

The anatomy of grading at U.P.E.I.

One man's system

In our December 1 issue, our editorial attacked the grading system at UPEI as being arbitrary and potentially unfair. This week we were approached by Thomy Nilsson of the Psychology Department who had carefully prepared an explanation of how professors can ensure that marks are fair. We hope that this will better inform students on an issue vital to their educational careers, and once again, we encourage any articles on topics relevant to university life.

By Thomy Nilsson

Have you wondered how your professors come up with the grades you get? It may surprise you to learn that there are no rules written on stone tablets which tell them how to translate test results into a grade that represents the official assessment of your achievements in a course. At U.P.E.I., as at most universities, the guidelines amount to little more than definitions passed by word of mouth from the old guard to new professors. As a newcomer unfamiliar with the percent system of grading, I examined what was done here so that my grades would have the same meaning as grades given by other professors. What I learned may enlighten some students and perhaps even some of my colleagues.

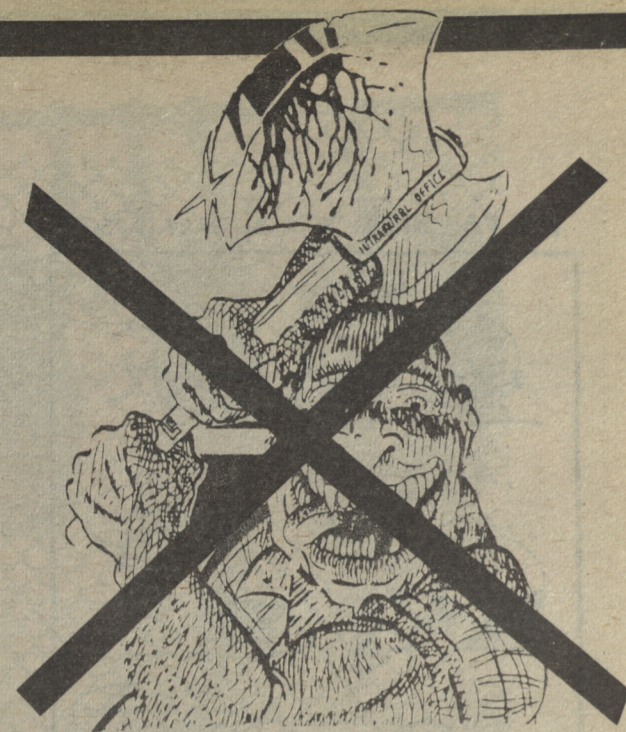
To start, we must distinguish the use of percent as grades from the use of percent as the proportion of questions which are answered correctly. It is reasonable to assume that someone who misses every question on a test has little or no understanding of the subject, and that someone who answers every question correctly has good comprehension. However, there is nothing which determines that getting half of the questions right represents a barely satisfactory understanding. For example, if a test comprises very difficult questions, answering even 40% could represent commendable achievement. Conversely, getting 70% correct on a test where all questions were easy could represent only marginal knowledge of the subject. Grades reported as percent have a meaning

which is entirely different from how many questions were answered on a test.

At U.P.E.I., a grade of 50% is considered a passing grade because the professors have agreed amongst themselves to use this number to designate the boundary between adequate and inadequate understanding of a course. The number four (4) could just as well have been chosen and would have as much meaning if used consistently. A similar consensus underlies the statement in the University Calendar that a grade of 80 percent or over represents "first class standing." Presumably this means a commendable achievement, but it only has this meaning by general agreement. There is good reason why the matter is not more explicitly defined.

All knowledge is relative. This creates a major stumbling block to achieving a firm relationship between test performance and grades. This may be understood by considering that a student who just scrapes by with a grade average of 52 percent today probably has more knowledge than the most erudite scholar of the eighteenth century. Conversely, the student who achieves a commendable 94 percent today probably knows less than an academic drop out will know in 2083. Grades do not represent the amount of knowledge a person has as much as they represent what he knows relative to his peers.

In order to assign meaningful grades to students in his course, the professor must evaluate how much they know about its content compared to how much student in other courses know when they receive a certain grade. The direct approach to this task would involve surveying the content of other courses, the tests that were given, the results of these tests and the grades that were assigned. Not only would this be a formidable undertaking, but also it would be fraught with assumptions and value judgements. There would be little consensus among professors as to how much knowledge in psychology was equivalent to a certain amount of knowledge in Chemistry or English. Fortunately there is an indirect



approach to grading which bypasses the whole question of course content and which involves only a few simple assumptions.

Most introductory courses are designed so that a student of average intelligence and motivation can earn an average grade. When matters of course content, the difficulty and number of test questions are all taken into account, the particular tests used to evaluate the students should make little difference to their grades. Regardless of the subject, an introductory course which is adequately taught and properly graded is likely to have a grade distribution which reflects the distribution of aptitudes. The distribution of aptitudes can therefore be used to estimate the grade distribution that one would expect in an introductory course. This expected grade distribution can serve as a guide for converting test scores to grades. We shall see shortly that there is more to this approach than just "putting the cart before the horse."

First let's summarize what has been said so far: For any test there is some formula which will convert the distribution of test scores into a distribution of grades. That formula can be estimated directly from analysis of course content and test questions. It can also be estimated indirectly from the expected distribution of grades.

How does one know what grades to expect in a course when test scores comprise all the information on the abilities of the enrolled students?

A half century of intelligence testing has shown that IQ varies as a normal distribution having a mean of about 110 and standard deviation of about 14 amongst university students. There is no reason to believe that students entering one area of study such as philosophy are smarter or dumber than those entering another area such as biology. Nor are the students that happen to get one professor likely to differ in ability from those getting another. If student in various introductory courses are similarly distributed in academic ability, it follows that grades in these courses should be similarly distributed. Therefore the average distribution of grades in all courses provides a good estimate of the expected grade distribution in any one course.

I obtained the expected grade distribution at U.P.E.I. by looking up the distribution of grades in all large introductory courses taught in the fall of 1982. These are shown in Table 1. While there are some differences in grading for various departments, there are strong overall consistencies in these figures. In most departments relatively few students were evaluated as either doing failing work or earning grades above 90 percent. Most students were evaluated as earning grades between 60 and 80 percent. There was little variation in the mean grades of these courses. All but two departments had mean grades between 65 and 70 percent. The distribution for French and Mathematics were marked different from the rest. This suggests that special factors are involved in their grades. On the average 8% of the grades in all introductory courses at U.P.E.I. were below 50 percent and 5% were above 90 percent. The overall mean grade was 67 percent and the standard deviation of the distribution around this mean was about 14 percent.

One way to check on the validity of this method of obtaining an expected grade distribution is to compare U.P.E.I.'s averages with that of another university. At the bottom of Table 1 are shown the average grade distribution from all large first year courses taught at the University of Alberta during the 1971-72 academic year. Converted to percent grades, Alberta's grade distribution is very similar to U.P.E.I.'s. The fact that our grading is neither harsher nor more generous than that of another university indicates that

Table 1 — Distribution of grades in introductory courses having more than 60 students taught at U.P.E.I. during fall semester of 1982 — shown as the % of students obtaining grades in certain ranges.

Department	Students	GRADES						Mean
		Fail	50-59	60-69	70-79	80-89	90-100	
Anthropology	66	11	29	23	20	17	2	63
Biology	103	5	24	30	28	13	0	65
Business Administration	126	4	19	29	33	14	1	68
Chemistry	129	12	29	26	17	9	5	63
Computer Science	146	16	20	16	16	21	11	65
Economics	282	6	18	23	25	19	9	70
English	262	8	16	28	29	18	2	67
French	78	3	6	12	24	37	18	77
History	175	2	18	21	30	27	1	70
Mathematics	207	25	23	18	15	11	7	60
Philosophy	75	5	23	28	27	12	5	67
Physics	112	11	33	16	21	14	5	63
Political Science	94	1	4	34	41	18	1	72
Psychology	400	6	15	28	27	17	6	68
Sociology	303	2	25	32	26	12	3	67
U.P.E.I. Mean		8	20	24	25	17	5	67
Alberta		8	18	23	27	19	5	

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