

When You Offer Options

ROBERT N. HURST

A STUDENT ENROLLED in the Biology 108-109 sequence at Purdue University chooses up to 25% of his curriculum during his enrollment. His choice is made from a list of optional instructional packages, minicourses, that have been described elsewhere (Hurst et al. 1970; Hurst and Postlethwait 1971; Postlethwait and Hurst 1972; Postlethwait et al. 1972; Hurst and Postlethwait 1973). The question arose early in the evolution of this format as to what kind of options ought to be offered and what kind of criteria should be used in generating topics, titles, and packages to fit student needs and preferences. The policy adopted for Biol. 108-109 is that whatever topic is of interest to students, whatever topic is of interest to the instructor, or whatever topic is of sufficient interest to a student or a graduate teaching assistant to cause them to develop or help to develop an adequate instructional package is allowable.

Over a period of 11 semesters many topics have been explored, and over 50 different content areas have been developed into optional minicourses. Many of these topics were suggested by students. Most of the minicourses have undergone extensive revision, and some have been buried. After a suitable time period or when an interest has seemingly been reawakened, some topics and titles have been resurrected and new packages developed. Some buried topics may never re-surface for lack of interest on the part of potential minicourse developers.

Minicourses have been developed by graduate and undergraduate teaching assistants, participants in summer development workshops, and the NSF-supported Minicourse Development Project directed by S. N. Postlethwait. One minicourse was prepared by students in the course, and I have developed several myself.

Choosing Topics for Minicourse Development

When offering a series of optional minicourses from which a student must select a certain number of units to fulfill his credit-hour option in the sequence, the question of which topics will be selected by the students and which will be successfully completed must be taken into consideration. Will some be completed by

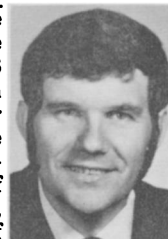
virtually all students while others are totally ignored? How much care should be taken to produce only minicourses of fairly general appeal? Can a developer concentrate on an area of expertise and interest to himself and expect participation from students?

In our sequence, all optional minicourses that have ever been produced were attempted and completed by at least a small percentage of the students enrolled. Obviously, some topics have proven much more popular than others, and some have been easier to complete than others. Based on a random sample of 200 students in the spring of 1974, the data in the table represent the percentage of students completing each optional minicourse and the level of difficulty of each minicourse.

As might be anticipated, the more difficult and specialized minicourses were completed by a smaller percentage of students, but at the same time a few not-so-easy minicourses were completed by a goodly number of students (for example, Op 30 Animal Adaptation and Op 36 The Everglades).

Some very specialized and sophisticated minicourses (for example, Op 16 Heart Dynamics, Op 18 Nerve Transmission, and Op 41 Protein Synthesis II) enjoyed little general popularity. Part of the reason in the case of Op 16 might have been its level of difficulty (the word spreads) which was 3.80, but the .78 level of difficulty (which is the number of failures to reach mastery per student completion) of Op 18 (Nerve Transmission) is lower than the difficulty levels of several minicourses that were more heavily used. Is the 3% level of completion for Op 41 (Protein Synthesis II) enough to warrant the continued offering of this minicourse? The 3% figure represents about 25 students per semester, and if 25 students are interested in completing a very good minicourse that goes into good detail on the topic of protein synthesis, that is probably sufficient reason to continue offering the minicourse. The topic may have had a certain appeal to those 25 students. And as one would expect and hope, topic appeal apparently influenced some optional choices. This assumption can be supported by observing the popularity of Op 11 on birth control.

The author is professor of biology at Purdue University, West Lafayette, Ind. 47907. He received an M.A.T. from Harvard in 1958 and M.S. (1964) and Ph.D. (1966) from Purdue. Hurst has served as a consultant for numerous conferences and workshops in the area of individual instruction. His experience covers the spectrum from design of physical facilities to the production, utilization, and administration of auditorial and programmed educational materials. He has been particularly active in the International Audio-Tutorial Congress and served as president of the organization in 1973-74.



Perhaps of greater interest and importance is the fact that Op 39, Water Pollution, was completed by only 52% of the students (which is a respectable percentage). But with the lowest (.08) level of difficulty, one might have expected a percentage nearer 100 if "easiness" were the only factor in student choice.

Student Options

Selectional criteria are obviously working, but these criteria may well cover the entire spectrum of possible reasons for selecting, completing the instructional program for, and attempting the quiz on any given minicourse. A few students every semester complete all or virtually all optional minicourses offered (although during most semesters this extra work resulted in no extra credit and no higher grade, only more knowledge).

One factor which may operate in selection is the unit value of a minicourse. The reason for this becomes evident if the student is approaching his required number of units, (for example, he has 16 units and needs 17). Is he more likely to choose Op 9 (Wood Anatomy), a one unit minicourse, over Op 12 (Vertebrate Skeleton), a 1.5 unit minicourse in this situation while both

are available in the learning center at the same time? Apparently the answer is not a resounding yes. Forty percent of all students exceeded the unit value needed for completion of their enrollment by at least .5 units; so unit value, even for the last minicourse or two, is apparently not as important as the topic (at least to almost half the students). Some students do admit to choosing to complete all the minicourses with a unit value of 2 which, though they may take more time and are more difficult, "add up faster." Still others admit to taking primarily one-unit minicourses because they are "easier and go faster."

Certain minicourses are used primarily by special-interest groups or majors in a particular field (most of the dendrologists, for example, completed Op 9 Wood Anatomy). Other minicourses, such as Op 6 (Behavior), Op 10 (Origin of Life), Op 11 (Birth Control), Op 32 (Drugs), and, obviously, Ops 44 (Human Reproduction) and 45 (Puberty and the Menstrual Cycle), enjoy fairly universal appeal.

In the fall semester 1974, a program that had been advertised for at least four previous semesters finally caught on. Students had been told that completing extra optional minicourses could earn them extra credit by enrollment in Biology 195, a special assignments

Quiz data for optional minicourses at Purdue, Spring 1974.

Unit Value	Op		Minicourse	Percentage of Sample Completing Minicourse	*Level of Difficulty
2.0	Op	1	Evolution	31	.98
1.5	Op	2	Parasitism	27	.67
2.0	Op	3	Population Genetics	11	1.42
1.0	Op	4	Flower, Fruit & Seed	18	.73
1.5	Op	5	Population	30	.88
1.5	Op	6	Behavior	55	.46
1.0	Op	7	Regeneration	28	.24
2.0	Op	8	Human Genetics	11	1.40
1.0	Op	9	Wood Anatomy	21	1.20
1.0	Op	10	Origin of Life	48	.19
1.0	Op	11	Birth Control	77	.20
1.5	Op	12	Vertebrate Skeleton	24	.98
2.0	Op	16	Heart Dynamics	6	3.80
2.0	Op	18	Nerve Transmission	9	.78
1.0	Op	19	Color of Man	37	.78
1.5	Op	20	Evolution of Man	13	1.30
2.0	Op	22	Complementarity of Organism & Environment	32	.33
1.5	Op	30	Animal Adaptation	33	1.30
1.0	Op	32	Drugs	55	.51
1.5	Op	34	Pulmonary & Heart Disease	35	.68
1.5	Op	35	Biological Clock	19	1.35
1.5	Op	36	The Everglades	38	1.17
1.5	Op	37	Venereal Disease	34	.38
1.0	Op	38	Man vs. Infection	41	.33
1.0	Op	39	Water Pollution	52	.08
1.0	Op	40	Protein Synthesis I	12	.80
2.0	Op	41	Protein Synthesis II	3	.85
1.5	Op	43	Endosymbiotic Theory	15	1.20
1.5	Op	44	Human Reproduction	46	.49
1.5	Op	45	Puberty & Menstrual Cycle	45	.53
Average Level of Difficulty					.73

*Average number of missed attempts or failures to reach mastery per student completion.

course number. For each additional 11 minicourse units completed, they could be credited at the same letter-grade level achieved on the required portion of the course with a single semester credit-hour of Biology 195. All they needed to do was to add the course to their programs, either the same semester or the next semester, to obtain the grade and credit. Twenty-three students did complete enough extra units to obtain an extra hour of credit, and some others will complete a few more additional units next semester, although they may not necessarily be enrolled in Biol. 108 or 109, to obtain credit for one hour of Biol. 195. A few students completed 22 extra units and will enroll next semester in two hours of Biol. 195 to obtain credit, and one student completed every optional minicourse and will enroll in three credit hours next semester (he came close to earning four credit hours of credit, but ran out of available optional minicourses—perhaps it is time to discuss with the registrar the awarding of 3.653 semester credit hours?).

Options for All

The flexibility and versatility of the minicourse format has permitted Biol. 108-109 to offer the student (i) some options, (ii) extra credit for additional work, (iii) a voice in which instructional packages are made available, (iv) a chance to design and develop an instructional package, (v) instruction of a specialized nature specific to his major option or interests, and (vi) topical instructional materials which otherwise might not be made available (Op 11, 32, 36, 44, 45, and so on).

The optional minicourse format has afforded those who work in the course (i) an outlet for special instructional interests, (ii) the chance to develop and test topical minicourses and instructional strategies, (iii) the opportunity to test out instructional packages produced elsewhere, and (iv) a reservoir capable of holding any new and potentially valuable instructional idea that ought to be tried out. In line with the last point, during the fall semester, 1974, two minicourses on topics of great interest to me were developed and made available in a video format, and two that involved printed materials only were introduced.

Though the management of options in a course can be a bit burdensome, the educational advantages are too numerous to enumerate. Most instructors in most courses would probably feel liberated enough to try some things they've always wanted to do if they would but back off a bit on the "required" portion of their courses and consider offering options.

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Smithsonian-Peace Corps Environmental Program

A wide variety of biology skills are among professional and scientific disciplines now in demand among a number of developing countries through a recently initiated Smithsonian Institution-Peace Corps Environmental Program.

Malaysia, at the southern rim of the South China Sea, is seeking a conservation education specialist to develop a plan for country-wide conservation education programs, including a wildlife biology and management course for game department personnel. Nepal has requested six wildlife biologists to study the various Nepalese ecological systems and to determine hunting potential and regulations for various protected and proposed reserve areas.

Types of assignments vary and include research and administration as well as teaching. Disciplines in which positions are available include zoology, entomology, fisheries and marine science, wildlife biology, ecology, and others. Countries in which these skills are being sought include Botswana, Colombia, Seychelles, Brazil, Malawi, Venezuela, and Morocco, with further requests anticipated from additional countries in the coming months.

The Smithsonian role in the program is threefold. First, Smithsonian officials work with officials of the Peace Corps and the developing country to plan projects and individual assignments in the various environmental fields. Second, the Smithsonian identifies qualified individuals interested in serving for two years in a developing country and, finally, matches the skilled applicants to the overseas projects for which their training and interests are best suited.

Once accepted into the program, the volunteer is assigned to a host country agency under the auspices of the Peace Corps. For further information or application forms, contact Robert K. Poole, Office of Ecology, Smithsonian Institution, Washington, D.C. 20560.

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