THE RESULTS OF INVESTIGATIONS CONDUCTED DURING THE PAST 6 YEARS IN SELF-INSTRUCTION IN FOREIGN LANGUAGES HAVE LED RESEARCHERS TO CONCLUDE THAT TOTAL PROGRAMED INSTRUCTION SEEMS PRODUCTIVE ONLY IN CASES WHERE THE TERMINAL BEHAVIOR TO BE ACHIEVED IS VERY LIMITED. EXPERIMENTS HAVE SHOWN THAT IT IS MOST USEFUL IN MODULES AT EARLY LEVELS FOR TEACHING SPECIFIC FEATURES OF PRONUNCIATION, GRAMMAR, OR VOCABULARY. PARTIAL PROGRAMING, SUCH AS THAT DEVELOPED AT INDIANA UNIVERSITY FOR MULTIPLE CREDIT ELEMENTARY FRENCH, HAS EMERGED AS A POSSIBLE SOLUTION TO THE DIFFICULTIES INHERENT IN PROGRAMING LANGUAGES AND SUGGESTS THAT LIVE TEACHING AND PROGRAMED INSTRUCTION CAN BE COMPLEMENTARY. THE MACHINE IS USED FOR ROUTINE DRILL WHILE THE TEACHER PROVIDES SITUATIONS AND OPPORTUNITIES FOR THE STUDENT TO TRANSFER STRUCTURE AND VOCABULARY LEARNED AND PRACTICED IN THE LABORATORY TO NATURAL COMMUNICATION IN WHICH HE ADJUSTS TO THE UNPREDICTABILITY OF ANOTHER HUMAN BEING'S RESPONSES. THIS ARTICLE IS PUBLISHED IN "THE FLORIDA FL REPORTER," VOLUME 5, NUMBER 1, WINTER 1966-67. (AM)
Six years ago at a conference on foreign language learning aptly entitled "The Language Laboratory as a Teaching Machine," F. Rand Morton painted in bold strokes a futuristic language instruction scheme that would indeed make the language laboratory a teaching machine (Morton, 1960). Working with carefully programmed electronic equipment, students would acquire all language skills through auto-didactic activity. All learning would be achieved by the student working independently of the teacher; the latter’s presence would be required only for occasional evaluation of student pronunciation and remedial guidance. No testing would be necessary and the student’s achievement would be directly related to assiduity: no student would fail the course since “by both definition and procedure completion of the course guaranteed satisfactory proficiency on the student’s part.”

Since Morton’s prophecy, a small number of research workers, intimately familiar with recent developments and trends in FL instruction and drawing upon the allied fields of linguistics and experimental psychology, have sought to apply programmed learning techniques to FL courses that aim at the attainment of a high level of audiolingual competence on the part of the student. These researchers have proceeded in two directions: (1) complete auto-instruction with or without the use of teaching machines (Carroll, 1963; Morton, 1964; Pimsleur, 1965; Saltzman, 1963; Sapon, 1962); and (2) partial auto-instruction without the use of teaching machine (Marty, 1965; Mueller, 1965; Valdman, 1965). The term “teaching machine” refers to any device that controls the progress of the student through the program, but it does not include the tape recorder except the extent to which that device is modified to control effectively student progress and behavior.

The last mentioned group of researchers have proceeded from the premise that, by definition, FL instruction is not amenable to total self-instruction, and they have limited the role of the auto-instruction component to the imparting of mechanical skills: the presentation of authentic native models for imitation, the artificial manipulation of structures, pronunciation drill, training in auditory comprehension, etc. Thus relieved of mechanical tasks which properly programmed magnetic tapes and workbooks could perform more efficiently, the trained and competent FL teacher could devote his time to the use of FL patterns in simulated situations of normal language use.

After six years of experimentation and development, can we look to the impact of programmed learning on FL teaching with as much optimism as did Morton in 1960? We would hazard the conclusion that programmed courses aiming at full or partial auto-instruction have generally proven more effective than comparable conventional courses. However, the comparison of two methods of instruction is notoriously difficult. In the course of one or two years of normal instruction, let us say, five hours a week of contact for thirty to forty weeks per year, variables can become heavily contaminated. One of the major shortcomings of comparison research is that, even where results show the superiority of one of the two methods under scrutiny over the other, there is no guarantee that the results obtained can be replicated in other contexts. In addition, in the comparison of the relative pedagogical efficiency of programmed versus non-programmed FL courses an important factor to be considered is the cost of instruction, for the development of programmed materials is very expensive; some sort of procedure would need to be devised to compute achievement in relation to total instructional costs. In this brief survey of the application of programmed learning to FL teaching, it will be more fruitful perhaps to review the problems encountered and how these problems bear on the direction which the application of programmed learning to FL teaching should take.

1. In FL learning “programmable”?

It will be remembered that one of the fundamental principles of programmed learning theory is that learning results from the shaping of behavior toward some predetermined criterion. Shaping takes the form of the reinforcement of all responses that lead to the attainment of the criterion behavior and the extinction of all other responses. Implicit in the application of programmed learning to FL acquisition is the view that language is behavior, a complex set of habits amenable to control by operant conditioning techniques. Another assumption which programmers must make when they tackle FL acquisition is that the set of habits which the student is to acquire and the set of habits which he brings to the learning situation can be specified with precision and in measurable terms. But, recently, generative grammarians have advanced the opinion that language is not, as is held by structural linguists and most psychologists, a complex set of habits acquired by the classical principles of reinforcement, association, and generalization. For the generative grammarian language is an abstract system related to observable sensory manifestations in a very complex and indirect way. The capacity to learn language, whether the mother tongue or a second language, is part of the innate intellectual organization of man and as such is difficult for the generative grammarians to see how the non-trivial aspects of language could be acquired through experience and training. As Chomsky (1965) states it:

“...there is no more reason for assuming that the basic principles of grammar are learned than there is for making a comparable assumption about, let us say, visual perception.”

For Chomsky and his followers the characteristic property of language is that it is stimulus-free and innovative. This means that learning a foreign language involves not only the acquisition of definable sets of habits and sets of repertoires (sets of phonemes, lists of vocabulary items, and the like) but also the acquisition of the ability to understand any sentence of a given language and to "cre-
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ate" an infinity of grammatically correct and semantically appropriate sentences many of which have never been heard previously. As the preceding remarks have indicated, generative grammarians are not at all certain that learning a foreign language involves so much the acquisition of this ability as the redirection of an ability already present in the brain of the student.

Clearly Skinner (1957) was prematurely optimistic when he claimed that "the basic processes and relations which give verbal behavior its special characteristics are now fairly well understood," and few programmers would agree that results from experimental work carried out on lower species could be extended to human verbal learning without serious modifications. FL learning, unlike laboratory research on the control of behavior, involves a restructuring of the student's well established first-language habits and repertoires rather than the shaping, maintenance, and extinction of behavior on initially naive organisms.

2. Determination of Learning Steps

If we accept, with generative grammarians, that observable responses bear only a partial relationship to underlying linguistic competence, then the specification of initial and terminal behavior will be difficult indeed, as will be necessarily the determination of the optimum sequence of learning steps. Some programmers consider that a language is composed of a "finite number of basic arbitrarily meaningful and contrastive significant patterns" often termed "acoustic signifiers" (Morton, 1960). According to this view /o/ in Spanish is considered the acoustic signifier for first-person actor (e.g., hablo versus habla), and the consonant /n/ is the acoustic signifier for third-person plural actor (e.g., hablan versus habla). But, even if we grant that learning steps may be determined directly by the analysis of observable behavior, it is difficult to see how this approach could be generalized and how such units could be enumerated in a consistent and simple fashion. For instance, in French there are at least six acoustic signifiers for the distinction third-person singular versus third-person plural (compare the pronunciation of /I mange/ /ils mangent; /il aime/ /ils aiment; /il finit/ /ils finissent; /il arrive/ /ils arrivent; /il tient/ /ils tiennent; /il écouté/ /ils écoutent; /il va/ /ils vont; /il a/ /ils ont/).

The concept of the acoustic signifier is of little utility in the ordering of the syntactic processes of a language, and the fact that so little attention has been given to that level of linguistic organization seems to indicate that programmers have assumed tacitly that most of the syntactic rules of the first-language are transferred to the FL. With the advent of transformational grammar, there has been a tendency to equate learning steps with transformational rules. For example, consider the production of English yes-no questions. It is well known that in English, interrogative, negative, and emphatic sentences all are characterized by the do insertion transformation, that is, if an English verb phrase does not already contain a modal auxiliary, then do must be inserted (compare I am/Tm not and I go/I don't go.). These facts suggest that a basic course in English as a Second Language should introduce verb phrases of the type modal auxiliary plus main verb before phrases consisting of main verb forms only. After a variety of modal auxiliary plus main verb phrases have been presented, the student should be taught to construct emphatic sentences involving only the placement of stress on the modal auxiliary and should then proceed to the construction of interrogatory sentence structures containing the empty function word do, then to the construction of yes-no questions (I do work, I don't work, do I work).

But surely Chomsky himself would reject so literal an application of linguistic analysis to a pedagogical task. Nor can the determination of optimal learning sequences be guided in any significant way by student responses: the structure of a language is so complex that the testing of even a fraction of all the possible strategies would be overwhelming. It would appear that the best solution lies in ordering the content of an FL course in terms of the situations that the student will be expected to handle. Some effort should be made to grade grammatical features on the basis of a variety of criteria (programmer experience and intuition, linguistic analysis, student responses), but FL programmed courses that have based the ordering of the course content exclusively on linguistic analysis have had an unfavorable effect on student motivation. It is ultimately the student's observable behavior (performance), and not the internal system (competence) that underlies this behavior and which may be described in terms of rules, etc., that the programmer must ultimately control.

Another thorny problem in the establishment of learning steps centers on the relationship between explanation and drill in the acquisition of grammatical structures. Proponents of the version of the audiolingual approach labeled the "New Key" insist that grammatical structures be acquired inductively and that rules function only as "summaries of behavior." What little valid research has been carried out to throw light on this issue seems to indicate that, on the contrary, accurate and relevant formulations facilitate the acquisition of grammatical patterns. How grammatical formulations are best integrated with drills and which types of grammatical drills are most effective—or for that matter whether drills are at all effective—these are questions that weigh heavily on the determination of learning steps.

3. Control of Student Responses

In programmed learning unreinforced practice can be dangerous, for it may lead to the overlearning of undesired responses. It is quite easy to confirm responses when the student's task is limited to discrimination or the construction of written answers. But how can oral responses be confirmed? Three choices present themselves:

a) The instructor
b) An evaluating device
c) The student himself

The first alternative is excluded by definition since the ultimate goal of programmed learning is self-instruction. Speech analyzing devices have been utilized but only for those aspects of the sound system whose physical parameters are such that they can be interpreted by electronic devices. For instance, Buiten and Lane (1966) have devised a system (SAID — Speech Autoinstructional Device) for the teaching of prosody: pitch, stress, and rhythm. But an
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economically viable language-evaluating device capable of controlling the production of all types of speech sounds is still in the realm of science fiction, and programmers have had to depend on student self-evaluation. Starting from the assumption that the ability to discriminate between two sounds leads directly to the ability to differentiate them, they train the student to distinguish between native and target language near equivalents, on the one hand, and to distinguish between target language sounds, on the other. The assumption has proven correct generally, and, surprisingly, the most noteworthy feature of self-instructional programs is the degree of accuracy in pronunciation attained by the students. But more research and more widespread testing of programs are necessary, however, before it can be claimed that any student, no matter how low his linguistic aptitude, can function as an accurate self-evaluator and acquire a flawless accent in any language through self-instruction alone.

4. Teacher and Student Reaction

Except for short programmed courses and situations where a program was tested by its developer (who could make immediate modifications when necessary) the use of programmed FL courses has not always been very successful. In general, programmed FL materials have proven clearly more effective than conventional materials with comparable objectives only when utilized by older and more highly motivated students. Because courses with a high proportion of self-instruction have liberated them from lockstep progress and permitted them to master the course content in a shorter period of time, these students have not reacted, versely some of the less desirable aspects of programmed learning and self-instruction. But as regards less able and presumably less motivated students, Morton's assumption that all types of students could attain a reasonable auditory control of an FL has proven to be incorrect, at least given our present understanding of the language learning process and our inability to control motivation to any significant degree.

All of the FL programmed courses cited above are basically of the linear variety, for it has proven difficult in the extreme to prepare branching programs for extensive and protracted courses, and it may be that those programs have not taken into account sufficiently the problems of the slow learner. Field validation and experimental use of programmed FL courses have revealed the following shortcomings:

a) Students may miss the teacher-student relationship, and teachers, on the other hand, experience difficulty in maintaining a feeling of true urgency when daily opportunity for students to communicate with the teacher and other students is lacking.

b) There is a built-in monotony in the use of programmed materials due to the sameness of the learning tasks and the surrounding in which learning takes place.

c) For most students, reinforcement by a machine is not sufficient to provide a high level of motivation and there is a necessity for "public" reinforcement.

d) Self-instruction does not provide the opportunity for the student to transfer habits and repertoires learned by dialogue with a machine and in artificial drills to the natural conversation situation. One might say that natural communication is unprogrammable by definition since in the normal use of language persons engaged in a speech act can seldom predict the responses of their interlocutors.

e) The acquisition of an FL is a long and arduous task. Programmed learning exacerbates this problem because it makes the learner keenly aware of his degree of progress and the distance that separates him from stated goals. It is for this reason that programs that stress the audiolingual skills are more likely to adversely affect student motivation than grammar-translation oriented programs.

f) Administrators have been attracted to programmed learning because they hoped that it would reduce the need for competent FL teachers. On the contrary, when autodidactic activities have been scheduled in conjunction with some sort of instructor monitoring, the task of the teacher is considerably complicated and the need for teaching and supervisory personnel has increased. In courses that feature full self-instruction, released teacher time has had to be allocated to supervisory and co-ordinating activities.

Many of the alleged shortcomings of programmed learning are due not to inherent flaws of the technique but to the act that self-instruction and programmed learning were introduced in the conventional teaching context without prior modifications and adjustments. It is to be expected that those who have been conditioned to conceive of the learning process as centered on the teacher will be confused and frustrated when responsibility for learning is placed squarely on their shoulders. By the same token, teachers will need to be gradually trained to step out of the limelight, to orchestrate rather than lead the learning process. It must also be pointed out that the art of preparing programmed FL materials is still at the preliminary stage, and it is inevitable that these materials would not compare too favorably with materials culminating twenty years of development.

5. Partial Self-Instruction

Given our present lack of knowledge about many aspects of language structure and the process of language acquisition, the preparation of extensive, self-contained autodidactic programmed courses may not represent the best investment of our efforts, time, and funds. These might better be directed in three other directions: (1) research-oriented programs; (2) special-purpose programs; (3) extensive multicomponent courses featuring special purpose programmed modules and redefinition of the teaching context.

One of the factors that have reduced the validity of much of what purports to be research in our field is the difficulty of isolating independent variables and, particularly, of eliminating the contaminating effect of the teacher variable. Short self-instructional programs that deal with simplified but nonetheless relevant language learning tasks would make it possible to study the effect of single variables on specific language learning problems. Such programmed courses have already been developed to investigate the role of discrimination and differentiation in self-shaping, echoic behavior, but their use needs to be extended to the investigation of the various problems mentioned in our discussion of the ordering of course content as...
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well as to questions pertaining to the modalities of use of programmed materials.

Difficulties in the definition of initial student behavior would be obviated by the preparation of self-contained programmed modules teaching very narrowly delimited features of pronunciation, grammar, or vocabulary. For instance, one such programmed module consisting of several ten-minute tape cartridges and accompanying workbook would treat the morphophonetics of the French negative marker ne... pas. These self-contained special-purpose programmed modules could be employed in conjunction with classroom activities of a more conventional nature. Such a scheme would be particularly effective in the teaching of English as a Foreign Language, a field in which student groups are particularly heterogeneous with regard to both relative proficiency and native language habits. It would also be very useful in advanced and remedial FL courses.

Partial programming is probably our best vehicle for the widespread and rapid diffusion of programmed learning. It would still well nigh revolutionize the administrative and pedagogical context in which language learning takes place without at the same time unduly alarming administrators and teachers. Below we shall describe briefly an attempt to introduce partial programming in an experimental course in French tested at Indiana University for a period of four years (Valdman, 1964; 1965). Similar courses using different sets of programmed materials have also been introduced at Hollins College, Virginia, by F. Marty and at the University of Akron by T. Mueller (Marty, '65; Mueller, '65).

The experimental course, labeled Multiple Credit Elementary French (MCEF), consisted of six to eight hours of individually paced work in the language laboratory with programmed materials and from forty to ninety minutes of instructor-guided conversation in small groups (Display Sessions). The experimental course was equivalent to three semesters (roughly forty-five weeks) of conventional instruction in French at Indiana University, but students could complete the course in a variable number of semesters without prejudice to their grade or their class standing. The time required for the completion of the course ranged from two to five semesters, with most students completing the course in three semesters. Grade and credit for each semester was awarded on the basis of demonstrated proficiency on a battery of national-normed tests (the Modern Language Association of America (MLA) Lower and Higher-Level proficiency tests in listening comprehension, speaking, reading, and writing). Students who failed to qualify for credit in a given semester were given the opportunity to continue and to remove the deficiency in the course of the following semester. More than ten per cent of the students who completed MCEF were able to master the course content in two instead of three semesters. The course had no marked ill effect on participating students, for a larger proportion of the approximately 200 students who enrolled in MCEF was retained than of those in a matched control group. Overall proficiency in French achieved by students in MCEF and the control group was evaluated with the aid of the MLA four-skill tests, but, in view of remarks on comparison-research made above and the fact that MCEF placed greater emphasis on the audiolingual skills than did the method employed with the control group, comparison of the proficiency attained by the two groups would be inconclusive.

Autodidactic activities took place in a language laboratory equipped in a quite conventional manner (Viking 76 and Viking 85 tape decks and a dual channel listen-record system in two-way inter-communication with a control console and rather poor sound quality). Autodidactic sessions were unsupervised, except that an attendant was on hand to attend to mechanical difficulties and course instructors occasionally monitored student performance. Display Sessions were led by instructors of graduate assistant level, most of whom spoke French accurately and fluently but few of whom were native speakers; their pedagogical experience varied greatly and at least half were neophytes. One of the objectives of the experiment was to determine optimal size for the Display Sessions. It was discovered that optimal size was a function of the level and student proficiency and the efficacy of the programmed materials. Groups of ten students proved quite manageable at the beginning level but Display Session size was gradually reduced to a maximum of five at the advanced level. When the programmed materials failed to teach particular grammatical features, the instructor had to devote Display Session time to drill, an activity which is performed as efficiently with a group of ten as with a group of three students. The function of the instructor was to lead the students to use in a simulated natural situation the structure and vocabulary learned and practiced in the language laboratory and, at a later stage, to discuss reading material in French.

Our experience with MCEF leads us to view the future of total self-instruction in FL learning with great pessimism, except in cases where the terminal behavior is very narrowly specified (for instance, in courses designed to train a tourist to "get around"). While total self-instruction is tolerable and effective at the beginning stage of an FL course when emphasis is placed on the acquisition of pronunciation accuracy and the mechanical manipulation of a limited number of grammatical structures, it must be gradually faded out as the repertoire which the learner must handle increases. The examination of totally programmed materials cannot fail to reveal a striking incongruity between a quixotic attempt to fraction course content into minute learning steps at the beginning of the course and a sudden return to conventional practices midway through the course. As a result, the student who has been carefully spoon fed is unable to digest the richer diet and may well lose heart. The prolonged continuation of excessive formalism in the presentation of course content and deprivation from contact with normal language use also frustrate the student who feels he is ready to deal with concrete situations and interlocutors who do not always provide the correct answer or whose responses are not always predictable.

Finally our experience with partial programming strongly suggests that competent "live" teaching and effective program writing and presentation are complementary; the more skillful the teacher, the more he is pleased to entrust mechanical and routine drill to the machine; the

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more effective the program in the presentation of those aspects of language amenable to mechanical manipulation, the greater the opportunity for the teacher to lead the student to "behave" in the foreign language and to motivate him to continue to learn.

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**REFERENCES**


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**FILM SERIES**

A new Language Lab Film Series, entitled *The Walter O'Connor Co. (100 No. Cameron St., Harrisburg, Pa.*) has recently appeared. It is called Successful Use of the Language Laboratory and comprises eight films each of which is about 15 minutes long.

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**MLA/ERIC CLEARINGHOUSE**

The MLA has entered into an agreement with the U. S. Office of Education to serve as one of 12 subject-matter clearinghouses which will collect, review, and process current educational documents into a national system of information storage and dissemination known as the Educational Research Information Center (ERIC).

In present circumstances, any effort to keep abreast of the welcome flood of current information and discussion about FL teaching is frustrating and futile. It is simple enough to learn about new books on methodology, applied linguistics, and testing; and the well-known national journals can be monitored easily for useful pedagogical and professional articles. But there is a growing volume of new informational materials, much of it significant, which all too often reaches only a limited audience. Such materials include reports and addresses at state, regional, and even national FL meetings, or at special FL conferences; lectures and speeches at NDEA FL institutes; international curriculum studies in school systems and internal studies of FL matters at colleges and universities; surveys by state departments of education; articles appearing in small-circulation periodicals and newsletters, journals in related subject-matter fields or in other countries.

It is one of the purposes of the MLA/ERIC Clearinghouse on the Teaching of Foreign Languages to collect and evaluate all such documents and forward into the Central ERIC system those that appear to have current utility. Specifically, we are concerned with significant information on instruction in the so-called commonly taught foreign language in American education—from preschool to the graduate level—French, German, Italian, Russian, Spanish, and the classical languages. We seek to serve the interests of administrators, researchers, and FL teachers.

Information collected deals with relevant monographs of research, methods, materials, and equipment; applied linguistics; psychology of languages and language learning; teaching the cultural and intercultural content; curricular problems and developments; teacher qualifications and training.

The Center for Applied Linguistics (1717 Massachusetts Ave., N.W., Washington, D.C. 20036) is initiating a companion ERIC Clearinghouse for Linguistics and the Uncommonly Taught Foreign Languages.

As the ERIC system develops, significant documents will be stored in a central facility from which it will be possible to order copies at reasonable cost—for instance, 18 cents for a 100-page report, on 2 sheets of 4 x 6 microfilm, or printed out in booklet form at 4 cents per page. Monthly abstracts of all stored documents will be available. An annual bibliography will be prepared of all significant materials on FL teaching, published and unpublished.

We invite your help in encouraging authors and institutions with relevant materials to submit them to the MLA/ERIC Clearinghouse; new materials may be typed, mimeographed, dittoed, or printed, but should be addressed to MLA/ERIC, 4 Washington Place, N. Y. C. 10003.

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