted and the delight of those who attended,
backed by a formal evaluation by a seconded headteacher, left no doubt about the
success. Internationally, following a presentation by the Team at the PATT
Conference at Eindhoven University in April 1988, the books have been used in
many parts of the world from Australia to China, have been selectively adopted for
the Netherlands National Curriculum in Technology following a visit to Devon by a
group of their educationists, and have been translated in toto for use in certain
East European countries. It is interesting to muse on the fact that this must be one
of the few ESG programmes where the team of advisory teachers led themselves
from direct contact with teachers in schools, and it has certainly been extremely
effective despite or because of that fact.

The future is less certain. While certain aspects, such as the provision of
resources to rural schools, will be extended possibly by use of a bus, the depth
and quality of the courses themselves cannot be repeated. The new team of advisory
teachers, overstretched by the pressures of covering all teachers in all 450
schools for the National Curriculum in Science and in Design and Technology, may
be able to do little more than scratch the surface by comparison. It may perhaps
be seen as unfortunate that the welcome ripples from a planned development have
been overwhelmed by the larger and as yet unproven tidal race of the National
Curriculum.

R. O. Harvey

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