
Teaching Math in the ESP Classroom

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Have you yet found yourself teaching an English for Specific Purposes course that requires you to address math skills? If not, count yourself temporarily fortunate. I say "temporarily" because the chance that you will someday need to do training in the arcane world of numbers and formulas is growing ever greater as our profession moves away from traditional English training syllabi and becomes more and more responsive to the special concerns of the students we serve.

Passing standardized tests, such as GMAT, GRE, SAT and TOEIC, provides the rationale for many students to enroll in EFL courses here in Japan. Unhappily for language teachers, who principally hold degrees in the humanities and for whom algebra-and-beyond were not the most favored academic pursuits, these examinations include math components. Therefore, EFL instructors here sometimes find themselves responsible for teaching concepts which they themselves may not have fully mastered.

Do not despair. Let me share with you an approach to teaching math that we have used to good effect within the MBA Preparation Course at the University of Pittsburgh ELI. Although the aim of this course is to cultivate advanced study skills--principally analysis of real texts, academic writing, formal argumentation, and presentation techniques--a GMAT preparation component occurs throughout the second term. And that means teaching math.

The math section of our course consists of twelve one-hour lessons delivered at one-week intervals. Our textbook is *The Official Guide for GMAT Review* (1989-90 Edition) prepared by the Educational Testing Service in Princeton, New Jersey. Within this guide is a wide assortment of the four major types of math problems on the GMAT: (1) arithmetic, (2) algebra, (3) geometry, and (4) word problems. This text serves as a bank from which math training materials can be developed.

Materials Preparation

1. Catalogue problem types. Each week a set of problem sheets is prepared which exemplify only one of the problem groups noted above. Limiting the problem type in this way focuses student attention on the similar equations and formulas that are reiteratively employed for solutions. In order to know which problems in the *The Official Guide for GMAT Review* are characteristic of each group, the instructor must first analyze all problems appearing in the text, classifying them into the category (or categories) they best represent. In other words, the guide does not have all the arithmetic problems together in one section and all the algebra problems in another. Nor are all the ratio and proportion problems (one type of arithmetic problem) grouped apart from other types of arithmetic problems such as percents, powers and roots, and decimals. Therefore, it is the instructor's task to examine all entries in the guide and then

sort these by type so that similar kinds of problems can be introduced together.

2. Prepare problem sheets. After the cataloging is accomplished, problem sheets can be organized. Each "problem sheet" contains a single problem at the top and the explanation of that problem on the bottom. [See illustration.] Approximately twelve to fifteen problem sheets are necessary for each hour of instruction. Instructors should be sensitive to the fact that some problems are rather easy and others are quite hard. Therefore, it is important to try to assemble a representative cross-section which includes all levels of difficulty.

Instructional Methodology

1. Distribute the first problem sheet to each student. These papers are placed face down on the desk; no one may begin until the instructor says, "GO."

2. When given the signal to begin, all students turn their sheets over and fold the page so that the explanation section at the bottom is hidden from view. They then start working as quickly as possible to solve the problem.

3. When a student thinks he has the correct answer, he raises his hand. The instructor walks over to see if this answer is, indeed, correct or not.

a. If the answer is correct, the instructor says, "One minute." The rest of the class continue working for this additional amount of time. The instructor watches the clock and says, "Stop" when the minute has passed.

b. However, if the answer is incorrect, that student is "out," and the others continue working until someone else thinks he has the solution. Once more, when this happens, the instructor checks to be sure the response is correct and the others are given one more minute to arrive at an answer.

4. After the one-minute time limit has passed, the instructor says "Stop," and everyone must cease working. Following this, each student must orally state his answer; the person who first had the correct answer recites last. Hearing the answers that students have chosen gives the instructor an idea which members of the class are having difficulty; it also forces students to take risks. Each student **MUST** have an answer even if it has been reached by guessing.

5. The person who first answered correctly then explains how the problem should be solved. At this stage, Japanese is permissible. After all, our purpose here is to promote math competence--an intellectual activity that will almost certainly always be performed using the linguistic traditions of the first language; we should not allow our urge for classroom purity to interfere with this immediate pedagogical goal. Furthermore, others may ask questions--in Japanese. Allow as much time as the students need to share fully this information with one another before going on to the next problem sheet. The teacher need not become engaged in the technical operations of the formulas and equations; however, it is the instructor's duty to resolve difficulties that require linguistic explanations.

6. Only occasionally does a problem prove to be so difficult that no one in the class can reach a correct answer or provide a satisfactory explanation how it should be solved. In these cases, the printed explanation at the bottom of the worksheet can be called upon for assistance.

7. When everyone has been satisfied with the proper way to solve the first problem, pass out a new problem sheet and repeat the steps noted above.

Advantages of this Procedure

I have found that the game-like atmosphere which this procedure generates

stimulates enjoyment while exercising the math skills needed to pass standardized examinations. As one of those EFL instructors who becomes muddled by tasks as elementary as keeping a checkbook straight, I welcome the way in which this technique enables my MBA prep students to develop their math skills without exposing my utter incompetence.

About the Author

David Wardell, instructor for the University of Pittsburgh (Japan) MBA Preparation Course, has taught in Thailand, China, and Iran as well as at several universities in Portland, Oregon.

ILLUSTRATION

PROBLEM

The regular hourly wage for an employee of a certain factor is \$5.60. If the employee worked 8 hours overtime and earned 1 1/2 times this regularly hourly wage for overtime, how much overtime money was earned?

- (A) \$67.20
 - (B) \$55.40
 - (C) \$50.00
 - (D) \$44.80
 - (E) \$12.00
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EXPLANATION

The employee would have earned $8 \times \$5.60 = \44.80 at the regular rate. For overtime he receives an additional amount equal to half the regular rate, or \$22.40. The total overtime earnings are therefore $\$44.80 + \$22.40 = \$67.20$, so the best answer is A.