She Teaches Statistics in Singapore Schools

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1. Introduction

Statistics is taught in all Singapore schools as part of the compulsory subject mathematics. Only at the university level may statistics be offered as a subject by itself, in the Department of Economics and Statistics.

In attempting to make every school-leaver numerate and literate the statistics taught at the school level is meant to equip an individual with the ability to interpret and understand correctly the data presented in tables, diagrams, charts, and graphs. It is the concern of every mathematics teacher in school that pupils should know enough about simple statistics to be able to interpret them correctly and not be deceived by them.

2. Statistics in the school curriculum

2.1 *Statistics in the primary school*

In the primary mathematics curriculum (age group 7 to 12 years) although pupils are not explicitly introduced to statistics, they nevertheless do graphical representations of data which form the basis of the work for descriptive statistics in the secondary mathematics (13 to 16 years) curriculum. In Singapore, primary education is of six years' duration. During the first year in primary school, i.e. primary 1, pupils are introduced, via patterns, to class activities such as the following, thereby introducing them to pictograms based on a one-to-one correspondence.

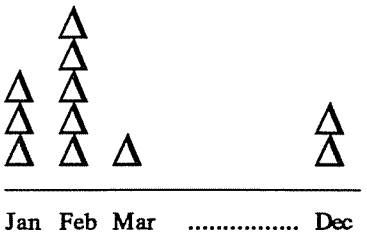

FIGURE 1
Birthmonths of pupils in our class

Gradually, over the years in the primary school, with consistent input every year via the mathematics curriculum, the pupils should be able to:

(i) construct and read pictograms, column graphs;
(ii) read and interpret pie charts; and
(iii) classify and organise data by constructing tables.

2.2 *Statistics in the secondary school*

In the secondary mathematics curriculum statistics is one of the 12 topics dealt with in the syllabus. Secondary education in Singapore is of four years' duration for above average pupils and of five years' duration for other pupils. Statistics is taught in the third year to pupils in the four year programme, and in the third and fourth years to pupils in the five year programme.

The detailed content of the topic "Statistics" in the secondary mathematics curriculum is as follows:

> Bar chart, pie chart, frequency distribution, histogram, frequency polygon. The ideas of averages: mean, median, mode; modal class. Calculation of mean from a frequency distribution. Cumulative frequency diagrams, estimation of median and quartiles, interquartile range.

3. Who teaches statistics in the school?

One may say that in Singapore the teaching profession is feminised (Inglis, 1982). Since 1963, women have consistently outnumbered men in the teacher training courses and particularly those preparing teachers for the primary schools. In the courses designed for secondary school teachers, women began to outnumber the men from the 1970s. The 1989 student intake figures from the Institute of Education for the pre-service secondary school teacher training courses show that 23% were males and 77% were females.

Surveys conducted in 1989 and 1990 of 18 and 20 secondary schools respectively revealed that 70% of mathematics teachers in these schools were female university graduates in the subject mathematics, with professional training to teach mathematics as one of their teaching subjects. These teachers teach statistics as part of the mathematics

curriculum in Singapore schools.

4. Approach to the teaching of statistics

Statistics in the secondary mathematics course may be viewed as a "practical" topic, and many of the examples in the textbook may be supplemented by practical exercises on data collected either by the students, so that they can learn to classify, tabulate, and analyse "raw" material, or by the teacher collecting data related to the students. Sometimes this may involve much arithmetical computation, but experience has shown that interest in the exercise makes students very tolerant of this work.

As group projects provide first-hand experiences for the students by direct participation, and as psychologists have stressed, "development cannot take place without appropriate experience" (Assistant Masters Association, 1973, p.4), exercises on data collection and descriptive statistics are often done via groupwork.

Mathematics teachers in the secondary schools often adopt an approach which aims to strike a balance in the teaching and learning modes, namely

(i) exposition by the teacher;
(ii) discussion between teacher and students and between students themselves;
(iii) problem-solving including the application of mathematics to everyday situations;
(iv) consolidation and practice of fundamental skills and routines;
(v) investigational work;

when teaching statistics to the pupils.

One of the investigations which most secondary pupils enjoy is the

STATISTICAL METHOD OF OBTAINING THE VALUE OF π

Materials needed: a box of match sticks; a sheet of paper; a record sheet.

Procedure:

(i) On the sheet of paper, draw two long parallel lines exactly two-match stick lengths apart.
(ii) Take 10 match sticks in one hand. Hold the hand centrally half a metre above the parallel lines and let the sticks fall. Count the number of match sticks that cross or touch one of the lines.
(iii) Repeat step (ii) many times (say 10 times) and calculate the mean number of sticks that cross or touch one of the lines.
(iv) Record your results on the record sheet provided as shown:

Expt. No.	No. of sticks thrown (C)	Mean no. of sticks that cross or touch line (D)	C/D
1	10	3.2	10/3.2 = 3.1
2	20		
3	30		
4	40		
5	50		

(v) Repeat your experiment with 20, 30, 40, and 50 match sticks.

The values in the last column will be close to 3.1 or 3.2 and the mean of the values in the last column will be approximately 3.14.

In many secondary schools, statistics today is taught via fun-filled activities and investigations of everyday mathematics.

5. Conclusion

Statistics taught in Singapore schools helps guard individuals from making baseless statements, and enables them to appreciate information such as that shown below, and realise why one could say "She teaches statistics" today in Singapore schools.

TABLE 1
More women graduates from Singapore universities

	No. of women graduated in 1976/77	1986/87	Women as % of all graduates in 1986/87
National University of Singapore	836*	2390	60%
Nanyang Technological Institute	-	104	16%
Singapore Polytechnic	464	950	25%
Ngee Ann Polytechnic	105	941	35%
Institute of Education and College of Physical Education	455	686	78%
Total	1860	5071	42%

* Refers to University of Singapore and Nanyang University
Source: *Yearbook of Statistics*

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SINGAPORE SNAPSHOTS

STATISTICS THAT SHAPE THE COUNTRY

More women graduates

ALMOST three times more women graduated from institutions of higher learning in 1986/87 than 10 years earlier. In comparison, the number of men graduates slightly more than doubled over the same period.

	No. of women graduated in 1976/77	1986/87	Women as % of all graduates in 1986/87
National University of Singapore	836*	2,390	60%
Nanyang Technological Institute	—	104	16%
Singapore Polytechnic	464	950	25%
Ngee Ann Polytechnic	105	941	35%
Institute of Education & College of Physical Education	455	686	78%
Total	1,360	5,071	42%

*Refers to University of Singapore & Nanyang University

Basic data: Yearbook of Statistics

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