Some Ideas on Teaching a Career Mathematics Course

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Teaching a career mathematics course is one of the most difficult and yet one of the most rewarding experiences in mathematics education. It has been said that a good student can learn mathematics *in spite of* the teacher, but the slow student learns only *because of* the teacher. The nonacademic student generally fits in to the latter category. I believe that even with the tremendous range of ability found in general mathematics classes, it should *not* be taught on an individual basis. These students need the motivation and guidance that an interested teacher can provide.

When the mathematics department at Queen Elizabeth implemented the new career mathematics course in September, 1974, we saw a tremendous possibility. Here was a course that related to student need and was relevant to everyday situations. Much of the career math course followed the text *(Career Mathematics, Industry and the Trades,* by Lyng *et.al.*, Houghton-Mifflin). Worksheets were provided for the better students so that the class covered the material at the same rate.

Whenever possible, related mathematics problems from the community were introduced. For example, when dealing with graphs, every student was asked to bring to class examples of graphs from magazines or newspapers. We went over each one, investigating how to improve them and pointing out how graphs can be misleading. An excellent example is shown in Figure 1.

The class was asked to comment on the reasons why the number of eggs laid and hatched were not proportional. A very interesting discussion ensued.

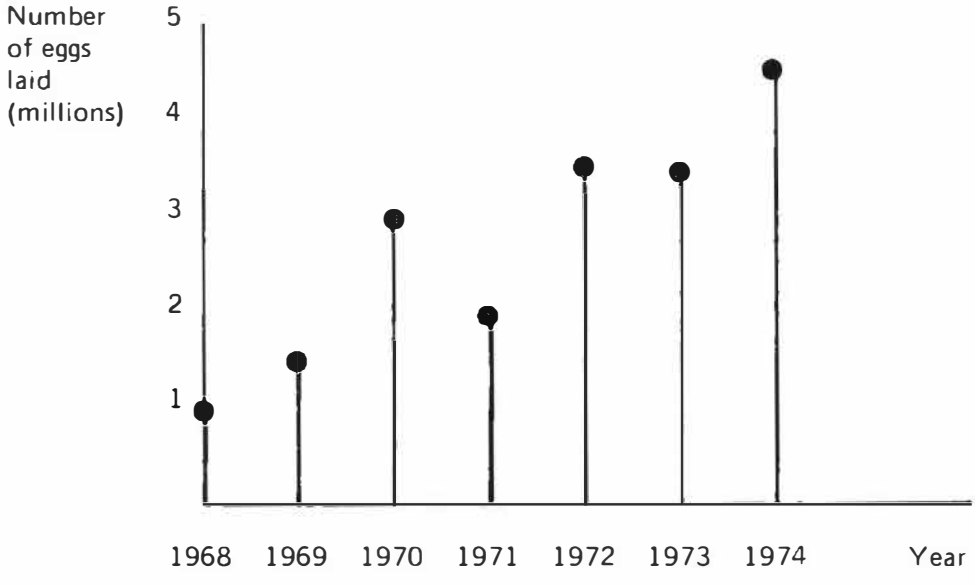
Estimating was covered quite extensively. We had a guest speaker from a lumber firm who showed how estimating is used extensively in forest management. For instance, the number of board feet of lumber per acre in a forest is estimated by taking average tree heights and diameters and average tree density or by methods involving aerial surveying. Estimating was related to the construction industry as well. We actually went out to houses under construction and estimated the amount of gyproc, shakes, insulation, and siding needed.

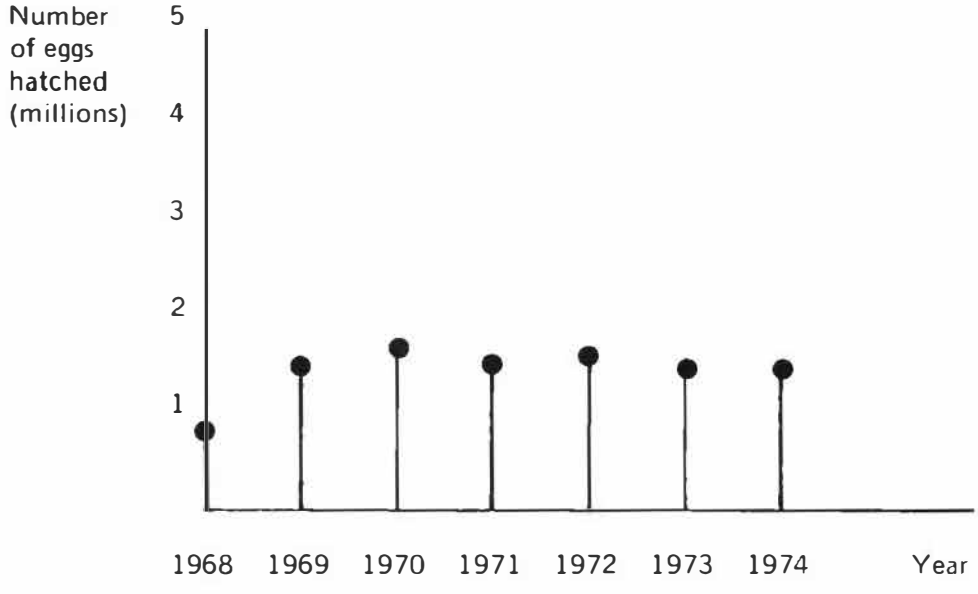
We also discussed examples of how computers are used in fitting the pieces needed in a pair of pants and cutting them out with a laser beam to minimize fabric waste. Container ships use the ideas of fitting the greatest number of objects into the smallest volume. In another activity, students were given a drawing of a desk of a chest of drawers together with some random lumber sizes and asked if they had enough lumber for the project if the pieces were fitted properly.

Micrometers, calipers, and resistors were actually used in the classroom. The students measured the thickness of objects such as their own hair, paper, pieces of metal, and machine bearings. Some of the students brought machine parts from the automotive and machine shops.

NICOMKEL RIVER
RESEARCH PROJECT

(Figure 1)





The concept of ratios was taught completely by example. I brought in scale models of King Kong, giant spiders, maps of the city, house plans, furniture plans, model toys, planes, and housing developments and we related these to the ratio concept.

The construction chapter was covered very thoroughly and many field trips were included. We obtained a plan for a basic 1,200 sq.ft. house and went about pricing the house in three different ways: buying the home outright, building it yourself, acting as your own contractor. This project involved obtaining estimates from construction firms, estimating the amount of material required and pricing it

at local lumber yards and wholesale distributors, and contacting framing crews, electricians, plumbers, roofers, insulators, painters, etc., for prices.

We also spent time demonstrating what to look for when buying an older home. Examples were shown of dry rot in attics, houses that used cheap construction methods and materials such as return gyproc, and minimal insulation.

Since implementing this career mathematics course, as well as locally developed business and consumer math course, and a General Math 12 course, we have increased our general math enrolment from two classes to 11. This, I think, is directly related to the relevance of the material offered.

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A Maze for Mathematics

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As a classroom teacher, I often searched for a variety of ways to stimulate my students to enjoy dull drill. One particular device not only provided a way to 'drill' some basics but also provided an interesting 'twist' that reduced students' dislike to practise computational skills: This device is commonly referred to as a Maze.

The only tools needed to make a maze are a grid of some sort to record drill questions and a supply of drill type questions. An example follows. This maze is based on straightforward calculations. Once the students find an answer, they need to study their answers to find some pattern or rule that connects START to FINISH The path followed must go horizontally or vertically (not diagonally).

START

$8 \div 4 \times 6$	$49 - 7 \times 0$	$18 \div 3 \times 2$	$\frac{18-9}{9-6}$
$4 + 2 \times 3$	$16 \div 2 \div 1$	11×11	$3 \times 7 \times 2$
$\frac{8+4}{8-4}$	$24 \div (4 \times 1)$	$\frac{36}{3+6}$	$15 \div (3+2)$
$\frac{6 \times 6 - 3}{11}$	$16 \div 8 \div 2$	$\frac{8+32}{20}$	$12 \times 9 \times 4 \times 0$

FINISH

The answers for each square are shown in the next grid.