

# *Michigan Business Review*

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# Programmed Learning for Business

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*Geary A. Rummler*

A large Midwest department store hired 600 part-time workers last fall and taught them how to operate a cash register and fill out a sales slip without an instructor—and did it in two-thirds of the time previously required.

In The University of Michigan Library at Ann Arbor, 200 part-time student assistants, including approximately 60 per cent foreign born students, will learn to use the Library of Congress filing system in an hour, one-third of the usual time and without a lecture being given. Tests have indicated that their performance will be the highest ever.

A training specialist for a space agency teaches new recruits the contents of a two-pound manual of technical data about missiles without talking to the class except to tell them how to use the special kind of book.

What do these things have in common? All of them grew out of a training workshop on the Michigan Campus by the new Center for Programmed Learning for Business, a part

of the Bureau of Industrial Relations of the Graduate School of Business Administration. To date, 140 educational and training personnel from 85 industrial and governmental organizations have learned how to write programs for teaching machines or how to program books in these workshops.

## What Is Programmed Instruction?

Recent publicity on teaching machines has focused attention upon the new educational technology in the popular press. Termed a "revolution in training" by the American Management Association, programmed instruction has several distinctive features which make it differ from conventional training and teaching.

Programmed learning is based on a behavioral model of learning. That is, learning is viewed as a change in behavior. The instructor must state specifically what final behavior he desires his student or trainee to exhibit—"terminal behavior," as it is called. Next he must determine as near as possible the initial behavior, or the beginning behavior of the student before he takes the program. The task is then one of changing or shaping the initial behavior of the student, through the program, to the predetermined and pre-specified terminal behavior.

Programming then applies the basic principles of learning theory to best bring about this change in behavior. Briefly stated, these principles are:

1. Control over the learning situation;

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### *About the Author—*

Geary Rummler is in charge of the Center for Programmed Learning for Business, in the U-M Bureau of Industrial Relations of the Graduate School of Business Administration. Prior to joining the Michigan staff he was Assistant Director of the Institute for Behavioral Research and Programmed Instruction, a private research organization. Before that, he had served as a personnel administration staff member for the University of Michigan's Office of Research Administration. He is a Michigan graduate, holding an MBA from this school. He has written several articles and extensive teaching materials on programmed instruction. He consults with several large firms on the use of programmed learning for business, and is a member of several learned societies.

2. Gradual progression to establish complex repertoires;

3. Requiring the student to respond to the material presented, thus making it possible to observe the student's learning progress; and

4. Immediate confirmation for the learner as to whether the response was correct, thus encouraging him to continue on.

The greatest divergence from conventional courses is that the emphasis is on *learning*, not on teaching.

### Where Does the Machine Fit In?

The "teaching machine" is simply the device used to control the learning situation. It can be a \$5,000 electronic device or the programmed-text, depending on the control desired. Many machines used today are little more than "automatic page-turners" and offer few advantages over the programmed text.

The key to programmed learning is the program itself—not the machine. Without the well developed program inside it, the teaching machine's only function is that of an expensive book-end or conversation piece.

### The Program

Ordinarily the program consists of segments of material called "frames." Below is an example of such a frame. After reading the frame, record your answer in the blank.

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Programmed instruction is a new technology of education. The technology can be used to ..... academic and industrial skills.<sup>1</sup>

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This is the first frame of a program designed to teach programming. Acceptable responses are "teach," "train," or "program." As the program proceeds, synonyms are no longer considered acceptable and the student is shaped into using only technically acceptable terms. This frame is an example of a program to shape verbal (writing and speaking) be-

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<sup>1</sup> Dale M. Brethower, *Programmed Instruction and Programming Techniques*, Volume I. Operant Associates, Ann Arbor, Michigan, 1962.

havior. Many programs are in use which shape other behaviors; such as operating a cash register or manipulating a slide rule.

### How Extensively Is It Being Used In Industry?

One survey, done by Michigan's Bureau of Industrial Relations last year showed that less than four per cent of the firms doing training were using the new method. Since that time over 70 firms have sent representatives to Michigan to learn how to write programs, and all of them have written at least one program, if only the one they wrote during their course here.

There's ample evidence that programming is growing rapidly.

1. Teaching machines and programming firms have sprung up in great quantity across the country.

2. Associations of programmers and people interested in programming have been established.

3. Companies are actively recruiting programmers and establishing programming departments to produce programmed materials for internal use.

Among this new group of entrepreneurs have been some of the largest and most reputable publishers and manufacturers, as well as a few less reputable hustlers who hope to cash in quickly on this new field. As a result of the latter, a rash of misinformation and wrong information about costs, utilization, feasibility, theory, and practice of programmed instruction has sprung into being.

### The Center for Programmed Learning for Business

Early in 1962 Michigan's Bureau of Industrial Relations conducted two seminars to introduce training persons to the new technique. Later—in July—it saw an opportunity to add to its program a completely new unit for the training of programmers. The workshop program of trained industrial staff people to write programs had started as a privately owned research organization in Ann Arbor.

When that organization decided to concentrate exclusively on equipment and machines and drop workshops, the staff of that center was taken into the University staff as a part of the Bureau of Industrial Relations. With the concurrence of the Executive Committee of the Graduate School of Business Administration, the Center was adopted as a University of Michigan program in the Bureau of Industrial Relations. The first workshops included all of the staff of the former research center as well as other experts from various parts of the Michigan faculty in psychology, education, language, and business.

The Center is now conducting regularly-scheduled, week-long workshops to train business and industrial personnel in programmed learning. This workshop aims to train graduates who can:

1. Advise management on the feasibility of using programmed instruction in their organization;
2. Begin actual programming of selected problems (training and others) within their own organization;
3. Select and hire programmers to work in their organization;
4. Evaluate and select wisely from commercially prepared programmed instruction and commercially available teaching machines.
5. Discern what areas or subjects might be programmed within their organization.

This degree of sophistication is gained by:

1. *Work*. This course is a WORKshop. It involves the student's participation in every learning exercise. He is not subjected to a barrage of lectures.

2. *Experience*. The participant actually programs his own materials while in the course.

3. *Instructional format*. The workshops follow a sequential, programmed process of instruction.

- a. Programmed instruction vocabulary
- b. Theory of shaping behavior
- c. Basic procedures for programming
- d. Determination of objectives for program
- e. Program on writing techniques

- f. Practice programming with own materials
- g. Evaluation and revision of program

Factors which make this workshop valuable are:

1. The use of programmed instruction to teach programming. Five programs are used to teach various facets of this skill.

2. Maximum interaction between faculty and participants. The number of participants is limited, in order to guarantee the proper faculty-student ratio.

3. The participant receives a Programmer's Bookshelf containing five books relevant to his programming activities and selected to aid the participant after returning to the job.

The workshops scheduled each month, run from Sunday evening through Friday afternoon, and consist of approximately sixty hours of instruction.

### **Can a Programmer Be Trained In One Week?**

One of the most common questions asked by those enrolling is whether or not a week is long enough to teach a person how to prepare a sound program. The experience to date has been highly successful. Our alumni and our faculty make these comments:

1. Although practice and self improvement on the job will improve competence, learning the basics requires no more than a week. More time than this could well be spent back on the job, writing and testing programs.

2. Since the programs are "self correcting," the best way of becoming a skilled programmer is to learn the basic techniques first (one week will cover it nicely) then write material and test it. Those individual frames which are poorly constructed will show a high "error count" in practice and can be rewritten after the first run-through with actual learners.

3. Too many workshops for training programmers dwell excessively on the theory, and too little on the "how to write programs" aspect. The Michigan workshop presumes that those attending want to learn how to actually *write for use* and not become learning theorists. For those wishing to expand

their knowledge of the theory, a library of five books is part of the course material. They may use it for reference when they return home.

4. Advanced workshops for discussing problems based on actual experience in writing frames will help maintain proficiency.

To date, the result of the Michigan Center has been the training of programmers who write programs that are now being used to shape employee behavior on actual jobs. The potentialities of it for many aspects of business are yet untapped.

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### LETTER FROM A TRIPLE-THREAT GRAMMARIAN

by George W. Feinstein  
*Pasadena City College*

Dear Sir: you never past me in grammar because you was prejudiced but I got this here athaletic scholarship any way. Well, the other day I finely got to writing the rule's down so as I can always study it if they ever slip my mind.

1. Each pronoun agrees with their antecedent.
2. Just between you and I, case is important.
3. Verbs has to agree with their subjects.
4. Watch out for irregular verbs which has crope into our languange.
5. Don't use no double negatives.
6. A writer mustn't shift your point of view.
7. When dangling, don't use participles.
8. Join clauses good, like a conjunction should.
9. Don't write a run-on sentence you got to punctuate it.
10. About sentence fragments.
11. In letters themes reports articles and stuff like that we use commas to keep a string of items apart.
12. Don't use commas, which aren't necessary.
13. Its important to apostrophe's right.
14. Don't abbrev.
15. Check to see if you any words out.
16. In my opinion I think that an author when he is writing shouldn't get into the habit of making use of too many unnecessary words that he does not really need in order to put his message across.
17. In the case of a business letter, check it in terms of jargon.
18. About repetition, the repetition of a word might be real effective repetition—take, for instance, Abraham Lincoln.
19. As far as incomplete constructions, they are wrong.
20. Last but not least, lay off cliches.

—*College English*, April 1960. Reprinted with the permission of the National Council of Teachers of English.