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Abstract

There is a general notion that within the Scottish education system more girls would opt for technical or technological subjects if they had an example to follow, the belief is that the best example is a female teacher.

The following will show that whilst the numbers of girls taking technology beyond Secondary Year 2 (S2) is low, that this is also true in schools where there are female teachers. At the end of S2 the pupils choose which subjects to study to Standard Grade level, at the time of writing choosing seven subjects from those studied during first and second year.

Reasons for the low numbers choosing to study technology subjects will also be looked at as well as other influences on the pupils at this time of choice.

Getting into technology

The Scottish Education system offers three subjects that are technical or technological in nature. Despite this, when the Secondary Year 2 (S2) pupils make their course choices, some technology departments find that they are struggling to achieve sufficient numbers to run the classes. In some schools, due to the nature of their choice form, graphic communication is competing with craft and design, or technological studies with the other two subjects for pupil numbers. Unfortunately, it is not uncommon to find that some of the schools offer only two of the three available subjects and even so, some of these are struggling to attract pupils.

Getting girls into technology

The statistics below show the number of boys and girls taking Standard Grades, Higher Grades (our equivalent of GCSE and A Levels) and Certificates of Sixth Year Studies (CSYS) in each of the three technological subjects. From these it can be seen that there is an imbalance of gender within the pupil population. Standard Grade Graphic Communication has the highest percentage of girls achieving certification however, even within this subject, girls make up less than a quarter of the pupil population.

Boosting the class figures alone is not the only reason for wishing to attract girls into technology. They represent a large pool of potential skills and talent for the subject which is, in the main, untapped.

Getting women into technology teaching

To get more girls into technology classes, a number of principal teachers believe that having a female member of staff, in what is seen by many as a male dominated area of the school curriculum, may help. This, however, is not as simple as it may seem and is it the solution?

There are currently 65 women registered with the General Teaching Council (GTC) as technology teachers. This means, on balance, that 3.8% of technology teachers in Scotland are female. 14.8% of this year's new registrations are female. This is slightly higher than the national figures for girls studying technology subjects or for female technology teachers but there is by no

Table 1: Boys and girls taking Standard Grades, Higher Grades and Certificates of Sixth Year Studies (CSYS) in technological subjects

Subject	Level				CSYS boys	CSYS girls
	Standard Grades		Higher Grades			
	boys	girls	boys	girls		
Graphic Communication	5216	1454	1561	325	n/a	n/a
%girls achieving certification		22		17		
Craft and Design	10239	2335	1695	67	n/a	n/a
%girls achieving certification		19	19			
Technological Studies	5582	392	1079	67	14	1
%girls achieving certification		7		6		7

(figures from Scottish Examination Board for 1995 examinations)

means, an even split (Figures supplied by the GTC).

Getting women into engineering

When the percentages of male and female students are viewed for the five faculties at the University of Strathclyde, it can be noted that there are two faculties that have extremes of imbalance, showing that schools are not the only place where this occurs.

I made enquiries of other colleges and universities running engineering courses to discover if a pattern exists.

The first positive response came from my own establishment.

"Within our National Certificate programme we have an intake of about 70 full time students and over the past few years, about 3 females have made up that number" (Comment on questionnaire return)

The comment below was more typical of the responses I received.

"...we have found that despite several adverts and seminars, this area of Engineering does not attract female students"

Many of the colleges were offering courses in engineering or technology specifically aimed at women, e.g.

- Technology Training for Women
- Widening Access for Women into Engineering

Where special measures had been taken to encourage women into engineering and to make contact with schools, I noted that all respondents mentioned mathematics and science whilst none mentioned technical or technology subjects.

"This course is intended to provide an insight into Engineering for 32 girls who

Table 2: % of male and female students for the University of Strathclyde 1993/94

Faculty	%male	%female
Arts and Social Studies	34	66
Business	53	47
Science	57	43
Education	29	71
Engineering	81	19
Total	53	47

are currently studying Mathematics and Science subjects in S4, S5 and S6"

"This was aimed to encourage them to keep on their Physics option at O Grade and consider careers in the Sciences in the future"

The latter was a statement made describing the Women into Science and Engineering (WISE) bus that tours the schools trying to encourage women into these disciplines.

The problem lies in schools

Considering the nature of my enquiry, I was surprised that one reply attributed blame for low numbers to the schools.

"I feel the problem lies within the schools, before we get the students, through lack of encouragement from Technical teachers and poor information on what Engineering is about"

The all-female environment

All the special arrangements to encourage women into engineering and science took, as a common theme, the concept of using women to train or teach classes or to put women in an all-female student group.

It is, in general, not possible for schools to do either of these. Either there are not enough women teachers or the classes, as already stated, are too small to be able to isolate the girls in the class to give them separate treatment.

For these reasons, I set out to investigate how the presence of a female teacher

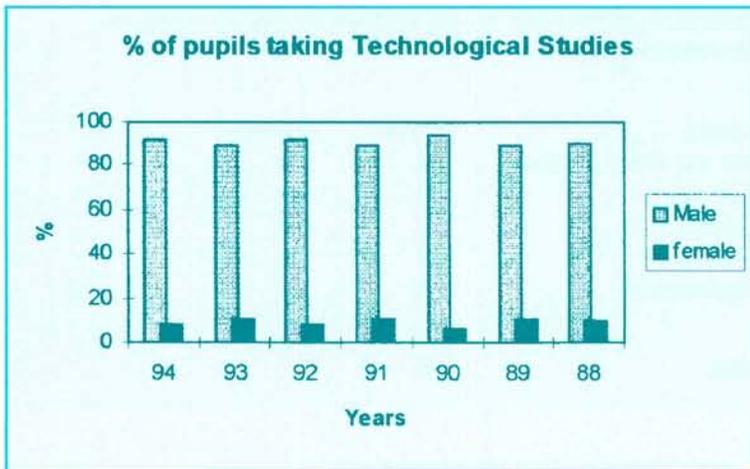


Figure 1

influences the number of girl pupils willing to take the subject beyond S2 and to find out if she makes any differences to the actual teaching methods or subject matter to bring about that change.

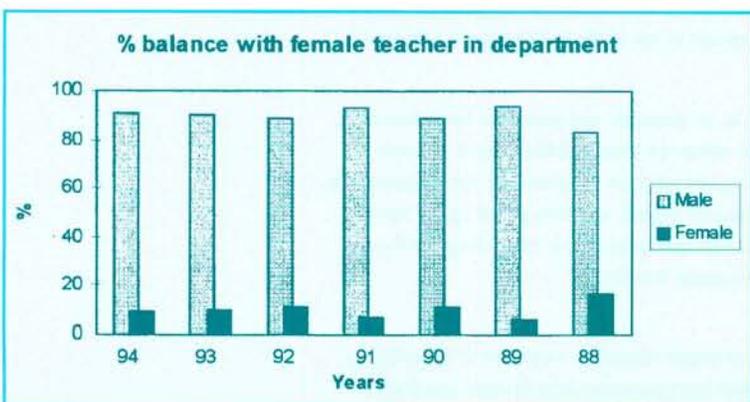
Reviewing technological studies

I concentrated on one of the three subjects – technological studies. This is the subject that is closest in content to engineering and, being one of the newer subjects, does not carry with it the same traditional attitudes as craft and design. Graphic communication is too recent a subject to be able to elicit sufficient data to obtain a true picture.

A questionnaire was circulated to 100 schools and the data from the 47 schools which replied was collated. From this I was able to establish various facts.

By using the figures from the schools, I was able to look at the percentage of girls taking technological studies for each year going back to 1988 (see Figure 1).

Figure 2



This figure varied between 6.1% and 11.1% over this time. It should be kept in mind that during the same period, the number of schools in the core sample presenting the subject, changed from 5 to 31.

Taking those schools who have utilised a female member of staff and compiling the same statistics produces the graph below (see Figure 2).

(This time there was a range from 6 to 17% but note that the highest figure was in the earliest year where my sample was smallest. It is also notable that within my core sample I had managed to capture schools with a 5.12% female staffing, higher than the national figure.

I have shown that the presence of a female teacher within the department does not on its own increase the number of girls taking on technology beyond S2.

What does influence the choice?

On interview, most principal teachers were of the opinion that a female member of staff would not have a direct influence on the numbers coming to the subject, but would have an influence on the curriculum within the department and would provide a balance within that curriculum.

All expressed a desire to have a female member of staff, but none would admit to allowing this to make any difference during recruitment of staff. Only if two candidates for a post were exactly equal would the gender of the candidate count, and then in favour of the female.

Why encourage girls into technology?

All teachers pointed to the fact that girls were, in the main, an untapped source of potential within the subject, some stating that the girls had better potential in the subject than the boys.

The group interviewed were split in their answer when asked if the presence of a female member of staff would influence or change the number of girls taking the subject beyond S2. One teacher referred to any difference in class size being due to

"gimmick value" and stated that there would be no long term effect. Only two of the schools interviewed provided any data to provide back-up for their answers to this question.

The main ways in which teachers viewed the effect of a female member of staff was a change of viewpoint to tasks and problems being presented to the pupils, and a change of ethos by being present at such events as parent nights.

Why do girls not take technology?

All the answers received about why girls do not elect to take technology pointed somewhere else. This, at first, looked very like the college who blamed the technical departments. Now the technical departments were passing responsibility down the line. However, almost all the teachers pointed in the same direction and almost all could justify their reasons for doing so.

Primary schools were not blamed; guidance staff and parents were. It would seem that, despite efforts to inform and influence them, parents carry a stereotyped image of what engineering and technology are about. These parents are also being influenced by guidance staff who carry their own stereotyped images of engineering and technology.

Altering the courses in S1/S2 to give a better gender balance to the projects and tasks undertaken has not made an appreciable difference in the numbers staying on after S2 except in one school. Here they had decided to teach technology in a very practical way, incorporating technology into the craft models. This school reported a 100% increase in the number of girls taking technology over the last 2 years.

What do the female staff think?

Within the interviews, it was mainly the principal teacher's viewpoint that was given. However, at those schools with female staff, we also made a point of asking their opinion.

All the female staff interviewed felt that they treated boys and girls equally and did not make any difference in their approaches.

Their presence within the department did not alter the attitude of the pupils, nor did it have an influence on the departmental staff. The only change to female pupil numbers was that in one school the craft and design numbers had been increased by 100%.

However, one interviewee told us that one of her former head teachers was unwilling to accept that she was a technical teacher. Rather than refer to the subject as a male-dominated area, these teachers referred to the subject as lacking female input.

As with their principal teachers, the female staff claimed that the perception of the subject outside the department was poor and suffered from stereotyping.

Conclusion

The presence of a female member of staff does not directly influence the numbers staying on beyond S2.

The presence of a female member of staff has more influence on the parents and on the guidance staff who, together, are responsible for the subjects taken by the pupils going beyond S2 into S3. This, however, is an influence that is much slower to take effect and to alter the pupil numbers.

While visiting the schools for interviews, I noted that the girls doing Higher craft and design were, on a number of occasions, very close to 50% of the class. In talking to the pupils I discovered that, once into 5th year, they, themselves, have much more influence on their subject choice.

In order to progress and to bring girls into technology, it is first essential to impress on parents and guidance staff exactly what the subjects are and how they are perceived by industry and further education. It is going to be a long, slow battle to achieve a gender balance of anything like 50%, however we cannot afford to sit back and wait until the girls decide to come to us.

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