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Gender inequality in technology... moving forward

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Abstract

Since the early eighties, the gender biased choices of young people entering the later stages of schooling have been a cause for concern. Numerous initiatives have raised the profile of female participation in Technology, but statistical evidence still indicates that although when they choose to engage with the traditionally male areas of Technology girls do well, very few make that choice. Few of those who do well at GCSE pursue Technology beyond the years of compulsory schooling.

This paper follows an undergraduate research project whereby a number of schools in one local area were approached and questioned about their policy and the strategies they had in place. The strategies used by schools were matched against the level of participation by female pupils. The paper asks the question "What provision are schools making to encourage more girls to take up Design and Technology work with resistant materials and electronics in key stage 4?"

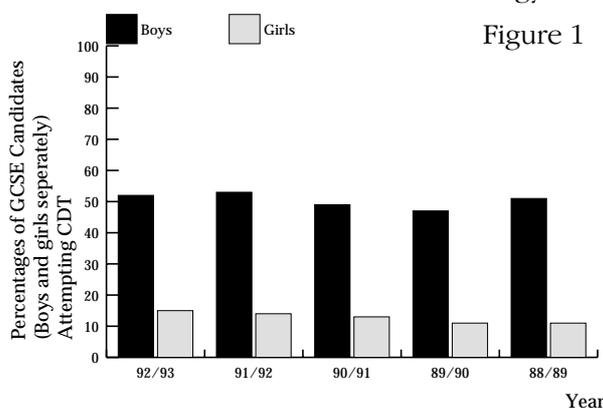
This research was undertaken with the co-operation of Berkshire LEA, and supported by an undergraduate research grant from King Alfred's College of Higher Education, with the assistance and encouragement of Bridget Egan, King Alfred's College of Higher Education.

Background

Since the early eighties, the gender biased choices of young people entering the later stages of schooling have been a cause for concern. Numerous initiatives such as the Schools' Council investigations and the development of the WISE and GIST programmes, have raised the profile of female participation in Technology. Statistical evidence still suggests that although when they choose to engage with the traditionally 'male' areas of Technology girls do well, very few make that choice. Of those who do well at

GCSE, few pursue Technology beyond the years of compulsory schooling.

Statistics published by the Department for Education show that few girls deliberately choose technological subjects other than food technology or textiles at GCSE. Design and Technology is a preparation for life in a modern society, it is as relevant, therefore, for girls to take the full range of Technology courses as it is for boys. An investigation was undertaken into why gender biased choices are still made, how schools can make changes and whether there are strategies which enhance girls participation in Technology.



Source: DES/DFE Statistical Bulletins Feb 1991 - Jun 1994

Research Process

Secondary schools within a region were visited to discover what strategies were being employed by the staff to encourage participation of girl pupils in the traditionally “male” areas of technology. Strategies employed were matched against the number of girls being entered for GCSEs in Technology subjects, specifically “Design and Realisation” and “Design and Communication”, in order to clarify which strategies seemed to be effective. The duration of employment of these strategies was ascertained to enable an analysis of whether participation had changed as the strategies had been introduced. A number of specific strategies were identified from the published literature listed in the bibliography. These were (i) the ratio of male to female staff, (ii) the choices of projects and subject contexts, (iii) displays of pupils' work, (iv) the dynamics of pupils working in groups, (v) teaching styles, (vi) school visits and representatives from industries in school, (vii) enthusiasm of pupils and staff, and (viii) pupil interest in extra-curricular clubs. The existence of a school equal opportunities policy was also ascertained.

Nine schools were visited, six being co-educational, and three being girls' schools. In the tables, schools 3, 5 and 8 are the single-sex schools and 1,2,4,6,7 and 9 are mixed schools. Not all interviews yielded answers to all the questions at the time of the visit and some schools have been unable to provide additional data. In every school the Head of Department for Technology was interviewed; in school 1, a Deputy Head spent some time answering questions. Comparisons are made between the responses of schools, but it should be noted that changes in statutory requirements following the 1988 Education Reform Act have led to considerable curriculum variation between schools. Comparisons of exam entrants should be treated with caution.

Pupils from a year 9 group in one school who had recently made GCSE options were also interviewed. Questions were asked concerning the importance of Design and Technology for boys and girls, which specific projects they liked, what aspects of the subject they liked and which they would like to change, and about working in groups.

All schools except school 6 have an equal opportunities statement. No schools had directives for implementing such policy and none were actively monitoring its effectiveness in terms of outcomes. In school 3 (single-sex), the Head of Department (male), stated that gender “is not an issue”. Only two schools had had Equal Opportunities training for all staff.

Strategies to Encourage Equal Participation in Design and Technology

Figure 2 shows the spread of strategies employed by each school. The following are explanations of the terms used:

“Gender-neutral projects”: Jean Rudduck¹ defined these as “the design and manufacture of objects that have,no obviousgender associations”.

“Environments” : Upgrading the department image from workshops to more comfortable spaces. Changes included “clean” carpeted areas, pot plants and bright visual displays.

“Broad curriculum”: All pupils, particularly in key stage 3, were exposed to a wide variety of experiences.

“Positive staff attitude”: A belief that all pupils have equal entitlement.

“Extra-curricular activities”: Clubs and special holiday courses.

“Appropriate resources”: Materials for pupil use carefully selected to avoid bias.

“Pupil centred curriculum” : Projects selected which had realistic contents and built on what the pupils already knew.

“Different work for girls” : is self-explanatory

Tables of Strategies and GCSE participation

Strategies \ School	1	2	4	6	7	9	3	5	8
Gender-Neutral Projects	■	■	■	■		■	■	■	■
Environments	■	■			■	■	■		■
Broad Curriculum			■	■		■		■	■
Positive Staff Attitude			■		■	■		■	■
Extra- Curricular Activities		■	■						■
Appropriate Resources		■					■		■
Pupil Centred Curriculum	■	■	■			■		■	■
Different Work for Girls					■				

Key:-
 ■ Representative from school claimed to be using these strategies

	School	1	2	4	6	7	9	3	5	8
D&R	1994 % Girl Entrants	95	00	250	200	UK	222	00	100	00
	1993 % Girl Entrants	UK	00	UK	176	UK	233	00	100	00
	1992 % Girl Entrants	UK	00	130	62	UK	116	00	100	00
	1991 % Girl Entrants	UK	UK	UK	00	UK	200	00	UK	00
D&C	1994 % Girl Entrants	467	143	167	41.1	UK	407	UK	00	00
	1993 % Girl Entrants	UK	200	UK	125	UK	148	UK	00	00
	1992 % Girl Entrants	UK	UK	167	33	UK	237	UK	00	00
	1991 % Girl Entrants	UK	UK	UK	42	UK	145	UK	00	00

Schools numbered 1,2,4,6,7 and 9 are co -education schools
 Schools numbered 3,5 and 8 are girls' schools

Key:-
 UK - Unknown
 D&C - Design and Communication GCSE
 D&R - Design and Realisation GCSE

Figure 2

Proportions of girls entering Technology GCSEs in five co-educational schools

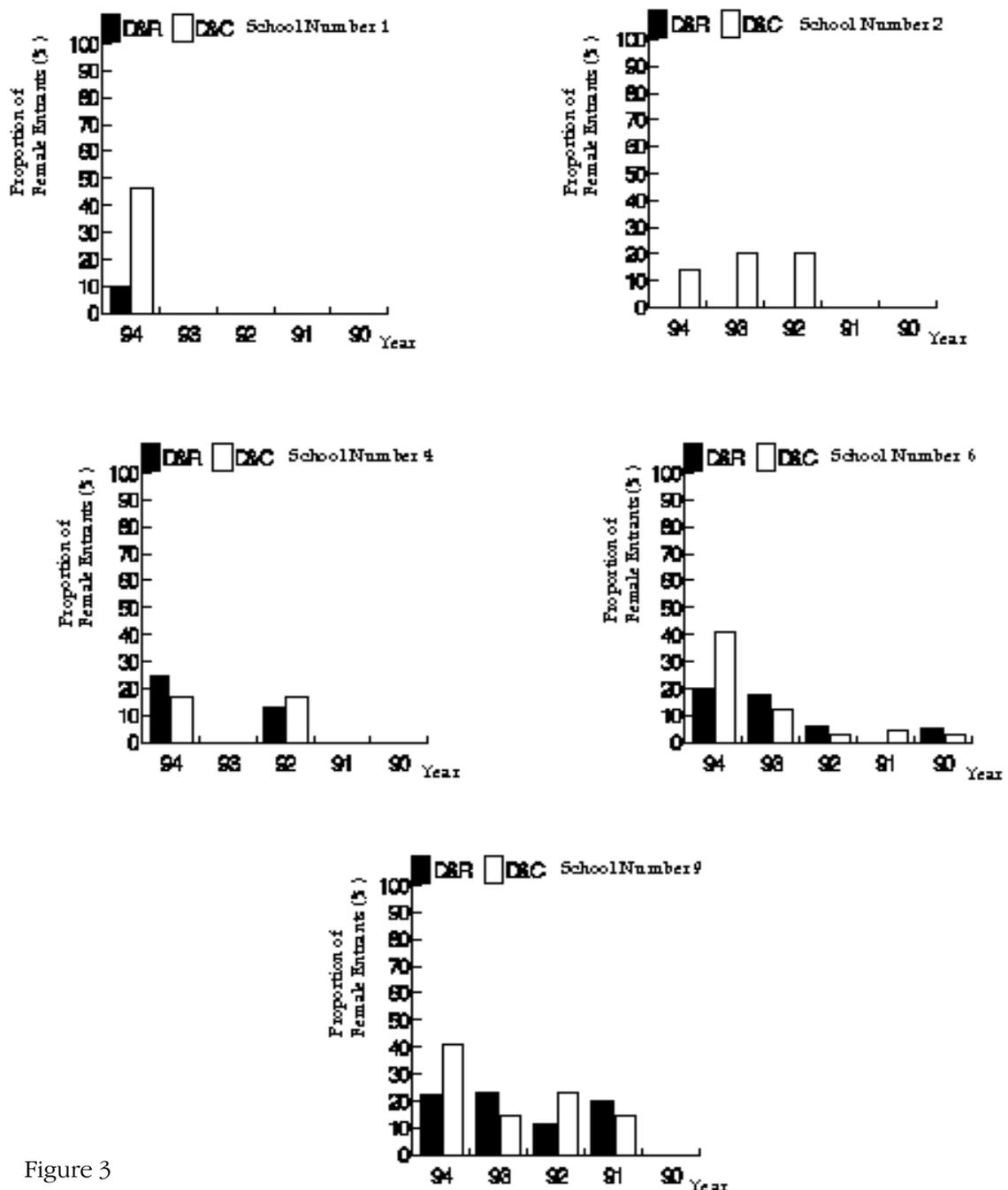


Figure 3

Projects

The Equal Opportunities Commission identifies the selection of gender-neutral projects as particularly important for the encouragement of girls². Schools 1, 6 and 9 had a high proportion (more than 40%) of participation by girls in Design and Communication in 1994. The only strategy

these departments had in common was “gender-neutral projects”. However, eight out of the nine schools used this strategy, some of which had quite poor participation rates. In previous years schools 6 and 9, had much lower participation rates. It is thus difficult to see how effective this strategy was.

It is also probable that staff have differing perceptions of gender-neutrality. Examples given by some of the schools included clocks, toys, games, sports cars, boats, bridges, business cards and advertising. School number 6 did a cosmetics package project that had been popular with pupils, and had a very high proportion of girls entering Design and Communication in 1994.

Games and clocks clearly are used equally by boys and girls, but sports cars and boats are more debatable, as reflected in the responses from pupils. When Williams³ carried out similar research, she found that most female students would prefer to design hairdryers than cars. In the same research paper³, Hann discovered that out of the nineteen project ideas suggested, the preferred project area for male students was car exteriors, which came eighteenth on the women's lists. 'Design for Children' was the sixth preference on lists of both sexes. Both boys' and girls' in this research favoured toy projects, followed by clocks.

It is also clear that pupils like to complete a project in order to feel a sense of achievement. School 8 emphasised the realistic design of projects were so that pupils could complete work to a high standard. Selecting projects with relevance to pupils' interests, such as toys, was a strategy in four schools.

Environments

All of the schools visited had made deliberate efforts to make the workshop and classroom environments more comfortable than the "cold, stark and uninviting" workshops of the past². There were allocated 'clean' areas, intended for all paperwork and drawings. Some schools had pot plants in the workshops, and most had carpeted areas. Some schools see this as important for all, others more specifically to encourage girls who "don't like to get dirty". Teachers also indicated the importance of visual displays. Most schools had made big efforts in this respect. Pupils' work took up a large proportion of the spare workshop space. This illustrates the work that the pupils do, and is seen as inspiring pride in the pupils. However five out of the eight pupils interviewed who liked to have their work on display emphasised "only if it's good". Work displayed in public areas of the school raises the profile of Design and Technology for all pupils.

Staff Attitudes

Five schools claimed to have positive attitudes to pupils. Again this is open to interpretation. The Head of Department in school 7 believed his Department had a positive staff attitude but it was this school which set the girls different (easier) tasks from the boys reinforcing the stereotype. He thought that few girls opted for Design and Technology GCSE because the course was "inevitably boys-biased". School 6 had even more negative attitudes - girls were actively deterred from doing Design and Realisation GCSE. Those who did persist and started the course, only lasted "a couple of weeks".

Clubs

School 4 had an after school club with the hope of encouraging individual interest in Design and Technology. This club had 50% attendance from girls and also a small increase in the numbers of girls taking Design and Realisation GCSE. Coventry Education Department⁴ draws attention to the effectiveness of girls-only clubs in enhancing girls' experiences. School 2 had sent some girls on a special electronics course organised by Leeds University, that had enhanced their experiences considerably.

For the Future - Analysis and Conclusions

The data obtained do not reveal which strategies have been effective in encouraging girls to continue with "core" Design and Technology at key stage 4. These nine schools have similar strategies but inconsistent uptake. What has been revealed, however, is a lack of interest in genuinely addressing the problem. All of the schools had introduced strategies in order to provide what they perceived as equal opportunities. However few of these teachers realised the ethos behind such strategies. The implementation of strategies was somewhat half-hearted. All schools claimed that their strategies had been effective, despite the absence of monitoring procedures.

Possible Actions for Change

Teacher Attitudes

Kelly et al⁵, concluded that most 'craft' teachers in both technical and domestic areas had 'traditional' attitudes, that is sex-stereotyped views. It has been shown that some teachers have lower expectations of the girls in

comparison to the boys in the 'technical' areas. These expectations do not bode well for inspiring the girls and perpetuate the preconceptions for pupils that 'core' Design and Technology is 'men's work'. It may be necessary for teachers to re-examine their attitudes and teaching methods.

Parents' Attitudes and Careers Advice

Farrell, Grant and Wilkinson⁶ found evidence that the negative attitudes of parents reinforce the lack of relevance of Design and Technology that girls perceive to their lives. Two of the boys and two of the girls interviewed thought that Design and Technology was more relevant to boys than girls and one boy believed that boys had greater ability in Design and Technology. Three of the girls thought that their parents did not regard Design and Technology as an important subject for them. Careers information and advice is a key area here. Hann and Williams³ state that there is "evidence that students are being guided... by people..., many of whom are subject to enormous bias and prejudice." They suggest that schools should campaign to raise girls' awareness of opportunities in traditional male domains.

Role Models

Only three schools in this survey currently employ a female teacher in the workshop areas, and two of these were part-time. The importance of positive role models in influencing pupil attitudes is well documented. The one boy in my sample who thought that boys had greater ability in Design and Technology than girls gave as his reason that he had "never seen a 'girl' Design and Technology teacher". Only three of the eight girls from the sample said they had ever seen women in technological careers. Clearly there is scope for further development by schools in offering role models.

Group Work

Millman⁷ found that in mixed-sex group work, girls tend to retreat to their desks to do the paperwork aspect, whilst the boys embark on the practical activities. Girls progressed more confidently in single-sex groups. National Curriculum non-statutory guidance supports this finding. Teachers may need to be more sensitive to this in planning group activities.

Projects

Clearly, the selection of projects has vital importance. Teaching teams may need to review their assumptions about what constitutes "neutrality". The responses of pupils show that not all projects are as neutral as teachers may think.

Within the National Curriculum there is wide scope for Design and Technology teachers to address equal opportunities. Monitoring of progress and change is necessary to ensure equal opportunities strategies are being effective. It is not enough to assume that having introduced strategies, there is equality of opportunity. Teachers must not expect to see overnight changes and must be continuously reviewing strategy effectiveness by assessing access and pupil outcomes. Many of the teachers interviewed indicated that those girls who do take on Design and Technology do exceptionally well and therefore assume there is equality of opportunity, but in this case the exceptions do not prove the rule.

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