

A survey of the effectiveness of in-service courses for teachers of primary school design and technology in England

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Introduction

In 1990, a new national curriculum for design and technology for primary children was introduced into all state schools in England. Although primary teachers had always taught science and art and craft together with a range of related subjects, design and technology was a new, single subject. It soon became apparent that the nature of the subject needed further understanding before it could be taught effectively in schools. Inservice training for primary teachers of design and technology, however, has been provided in an inconsistent way and it was not until 1993 that extended courses became available through government funded Grants for Educational Support and Training (GEST) courses. The courses were originally funded for twenty days but since 1994 have varied in length from five to twenty days.

The growth of the courses was rapid but no formal evaluation has been set up nationally to match the comprehensive study undertaken for similar courses for mathematics and science (Harland and Kinder, 1992). In April 1994, a conference was held at Warwick University to review the first set of GEST funded courses held throughout the country, and the findings were reported in the conference proceedings. It became evident that a broader evaluation was required to identify the key areas that were proving successful and those that needed development. This paper forms a part of that evaluative process by describing a survey which was

carried out into the degree of change generated by four courses run at The University of Central England and Warwick University.

Brief Description of the Four Courses

The courses at UCE were both 16 days in duration and at Warwick University the 20-day course was followed the next year by a shortened 6- day course. At both institutions, certain key elements were a necessary requirement for validation by the Department for Education (DfE), and were therefore included in all courses. These included the development of teachers' own knowledge and understanding of design and technology and their ability to plan and implement design and technology in school. Courses were to be jointly planned by Local Education Authority (LEA) and universities. Within this framework, the aims, objectives and content of the courses at the two institutions varied somewhat.

The courses at Warwick University placed a high emphasis on enhancing teachers' understanding of the nature of design and technology, and exploring the inherent processes through work with children, as a structured part of the course. Aspects of knowledge and understanding were developed through workshops where teachers sampled a range of activities.

Within the UCE. courses there was, in contrast, a greater emphasis on developing knowledge and understanding, whilst enhancing teachers' practical capability and making teaching aids which could be taken back to school. In addition, this course included 6 days delivered by LEA staff, where teachers worked on a long task at their own level. Here the emphasis was on making a high quality product. Courses at both universities explored issues relating to the role of the primary school co-ordinator for design and technology.

Survey intentions

It is important to be clear about the intentions of the survey and to recognise its limitations. The main aim of the survey was to gather information on the perceived changes within each school as a result of the courses attended. Some schools, which were already doing well in this subject, therefore, may have witnessed relatively small improvements. Generally, however, course members were chosen to attend the courses because the school had identified a need for improvement within the subject.

The first part of the survey focused on three main areas of potential change. Respondents were asked about the perceived change in themselves as course

members, some of the staff at their school and, finally, the whole school staff. Due to the inherent difficulties in gauging the change that an in-service course makes within a school, it was recognised that the analysis of the results should involve looking at general trends rather than individual results.

Methodology

The survey was carried out by using a questionnaire sent through the postal system to all members of the four courses described above. It was felt that this had a number of advantages. It gave respondents the chance to consider their own answers without being unduly influenced by those who had run the courses themselves. It was one of the least time-consuming options as far as the course members were concerned. It made it easy for teachers not to participate if they so wished. In this respect the survey responses will reflect the views of those who were interested enough to reply to the questionnaire.

The questionnaire made considerable use of a simple numeric scale in order to gauge the degree of change in any one area. This was as follows:

Ring one number changed a lot no change
1 2 3 4 5

The results were added to show the total number of responses for each number on the scale, thus indicating a trend towards a greater or lesser degree of change.

The questions were arranged around 4 main areas of interest:

1. Teachers' background knowledge of design and technology and the conceptual knowledge which supports this.
2. Dissemination of ideas from the courses and support provided in school for design and technology
3. The parts of the course which had significant effects on the participants.
4. The effect of the course on the whole school.

An initial questionnaire was drawn up and trialed with four of the teachers, each of whom had attended one of the four courses. This was followed up with individual interviews to gather information on how to improve the questions and the format of the questionnaire. The questionnaire, in its final form, was posted to all course members with a copy to their head teachers with a deadline of two weeks in which to respond.

The survey technique had a number of limitations:

- Respondents had a personal interest in indicating a significant degree of change since they were the main agents of such change.
- Degree of change in understanding, attitude and approach to a curriculum area was measured subjectively through the views of a single person.
- Some changes in schools would have happened without the influence of the in-service course. It is impossible to separate all such influences.

Survey Results and Analysis

Out of a potential 71 course members there were 25 respondents split almost equally between those attending courses in each of the two universities. Respondents did not answer all the questions since, in some instances; these were not all relevant to their particular course. It was noticed, in a significant number of cases, that the distribution of responses for the participants at both universities were similar so it was decided to combine both sets of results and focus on the general patterns which emerged from these.

Teachers' Background Knowledge and Understanding in Design and Technology

Respondents were asked about their own understanding, and that of their colleagues, of the processes of design and technology and their ability to use tools, materials and processes associated with these. They were asked to comment on their increased ability to plan, implement and assess design and technology. Also a large part of this section focused on the following areas of knowledge and understanding: structures and forces, mechanisms, control, energy, food and textiles.

A general trend in this section was for a significant increase in ability to be indicated for the course members but a lesser change for some of their colleagues in the school. An even smaller change was recorded in every case for the whole staff in the school. This trend is indicated in Fig. 1 which shows the results for an understanding of Structures and Forces and in Fig 2. for Control (Appendix).

Fig 1 shows there was a firm consensus of opinion as to the degree of change for each of the three groups while Fig. 2 shows less of a consensus. This may have been because Control as a distinct area of study did not feature so strongly on each

of the four courses. Structures, however, was almost certainly a key area of study making a more significant impact.

If results are compared for all subject knowledge areas then course members felt they had improved their understanding of Mechanisms the most, followed closely by Structures. The least change for course members was indicated in Textiles followed by Food technology. A similar pattern was noticed for *some colleagues in schools*. This general trend may have been because of a general emphasis within the courses on subject knowledge which is less familiar to primary school teachers such as those associated with the physical sciences. Indeed the specifications, set out by the funding body for the GEST funded courses, included mention of Structures and Mechanisms while not requesting, directly, work in Food and Textiles. A pre-course audit at UCE found that prospective course members felt they had a degree of confidence in Textiles and Food, thus supporting the theory that less change might be expected in this area.

The responses to the question about practical capability – an ability to handle tools and materials – showed an apparent lack of confidence in some respondents. 29% of respondents felt that they had made little or no change in this area, while the same percentage felt a moderate change had occurred. This may have been because they already possessed a degree of capability or that they did not recognize the need to achieve a practical capability themselves. It is more likely, however, that a practical ability is not easily gained on a relatively short course when much of the focus is on knowledge and understanding and issues such as classroom management.

The greatest increase in understanding, overall, was reserved for understanding of the processes of designing and making. Here 76% of respondents indicated they had changed a lot or quite a lot in their understanding. The results show that much of this understanding had been passed on to colleagues in school too. Such large improvements in a fundamental understanding of the subject indicate how relatively new these ideas are to most primary teachers and how much still has to be done to increase an overall understanding in all schools in England.

Dissemination of Ideas From the Courses and Support Provided in School for Design and Technology

Teachers were asked how ideas gained on the courses had been disseminated within their own school. The data revealed that informal discussion played the largest role in dissemination, with almost all teachers having been involved in discussion with colleagues through after-school meetings. Relatively few course

members had been able to share ideas through subsequent in-school training days. As English schools have only 5 such days each year and design and technology is not a core curriculum subject this is perhaps not surprising. Only one-third of teachers reported having any non-contact time for developing design and technology within their school. Where this had been available, either on a regular basis or as several whole days, it had been spent on a variety of tasks including writing schemes of work and meeting colleagues. Almost all teachers had used written materials to pass on ideas to colleagues and about one-third had worked alongside other teachers in their classrooms. One teacher commented that although time for formal dissemination was limited, the ideas had been transmitted through writing the school policy.

Funding for design and technology has been shown to vary across the country (DATA, 1995) and the survey showed that only one-third of schools had allocated extra funds to design technology as a result of the course. Some teachers reported other spending priorities, such as for Information Technology, or that each curriculum area is part of a rota for focused funding. If new ideas from a course are to be disseminated effectively then a temporary boost to funding would seem advantageous, as a time-lag in the availability of equipment to implement new ideas might mean they are not taken up effectively once initial enthusiasm has waned.

The Most Significant Effects of Elements of the Courses on Schools

The course members were asked to identify three key aspects of the course which they felt had the most influence on the teaching of design and technology in their schools. Overall, there was a significant difference in the response from teachers on courses at different institutions. At UCE over 70% of teachers identified knowledge and understanding (particularly in the areas of Textiles, Food and Mechanisms), linked to practical capability, as having had the most influence, whilst at Warwick University the pattern was very different. The responses here showed that there was no one aspect that had had a major influence. Indeed there was a wide variety of aspects which were identified and each influenced a small percentage of the teachers. This pattern could be explained by the nature of the courses at the different institutions.

Two further points of particular interest emerged from the data analysis. Whilst Food and Textiles were identified at UCE as having had the most influence and were chosen as the most influential areas in the course evaluations, they were not identified as having brought about a significant change in terms of the knowledge and understanding of the teachers. This can be explained in two ways. The teachers

may have gained ideas for practical implementation rather than increased knowledge and understanding and the "feel good factor" of the day may have remained with them, making it difficult to distinguish between enjoyment and influence on teaching. Secondly, although Structures and Forces were identified as areas in which teachers' knowledge and understanding had increased the most, they were not identified as having had a great influence on teaching in school. This could be explained by the fact that the course may have increased the teachers knowledge and understanding but, as Structures is a topic that is covered less frequently, it has not yet had an impact on teaching.

Overview of the Effects of the Whole Course on the Schools

Information was gathered relating to the place of design and technology in the school development plan, including the development of a school policy for design and technology and schemes of work. The perceived influence of the course on the head teacher's attitude towards the teaching of design and technology was also examined. An analysis of the survey responses shows that, overall, the participation in all of the courses has had a positive effect on schools, though this has not occurred uniformly in all schools. The majority of schools have linked the courses with the school development plan and this was one criterion for entry onto the course.

There were differences between courses at the different institutions on the issue of the degree to which the head teacher had been influenced with regard to the teaching of design and technology in school. Whilst on the Warwick courses it was felt that 70% of head teachers had been influenced a lot or quite a lot by the courses, only 43 % of teachers on the courses at UCE identified that the head teachers had been significantly influenced since the course. On the Warwick courses, unlike those at UCE, the head teachers were involved at key times during each courses. They attended an initial meeting to discuss the nature of the course and the intended outcomes and visits were made to some of the schools during the courses. Most significantly, the head teachers attended the final session of each course in order to discuss the needs of their school with the course member and to agree an action plan for the future.

Conclusions

The conclusions drawn from the results of the survey are:

- The courses surveyed have been shown to make changes in the perceived understanding of course members, and their colleagues in schools to varying degrees. In some areas of knowledge and understanding there has been more change than in others.
- One area of greatest improvement as a result of the courses was in an understanding of the processes of designing and making, thus indicating a probable lack of understanding before the courses.
- A greater change can be detected in those areas which were specified by the course funding body. (Structures, mechanisms etc).
- The degree of change is related to previous knowledge, confidence and perception of participant as well as course content.
- The different nature of some of the courses provides some reasons for different course members' perceptions of change.
- The cascade effect whereby course members pass on the knowledge and understanding gained on a course to their colleagues in schools can be measured to some degree. This effect, however, appears to diminish when all the members of staff in a school are considered.
- Dissemination of ideas gained on a course takes place largely through informal conversations, staff meetings and written materials, but could be improved by employing a wider range of methods.
- The time to disseminate ideas is not always made available to turning course members.
- Additional funds to support the dissemination of ideas gained on a course are not always made available at the most effective time after a course.
- There is room for improvement in the way head teachers are positively influenced by the courses their staff attend. The link between course aims and head teacher's perceptions of course are important.

Recommendations

In the light of the conclusions above, the authors would recommend the following for future in-service courses in design and technology.

1. Those who fund courses should identify a limited number of aspects which should be focused on by the course providers.
2. Course providers should include, as part of the course, ways in which course participants might disseminate new ideas to colleagues when they return to school.
3. Schools, including the head teacher, should do more to support the dissemination of course ideas and there should be a greater variety of ways in which this is achieved.
4. Head teachers should be made more aware of the details of the course and how they might support change within their school as a result of the course.

References

- Design and Technology Association, (1995) *A Survey of Capitation Allowances, Resources and INSET Needs for Design and Technology in Primary and Secondary Schools in 1994/5 – DATA research paper No. 3*, DATA
- Harland, J. and Kinder, K. (1992) *Mathematics and Science Courses for Primary Teachers: Lessons for the Future*, National Foundation for Educational Research.
- Clare Benson, Rob Johnsey, Di Wiggins March 1996.

Appendix

Fig 1. Knowledge and understanding of Structures and Forces

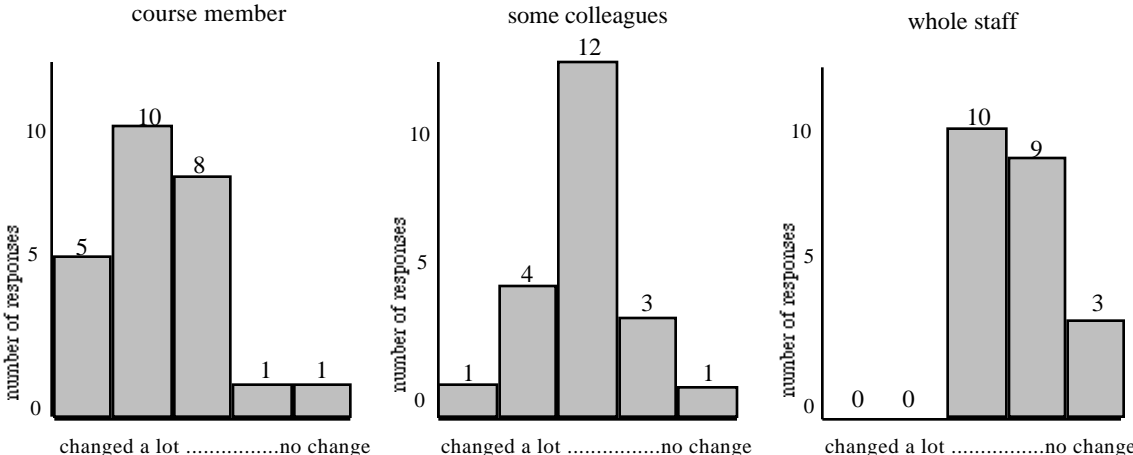


Fig 2. Knowledge and understanding of Control

