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ABSTRACT

The role and training of an educational consultant who is to become an "agent for innovation" is the subject of this report. He is seen largely as guiding and evaluating externally generated innovations in language programs and aiding the generation of innovation from within the school in the same subject area. Emphasis on design and articulation of the curriculum is to be directed toward an objective statement in behavioral terms of the instructional goals. Chapters discuss a foundations conference where basic problems were discussed, contrasts between the consultant and existing personnel in the system, curriculum design, course outline, evaluation procedures, selection of candidates for consultant training, problems identified by teachers, and a strategy of innovation. Two related papers, a list of the foundations conference participants, and a bibliography on innovative materials are included. (RL)

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FOREIGN LANGUAGE INNOVATIVE CURRICULA STUDIES

Report #3

August, 1967

**Associated Staff Training
Results of Planning**

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"Curriculum Design for a Consultant in Education"

A Report on the Results of One Year of Planning

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Chapter I INTRODUCTION

Innovation is a magic word in education. But like so many magic words, its effects are questionable. Even a cursory glance at the educational literature leads to the following conclusions: (a) many innovative efforts have been and are being attempted; (b) most innovations, regardless of their demonstrated effectiveness, either fail to gain acceptance into the school system or fail to be maintained by the system and consequently wither after initial acceptance. Our hypothesis has been that innovation fails because of a lack of appropriate reaction at the local (school and classroom) level. For example:

- Within the school there may be a failure to understand the innovative effort, its implications and the demands it will make on the system. As a consequence, a good innovation may be rejected out of hand, or it may be accepted without a full realization of the support necessary for its successful implementation. On the other hand, a poor innovation may be accepted before adequate examination and evaluation has taken place.
- An innovation may produce an adverse reaction because it is developed without recognition of local needs. It may be directed to problems which the school does not face or at least does not perceive as problems. Or it may be addressed to secondary problems while far more important ones are pressing on the system.
- The reaction might be overpoweringly positive with the local personnel viewing the innovation as a packaged panacea. The resultant failure of a single innovation to solve the multiple problems of instruction produces disillusion and disappointment.

We assumed that any innovation generated outside of the school needs to be looked at and evaluated in terms of local needs and resources. We also assumed that innovation requires continuing support and might well require adjustments of the existing system. It follows that someone in the local school is needed to guide externally generated innovations.

But the failure of externally generated innovations seemed only one side of the problem. Locally generated innovation, the kind of thing teachers engage in almost daily, fails to receive adequate support and recognitions. Local innovations die a-borning for lack of teacher time and skill or sustenance. Even successful local innovations fail to be widely disseminated. (A review of the relevant literature by the AST staff revealed local innovations to be low in quality, infrequently reported and inadequately described.)

As a result of this situation, many people involved in education view innovation as coming from the outside, large scale (e.g. whole curricula), erratic in occurrence, and, for the most part, unacceptable if not useless.

But innovation can be conceived of as an integral part of education, as a continuing, daily effort, locally as well as nationally, producing microscopic, individual changes as well as major mass changes.*

To achieve this end, we engaged in designing the role of a new man in the school and developing a curriculum to train this instructional consultant. This "agent for innovation" is seen as guiding and evaluating externally generated innovations in second language learning and aiding the generation of innovation in the school in the same subject area.

Second language learning seems an especially appropriate academic area for the consultant to work in. There is widespread recognition that instruction in this area needs improvement. The inadequacy of instruction may not be any greater in second language learning than in other curricula areas, but there is ample evidence of a special awareness among language teachers of the need to improve instruction.

*An elaboration of these remarks may be found in Appendix D.

Recently second language instruction has been the scene of repeated innovations (e.g., the FLES program, the language laboratory). The language teachers are not only interested in improving instruction; many are familiar with, or at least aware of, innovative efforts in instruction.

Since evaluation of final student performance is integral to a rational attempt to improve instruction, an innovative effort such as AST might well begin in an academic area with numerous explicit goals. The corollary to this is that many of these goals can be objectively stated in behavioral terms.

Finally, the area of language learning presents a rich array of problems to those interested in instruction and learning. Thus, while many content areas require little more than the acquisition of comparatively simple discriminations, language learning involves the development of new motor skills (i.e., articulation), establishing new conceptual repertoires, overcoming major interferences from the first language repertoire, etc. In short, the challenge in this area is greater than in perhaps any other academic area due to the variety of skills and knowledge and the types of behavior or learning that must take place for the student to meet the terminal goals of his study. Solutions to instructional problems in second language instruction are likely, therefore, to have greater generality to other curriculum areas.

Staffing Decisions

It was felt that the FLICS staff was heavily weighted with competent language learning experts and therefore the AST staff might best consist of instructional specialists and behavioral scientists. The director, a psychologist, was joined by an instructional designer (S. Knapp), a psychology graduate student (A. Weinstock), a social science graduate (H. Wallace) and an English teacher with special interest

in practical problems of language instruction (W. Beasley). Later additions to the staff included a psychology graduate student with expertise in evaluation (R. Chapman) and a graduate student in the combined psychology and education program at Michigan (R. Scott).

Chapter II

FOUNDATIONS CONFERENCE

Preface

In the following report of the foundations conference, the strategy has been to present and discuss major issues raised. This approach was chosen instead of a reportorial description of the affair for several reasons. The conference was somewhat unusual in structure, emphasizing informal interactions of participants and AST staff. The outcomes of each day were, almost without exception, rough working papers representing consensus. No formal papers were delivered or emerged from the meetings. Nor was authorship of the working documents, except in a few cases, clearly traceable to one participant. The papers were intended to, and did, serve as guides to the staff during the following months. The documents and discussions led to many new thoughts and changes in thinking among staff members. It is therefore both difficult and, more importantly, purposeless to report merely what took place at the meetings. We have chosen instead to integrate a report of those papers and discussions with a report of the resultant effect on our own thinking.

The following report then is, in good part, a series of essays representing the thinking of the AST staff as influenced by the great number of stimulating exchanges that took place at the Haven Hill conference. While the AST staff assumes complete responsibility for the opinions expressed in the report, it humbly recognizes the enormous contribution of the many excellent conferees and once again notes its appreciation for their efforts and cooperation.

Description

From August 1 to 5 a conference was conducted by AST at the Haven Hill Conference Center in Milford, Michigan. As in staffing, the emphasis was on the behavioral scientist. (Invitees are listed with biographical information in Appendix A.)

Other members of FLICS regularly attended and participated. In addition, each invitee was encouraged to bring a graduate student as a participating observer. This was only incidentally designed as an educational experience for the students. More importantly: (a) we hoped to disseminate the idea of the instructional aide among the "next generation" with the thought that the basic concept would perhaps stimulate them to develop variants applicable to their own situations and interests; and (b) we recognized that the graduate student today is often the "worker in the fields." Consequently the student might well have more specific information and comments than his professor, who must devote time to administration and planning and must remove himself to some extent from his own research efforts.

It should be noted at the outset that most of the invitees had engaged in applying principles of the behavioral sciences to practical problems of behavioral control. Yet in only a very few instances were the sites of such applications the school system. Although these men were representative of the movement from experimental analysis of behavior to behavioral engineering, in most cases the application involved a deviant population (e.g., retarded children) or a non-academic group (e.g., industrial trainees). The AST staff alone represented direct application to the public school system.

The invitees could be divided conveniently into two groups. One might be called "behavioral engineers." Members of this group are involved in exploring the intricacies of the process of behavioral modification. While the final outcome of a modification effort is of interest, the major concern is with demonstrating techniques of control. The second group (including the AST staff) might be termed instructional analysts. While they are concerned with the methodology of instruction, they are equally involved in the definition of and justification of curriculum goals.

A slightly different division of the participants might be made: the "behavioral modifiers" and the "materials designers." While both groups are devoted to engineering behavioral change, the first tends to do so by manipulating environmental conditions, especially those involving reinforcement (i.e., "motivational" variables). The second group is primarily involved in the generation of instructional materials (e.g., programmed instruction). The participants from each group had much in common (and indeed were chosen for their similarity of language and background). Nevertheless, there was clearly a difference in approach between, say, a conferee who had been engaged in manipulating the behavior of a nursery school child through selective reinforcement and the designer of self-instructional materials for shop foremen.

In the light of these remarks, it might be expected that the mix of personnel at the conference would provide rich discussions. And it did.

The conference was structured to provide a progression over four days toward a specification of the curriculum for the trainee. A great variety of group discussion techniques was used to provide ample opportunity for discussants to restate and elaborate their views as the conference spiraled from the general to the specific.

The conference was planned as a series of work meetings. No formal papers were delivered. Each session consisted of discussions growing out of a particular problem posed by one of the chairmen. As the conference progressed, the staff periodically would initiate "probing sessions." During these, each staff member would meet with one or two participants and proceed to question the participant in depth on a particular topic. The general sessions and the probing sessions each resulted in short documents used for later reference.

The first two sessions were devoted to the problem of defining the new member of the educational system, first in terms of the expectation of FLICS and the AST staff and then in terms of his role and image.

Objectives

Early and repeatedly during the conference the problem of objectives was raised (by both staff and participants).

Objectives were stated in answer to two questions: 1) What are to be the objectives of the trainee when in school? 2) What are the objectives for this project and its outcomes for each of the participating parties and groups (e.g., CRLLB*, FLICS, local school systems)?

At one point in the conference, small groups of participants were assembled and asked to generate lists of objectives. A summary of those lists is presented in Exhibit 1.

The Development of New Teacher Roles

As discussions and planning progressed, still another function of the trainee emerged. An understanding of this function requires a short digression, a description of the background against which this new figure will be placed.

In a number of professions, the increase in knowledge, the growth of automated aids, and the increase in number of specialized technical assistants has, in a sense, robbed the professional of his traditional role. In nursing, for example, the independent bedside nurse cared for the patient's physical needs, supported him psychologically, carried out the doctor's orders, reported to the doctor on the patient's condition, etc. In recent times, increased medical sophistication in diagnosis, treatment and care, coupled with more elaborate and efficient hospital facilities, has to some extent threatened the nurse by

*CRLLB: Center for Research on Language and Language Behavior. .

OBJECTIVES OF VARIOUS PARTIES CONCERNED WITH THE PROJECT

- I. Objectives of the project in relationship to school, community, state.
- A. Trainees should continue to be employed by the school after FLICS and CRLLB support is withdrawn.
 - B. Trainees will be requested by the school system and community to provide more trainees for use in the school and community.
 - C. Trainees will be requested by the school and community to generalize their skills (i.e. the trainees') to other areas besides language.
 - D. They will engage in sufficient local dissemination activities to produce some knowledge and understanding of their activities in people inside and outside the school.
 - E. They will produce little or no adverse criticism by community and school members.
 - F. Teachers and other members of the school and community will request opportunities to become trainees.
 - G. The schools in which the trainees work will become to some extent sites for educational research and training (e.g., graduate student projects might be conducted there; new trainees might undergo training there).
 - H. New materials and methods will be introduced into large-scale use in the language departments only after adequate testing has shown them to be:
 1. pedagogically effective,
 2. efficient,
 3. relevant to course goals.
 - I. There will be an increase in the "cultural maintenance" activities in the school and community with regard to second language (e.g., foreign language plays, movies, clubs, more foreign language books available).
- II. Relationship to research centers, the project, and the universities.
- A. Trainees will provide feedback to centers (such as CRLLB) in the form of applied research problems.
 - B. They will provide records of their activities to research centers and to each other.
 - C. They will request opportunities to engage in research at centers.
 - D. Being accepted as visiting researchers at research centers, they will investigate problems of language modification.

III. Additional trainee activities.

- A. Trainees will produce good evaluation instruments to test language proficiency.
- B. They will increase the utilization of existing good language teaching and testing materials.
- C. They will generate grant proposals in the schools (and possibly in research centers at which they are visiting researchers).

IV. Final objectives with regard to students.

- A. Students taught by methods and materials generated or selected in cooperation with the trainee will speak, read, write and understand their second language better.
- B. Learning second languages will proceed with maximum possible efficiency (in terms of costs, student time, teacher time, etc.).
- C. An increased number of students will be enrolled in language courses of an optional nature.
- D. There will be reduced attrition of second language students.

repeatedly subtracting parts of her role in medicine. Note that recently the trend has been for nurses to move into managerial and administrative positions.

A comparison can be made, we think, between the nurse and the teacher. The production of instructional materials, both for teaching and for testing, is becoming an industry removed from the school and less often involving teacher participation. The increasing number of specialists who deal with particular populations (e.g., deaf children, slow learners) has further reduced the teacher's role. Psychology's contribution in recent years to our understanding of the learning process has cast doubt on the efficiency of many traditional teacher activities in producing learning (e.g., lecturing to a class). Automation offers a way to reduce the record-keeping duties of the teacher. Computer-assisted instruction (CAI) and programmed instruction suggest routes to learning which do not involve teacher mediation.

The teacher, being threatened in many ways, may turn in new directions in an attempt to redefine and to bolster her role.¹ Already there is evidence of a new emphasis on the "mental health" role of the teacher, involving a near therapeutic relationship with students. But we feel that the teacher might best be conceived of first and foremost as a manager of learning. She, like the nurse, may begin to see herself more in a managerial and administrative position. She may in the future supervise many components of learning; she has had little or no training for this, having been taught primarily to be the major, if not the sole, component of the learning process.

Our trainee can be an important person in assisting the teacher in shifting and adjusting to new roles. The emphasis on evaluation and problem explication in our training program suggests new areas into which the teacher can move.

1. See, for example, Bright, R. Louis, "The Place of Technology in Educational Change," Audiovisual Instruction, April 1967, pp. 340-343.

In short, our trainee is not designed merely to bolster the existing role system in education. On the contrary, he will be trained to help shape new roles to expand and transform the existing system.

Concepts of Trainee Role

While some agreement was reached on the objectives, the "mental pictures" that conferees had of the trainee differed markedly. One session was devoted to an attempt to specify the role which each participant saw the trainee assuming. It seemed important to clarify what sort of "system component" the participants had in mind as they discussed the trainee. A great variety of concepts emerged. Some of the key ones are briefly described here to illustrate the range of roles proposed.

1. The Master Teacher. The trainee would be, or would learn to be, an outstanding language teacher. His function in the school would be, in good part, to serve as a model to other teachers. He would set up experimental classes, teach in the presence of observers, and spend some time training other teachers to duplicate his methods and procedures.

2. The Materials Producer. This trainee would learn techniques of generating materials for teaching second languages. The supporters of this role for the trainee emphasized the dramatic need for good teaching materials, the advantages of contacting the student directly through teaching materials, and the effect of good teaching materials on changing teachers' behavior.

3. The Traveling Salesman. Instead of being employed in one school, this man would service a number of schools, dropping in on schedule, spending the day consulting on instructional problems and giving advice, making suggestions, etc. Unlike the master teacher or designer, this trainee would probably be a "university type" with more general than specific skills. (One analogy proposed for this type of trainee was that of the county farm agent.)

4. Aide. A "mother's helper" role was proposed. The trainee would stand by the teacher and make himself useful in any way he could. While his goal would be the improvement of second language learning, he often would be engaged in tasks which were

primarily rewarding to the teacher, not to the student. In contrast to the previously described roles, the aide would be of fairly low status, heavily involved in detail and, in good part, committed to classroom improvement.

These four descriptions begin to suggest not only a variety of roles but also the many dimensions which had to be considered in connection with the new role. For example, while a graduate student in the School of Education might serve admirably as an aide, he would hardly be the appropriate one to select for training as a consultant. While a consultant might not be a member of the school, a master teacher probably would. While a materials designer might be only temporarily attached to a department, a master teacher would probably be a permanent employee.

A large number of dimensions to be considered in designing the new role were brought up at the conference; some of these are summarized in Exhibit 2.

Contrasts in Concepts of Trainee Role

Emerging from the above lists and exhibits are a number of contrasting roles. The questions raised and the suggestions offered at the meetings often clearly pointed up these major differences in perception of the trainee's role.

Most important is the distinction between a "consultant" and an "associate" in instruction. Some participants conceived of an expert on instruction, learning, and behavioral modification who advised but who did not engage in the fabrication of the solution; a man who stood back somewhat from the system - a designer of problem solutions rather than an implementer. Advantages of such detachment are numerous, and many are obvious (e.g., his objectivity is increased; freed from the details of execution, he can move to another problem). But disadvantages also abound. Perhaps the most critical one is the failure of

DIMENSIONS OF THE TRAINEE ROLE

- I. What will be the relationship of the new man to existing systems and people?
- A. To students
 - B. To teachers
 - 1. language
 - 2. non-language
 - C. To administrators
 - 1. local
 - 2. state
 - 3. federal
 - D. To parents
 - E. To community leaders
 - F. To language and instructional researchers
- II. How should the new man be perceived?
- A. In terms of responsibility and commitment:
 - 1. as a "teacher's man"?
 - 2. as an "administration man"?
 - 3. as a "student's man"?
 - 4. as a "free agent" (with prime loyalty, perhaps to a research center)?
 - 5. as a "university type"?
 - B. In terms of professional emphasis:
 - 1. as basically a language man with a specialty in instruction?
 - 2. as basically an instructional expert with an emphasis on language learning?
 - 3. as a master teacher who has moved to a higher level of language pedagogy?
- III. Does the new man have permanent and/or temporary attachments? If so, to what agencies and people?
- IV. How should the trainee view instruction, the school and the educational system? Examples:
- A. "The school, and especially the classroom-teacher unit, is the basic component of instruction."
 - B. "Instruction should be carried on by systems additional to, or even instead of, the traditional school-classroom teachers. (For example, commercial establishments or other extra-school systems might do better.)"
 - C. "Education is a continuing lifetime process. The school's importance in the process is much overemphasized; it is archaic"

to confine education to the 'early years.' If it is to be of maximum use to society, the trainee must lead the way to break education out of the red brick mold that now encases it."

NOTE:

The above three views are only a small sample of those that might be proposed. The conferees were simply making the point that the trainee's view of education and the educational system ought to be made explicit.

teachers to develop and maintain suggested innovations where no continuing support for the effort is available. Our own extensive experiences at the University, as well as examples drawn from the public school system, support such a statement.²

Unlike the "consultant," an "associate" might offer advice to the teacher, but, more importantly, he would engage in the detailed planning and implementation of the proposed change. He would work side-by-side with the teacher, from the originating of the explicit problem statement, through the devising of a solution, to the evaluation of the success of that solution. It probably is clear from what has been said previously that the AST staff opted for this latter trainee role.

A review of a point made earlier is relevant here. The contrast between behavioral modifier and instructional designer has been made. As the definition of trainee role became more specific, that contrast reappeared. The issue took the following form and was discussed basically and candidly: Is the trainee primarily committed to maintaining the present system? If he is a conservative, then the changes that he proposes will be designed to shore up, smooth over, and generally make more appealing to all concerned the existing teacher-classroom system of language learning. It follows that a good part of such a man's job would involve dealing with "behavior problems." As long as his commitment is to maintaining the classroom and supporting the teacher, he will be concerned with a major problem of that system: discipline. Therefore we would expect a heavy emphasis in his training on techniques of behavioral modification.

If, on the other hand, the trainee is viewed as free to expand the present instructional system or even to help construct alternate

2. See, for example, Geis, G. L., "Faculty Workshop in Programmed Instruction," Programmed Instruction, Feb. 1966, Vol. V, No. 5.

systems, then his skills would include such areas as systems analysis, the design of self-instructional materials and computer-assisted instruction.

While the dichotomy presented here is extreme and a position on one side was not taken, the AST staff inclined toward the latter role, with the trainee seen as taking part in changing the system as well as improving components of the existing system. This view agrees with an emerging overall motto which became a guide and criterion as work progressed. The trainee's primary commitment is to the student; his job is to improve the second language skills of that student. It follows, of course, that the degree of commitment to an existing system will be directly proportional to the system's effectiveness in teaching second language behaviors.

Another knotty problem providing continued discussion throughout the conference and thereafter concerned the content expert-instruction expert dichotomy.

Since most of the AST staff and conference participants were behavioral scientists, it was not surprising that the emphasis was on designing a course for developing an instructional expert. But the skill of the trainee in languages and classroom teaching repeatedly came up in discussions of both candidate selection and training. The language experts insisted that competence in these areas was essential for a successfully operating trainee. Some of the participants, skilled in instructional analysis and design, tended to agree that language skill would be of use in (a) analyzing instructional problems in language learning; (b) designing successful solutions, especially if the designs involved generating materials; (c) establishing rapport with and communicating with the language teacher; and (d) representing his efforts to the community of language learning experts (e.g., at conferences).

Opponents of this view argued just as vigorously, invoking such points as these: (a) The trainee must at all costs avoid threatening the teacher. Therefore his skills should minimally overlap those perceived by the teacher as her own primary skills. (b) In order for true cooperation and reciprocity to come about, the trainee and the teacher must each contribute skills that the other lacks. (c) The experience of the instructional designer indicates that the more naive he is, the more convincingly he can ask basic questions and the more likely he is to propose unique solutions. (d) It is vital that the trainee not be perceived of as another teacher. If he is, he is in danger of being assigned teaching duties. (e) If he is to represent a model figure whose skills are generalizable to other content areas in the school, the trainee, himself, should not represent a particular academic discipline in the school.

Perhaps the space devoted to these latter arguments and their enthusiastic presentation indicates that they were convincing to the AST staff.

While it was recognized that the trainees might purposely and necessarily be drawn from the population of language teachers, the staff concurred that language skill and classroom teaching skill should not be a prerequisite to candidacy. Nor should training in languages or linguistics be included in our program. Nor should the trainee represent himself to the teacher or to the school as expert in these areas.

Such a position may seem unusual if not bizarre to those who have never worked as part of, or at least viewed the operation of, a team involving an instructional expert and a content expert. Yet those who have done so (for example, professional designers of programmed material) repeatedly have experienced success in developing good instructional materials and good working relationships with the content expert despite minimal knowledge of the content area.

The AST staff has continued these discussions with language teachers and language experts. It remains firm in its conviction that the fewer skills the trainee has in common with the teacher (at least overtly and obviously in common), the more likely will be the probability of successful, continued cooperation.

Team Approach

Since so many divergent roles for the trainee were suggested (and several presented in much more detail than is indicated here), it is natural that some of the conferees suggested that the job required a team rather than a single man. Some of the simpler teams proposed consisted merely of experts in each of the several skills mentioned above. Other suggestions involved a team with some members in and some outside of the school. This "support team" concept is elaborated in a slightly different context in the next section, under the title Centers.

A simple but possibly powerful team was proposed by one conferee (FSK). Under this plan, our trainee would enter the school system as advisor, consultant and trainer. Upon finding a likely, enthusiastic candidate on the teaching staff, he would devote most of his time to imparting his skills to this "educational aide." The chosen teacher would enjoy an increase in both prestige and skill through this training program. Our goal in promoting home-grown innovation would be advanced by having a native as chief farmer. Our FLICS trainee would then move his efforts to another school and develop another aide, again one chosen primarily through self-selection. While continuing this procedure of generating local innovators, the FLICS trainee would remain a consultant and advisor to his former students, his alumni aides. Termed - only somewhat facetiously - the "Johnny Appleseed Plan," this proposal remains a tempting and active one in our current thinking.

Another intriguing team plan was proposed by two conferees (DB and SKD). They suggested that the entry into the system be planned by a specialist. This explorer or organizational anthropologist would be assigned the task of discovering the functional aspects of the school system. He would determine the group structures, power structures, systems and contingencies of rewards and punishments, problems, constraints, and resources for problem-solution.

Succeeding him would be a pair of specialists: one in evaluation and the other a solution designer. These men would work in the school on the dual tasks of defining instructional objectives in terms of quantitative measures and executing or at least designing solutions, often in terms of new materials. Their entrance into and maintenance in the school would be greatly facilitated by the information gathered and suggestions offered by the first team member - the systems analyst.

Centers

One major motivation among conferees for contemplating teams of one sort or another was the recognition of the many skills needed for a successful innovative project. But another and very important point was repeatedly brought up in connection with the team approach: the need to consider the support and maintenance of our trainee once he was in the field.

Our trainee will, it was felt, be useful to the existing system as long as he is not completely a part of it. He cannot innovate if he is wholly committed to the existing system. For this reason he must have alternative sources of support to which he can turn, from which he can receive encouragement, refreshment, and inspiration.

In short, we agreed that the trainee's continued health and support required an environment demanding, and providing for, divided loyalty. In order for the trainee to continue to inject new ideas into

the school, to provide a new perception of old problems, he has to "report to" (be in part under the influence of) another community. This second source of major control should be somewhat academic, prestigious, and research oriented.

Ideally, a variety of Centers should be available to him. Some, resource centers, may support him by providing highly skilled technical aid. For example, if the trainee is engaged with a teacher in designing a series of tests, a nearby Center with an evaluation expert in residence would be an ideal resource.

A second group of Centers would be applied research institutions. Here is a home away from home for the trainee. It is here that he would meet others of his own kind and engage in that exchange of ideas (and even gossip) that characterizes a professional in-group. Here, in short, he would realize that he was a professional--not a basic researcher in education, not a teacher, but one of a new breed of educational engineers. Here, too, he would become involved in rather specialized applied research: elaborating those projects he had begun in his school, following up leads that had been unearthed during his daily routines.

Finally, a Center or group of Centers should be available at which our trainee could conduct basic research, attend advanced seminars, etc. in areas of language learning, behavioral science, linguistics, and allied disciplines.

This cluster of Centers, then, could supply necessary "content" information and aid and also perform the other important function of providing the trainee with sources of reward for behaviors other than those he is rewarded for daily at school.

Such an array of Centers may at first glance seem unfeasible to develop. However, some Centers are already available (e.g. CRLLB,

Michigan-Ohio Regional Educational Laboratory) which, if they are not already so equipped, could be encouraged to become equipped to serve one of the functions described above.

"Center" is perhaps a grandiose term, for some of the functions discussed could be served at least in part by a very small, inexpensive organization. A few offices and a secretary could become an applied center if several trainees independently obtained research grants and agreed to work under one roof. An experimental class or classroom within the school might best serve many of the purposes discussed above. It might be considered an "applied research center." The trainee, in cooperation with the school system, might apply for funds for such an operation.

In some cases, State offices already contain staff members who might serve as consultants on special matters of concern to our trainee.

In addition, new Centers conceivably can be set up, with our trainee's needs acting as a means of coordinating the activities of these otherwise isolated operations.

It is early in the game to propose a grand plan. The project is committed, on this issue as on others, to allowing organizational growth to be dictated by pressures from below or within rather than to the more common strategy of setting up an organization and then searching for its purpose. There is recognition of a specific need for a variety of centers to provide support for our trainees; however, use should be made of existing centers, and the trainees themselves should aid in the evolution of necessary new ones.

Summary of Role and Systems

Given at least a working list of objectives and a general idea of the need for possible systems of support for the trainee, the conference

turned its attention to the problem of specifying the skills needed in order for the trainee to do the job described.

It is worthwhile to summarize here the trainee's role as agreed upon by the AST staff, recognizing that it does not necessarily represent the description proposed or supported by any particular conference participant. Rather it is an amalgam, a synthesis of the conference experts' and the staff's own views.

1. The trainee is to be a change agent in second language instruction. He is devoted primarily to the improvement of the second language proficiency and comprehension of students. Put another way, he is pledged to improving instructional techniques in second language learning. Crucial to this effort are (a) a description of the goals of second language instruction, (b) a battery of evaluation instruments which allow measurement of the success of any techniques, procedure or set of materials in reaching these goals,* (c) a variety of procedures, techniques and materials which may be tried in bridging the gap between desired goals and actual achievements.
2. The trainee, working within the school system as a participating member of the school, is seen as dealing with problems which will, for the most part, be brought to him by the language teacher. Acceptable problems are those which can be shown to be related to the goal of improved second language instruction.
3. The solutions to problems will be worked out jointly with the teacher. Part of the job includes training the teacher in the trainee's own skills: engaging her in the process of analysis, evaluation and innovation.
4. A solution to a problem will always be tentative. It will remain a "proposed solution" until there is empirical evidence that it solves the problem to which it has addressed itself. No solution will be tried on a large scale or disseminated until such proof exists. It follows that the trainee will be skilled in, and will emphasize the role of, evaluation for every innovation--big or small.

*Viewed another way, this battery of measuring instruments is the objective or operational definition of the instructional goals. The measures at least sample all of the behaviors designated as the desired output of second language instruction.

5. He will be affected by two communities: that of the school (especially a sub-set of the school, the language teachers) and that of his professional colleagues (e.g., other trainees and researchers).

6. His major contributions will come about because of his skills in problem explication, evaluation, behavioral analysis, and the design of systems of instruction and behavioral modification. It is important to note that he is not to be trained, or paid, as a teacher, a linguist, or a language expert. His field of expertise is instruction and behavioral modification. The teacher remains the foremost expert in matters of the language content and the problems of teaching. The trainee's role is coordinate, cooperative with and supportive of the teacher.

7. He and the teacher represent the beginning of an instructional team which, it is predicted, will expand to include more specialists and experts. (Indeed, some expansion has already taken place in many schools with additions of curriculum coordinators, special education teachers, audio-visual specialists, etc.)

Skills Catalog

With the objectives, role and supporting systems sketched out, the conference turned its attention to a definition of the trainee in terms of skills. Again, a variety of views was expressed and quite different emphases made. Exhibit 3 is an attempt to present, in an ordered way, the major skills that the conference generally agreed upon as necessary for the trainee if he were to meet the program's objectives (see Exhibit 1).

Materials, Procedures, Techniques for Training

Specific course content was discussed only briefly at the conference. Several of the conferees have since sent us outlines, reading lists, etc. from their own relevant courses. However, some time was spent discussing the kinds of materials and techniques which might be involved in training. While some traditional textual materials might be used, the inclination of the participants and staff was toward simulated experiences, practicums, "laboratory exercises," and the like.

PROPOSED TRAINEE SKILLS

I. Language

The trainee should:

- A. have advanced skills in speaking, reading, writing and understanding English.
- B. have similarly high-level skills in a second language (preferably French, Spanish, German or Russian)*.
- C. be knowledgeable in linguistics, at least at the level of a second-year course in general linguistics.

II. Behavioral modification and instructional design

The trainee should be:

- A. familiar with the basic principles of psychology in the area of the experimental analysis of behavior. He should be competent at the level of the second-year course.
- B. familiar with the principles and literature of behavioral modification, being able to cite examples of principles and techniques drawn from this literature.
- C. able to apply what he knows about basic and applied principles of behavioral modification to typical school problems.
- D. able to determine the relevant variables which may be operating to produce the particular behavioral problem cited in C.
- E. able to propose a feasible solution in terms of the principles of behavioral modification to problems cited in C.
- F. familiar with the major traditional curriculum materials in the language learning area and able to familiarize himself quickly with other available materials.
- G. able to determine the feasibility of a proposed solution in terms of the variables operating in the system in which the problem occurs.
- H. familiar with a variety of observational techniques which allow him to accurately record human behaviors in applied locations.
- I. able to select and use appropriate techniques of evaluation to determine the effectiveness of any solution proposed and put into practice.
- J. able to design and generate sample instructional materials, especially self-instructional materials.
- K. able to communicate successfully to the teacher the solutions which he proposes and to train her in the appropriate techniques necessary to institute the proposed solutions.
- L. able to explicate problems brought to him by means of appropriate probing skills so that the problem becomes amenable to examination and a solution becomes possible.

- M. able to select, on the basis of empirical evaluation (see Evaluation, below), from existing materials those which might prove helpful in solving problems brought to him.
- N. able to define instructional problems in terms of discrepancy between desired and measured attainment of objectives.
- O. able to construct a hierarchy of importance for problems brought to him, basing that hierarchy on such factors as cost, feasibility, importance, number of pupils affected.

III. Evaluation

The trainee should:

- A. be competent to construct model test items for second language performance at the high school level.
- B. be familiar with a variety of evaluative techniques such as questionnaires, work samples, etc.
- C. be skilled in techniques of informal evaluation of student performance in connection with developmental testing of materials and procedures.
- D. be familiar with "work-saving" devices such as machine scoring of tests.
- E. have some (at least minimal) familiarity with statistics in order to understand the appropriate literature in psychology and education and to devise simple statistical treatments for school projects.
- F. be able to assist the teacher in writing her objectives in terms of measurable behaviors, conditions under which the behavior will occur, and performance criteria.
- G. be familiar with existing relevant test materials.

IV. Systems knowledge

The trainee will be:

- A. familiar enough with the formal structure of the school system in the community and the state ("enough" being defined as equivalent to the most knowledgeable teacher in the school).
- B. familiar with the major functional routes of authority, financing, etc. in the school system.
- C. able, given any part of the educational system in which he is working, to describe accurately the role of this part in terms of its effects upon, and how it is affected by, other parts of the system.
- D. familiar with the regular routines of the teacher, demands upon her time, etc.
- E. familiar with the sets of reinforcers, punishers, and their contingencies which are available to and administered by various members of the system.

F. familiar with sources of funding for his work within the system.

V. Research skills

The trainee will be able to:

- A. design and execute projects at a research center, such as CRLLB.
- B. apply research design paradigms appropriately to his work in the school.
- C. devise appropriate visual presentation of behavioral data.
- D. state, or know where to find out, the names of funding sources appropriate for basic and applied problems which come up in his work.

VI. Communication

The trainee will be able to:

- A. explain his work to a variety of audiences: teachers, parents and other members of the community, school administrators, students' representatives of state and federal agencies, professional colleagues.
- B. prepare, and have accepted for publication in the appropriate journals, reports of his research and in-school activities (often to be prepared jointly with a teacher).
- C. prepare "in-house" reports of his activities.
- D. communicate successfully to teachers, summaries of relevant basic and applied research articles.
- E. communicate to teachers, when appropriate, news of innovations and innovative efforts elsewhere.
- F. shift to the appropriate jargon in order to communicate (at least minimally) to any one of the groups he meets with regularly, the problems and activities of the other groups.

VII. Support and accessory skills

The trainee will be:

- A. aware of the literature of second language pedagogy and be able to familiarize himself quickly with specific areas within that literature.
- B. familiar with experts and sources of information, in a variety of relevant areas, to which he may refer others for help.
- C. competent (at least at a minimal level) to repair basic audio-visual apparatus in the school.
- D. familiar with commercial sources of instructional materials.

*As mentioned previously, there was repeated discussion concerning the need for these language skills. The inclusion here indicates the intensity with which a few participants supported the skill, rather than a consensus for its inclusion.

One major suggestion emerged from discussion: that the training involve the school as a site as early as possible. There are a number of reasons for this.

We are attempting to train complex skills which involve decision-making, interpersonal relations, etc. These might possibly be taught in isolation but probably can be trained better, more quickly and less expensively by working at the final site.

Gaining early participation of the school, increasing knowledge of our efforts, engaging interest and cooperation there--all are aims of the project and suggest not only making contact in schools but involving them as contributors to the project. The use of the school as a training site, especially if it involves minimal cost and disruption, is a convenient way to meet some of these aims.

By using the school as one of the training sites, the developers of the courses of instruction can see the immediate effectiveness of what they are teaching. If a training course is completely designed and tested away from the trainee's final location, there is the likelihood of a mismatch between trainee skills and final site needs; even more importantly, the course becomes "locked in." It is difficult and aversive to change it. But by repeatedly using the school as one site, the course can evolve and adjust. If a particular bit of instruction turns out poorly (i.e., is inappropriate or ineffective), it can be revised; a remedy can sometimes be concocted right on the spot.

Furthermore, the feedback from the school, if proper channels of communication are set up, can include the teachers and administrators from the start. These people can make important, valuable suggestions and comments. And we suspect that they will be especially cooperative in doing so if they see immediate effects of those comments, in terms of revision of instruction.

A second major suggestion was that the training be self-instructional as far as possible. A great deal has been said in favor of programmed instruction as an effective teaching method. Those conference participants who were familiar with programmed instruction further endorsed the process of program development as a general procedure for generating sound instructional materials.*

But the most important argument in its favor concerned the continued use of the course we are designing. If training involved a staff of instructors, regular semesters, a center or institute at which instruction took place, then the dissemination of instruction would be limited and costly. The mobility of self-instructional materials allows them to be used almost everywhere. It therefore seemed wise to design materials and exercises that stood apart from the instructional staff developing them. Ideally, then, a school could develop its own trainees by acquiring the course package. Probably, in practice, some sort of guide or consultant-instructor will be needed. But possibly he need be nothing more than an alumnus of the original training course.

Furthermore, if, as envisioned, the trainee would train interested teachers in some of his own skills, packaged self-instructional units would enable him to do so with minimal interference in his other work.

The concept of discrete, small units of self-instruction was appealing, then, on practical grounds, given the constraints and needs of the system, as well as upon the more conventional grounds of its pedagogical effectiveness.

The use of a variety of approaches (i.e., media, kinds of exercises, etc.) can serve to illustrate to the trainee a spectrum of instructional

*See, for example, Taber, J.E., Glaser, R. and Schaefer, H.H., Learning and Programmed Instruction, Addison-Wesley, 1965.

techniques. That is, in the very process of "learning the content" he can see (and will have pointed out) the attempt to use all of the tools available to the instructional designer in producing the desired performances.

Especially with the first group of trainees, the student might well serve as a critic of instructional units. Student feedback is invaluable to the generator of instructional sequences in producing more effective revisions for later students. In the present case, the sharpening of the discriminative, critical skills of the student is one aim of the instruction. Again, the procedure of instruction itself can serve in part as the content of instruction.

It was pointed out by participants that although some materials already exist which are relevant to our training objectives, they are sparse and not always of high quality. Typical materials and exercises which might be used are mentioned later in this report (see Chapter IV).

Participants agreed that the scarcity of materials reflected the lack of an organized technology of behavioral modification and of instructional analysis and design. It was repeatedly emphasized that one extremely useful outcome of this project, as it continues through an operational phase, will be the collection and arrangement of existing relevant materials and the generation of needed materials. The view was that such an organized course would both produce an increased number of specialists and make explicit the gaps or lacunae of this emerging technology (i.e., those areas which call for skilled solutions, but for which we simply do not yet have knowledge to communicate to students).

Spread of Effect

As might be predicted from earlier discussions in this report, the inclination of the AST staff has been to start small and allow what

is established to grow, thereby promoting maximal adaptability to real, external needs and minimal contamination by internal organizational needs.

This bias in part determined the strategy of entering the school system via a rather content-specific innovative aide. Of course, an attractive alternative would involve a trainee or team of trainees who would be available to consult on all matters of instruction in all content areas (to some extent, the curriculum consultant or coordinator already has such a role). Both alternatives were examined in some detail at the conference.

Our trainee is purposely limited. The conferees agreed that while the trainee need not necessarily be skilled in languages, it would be wise at the start to limit his areas of operation. Having proven his success in the knotty area of language learning, it was felt, his skills will be in demand elsewhere in the school and, perhaps, elsewhere in the community where instruction is taking place. It is hoped that the extent of the "spread effect" will be governed in good part by the degree of success the trainee has shown, and that is how it should be. Not being obviously supported by a powerful group or institution, the trainee must depend primarily upon his competence and personal appeal to persuade and encourage others.

Since it is not our intention to have the trainee move to additional content areas (i.e., departments), it is expected that he will serve as a model for other departments. If his work is impressive enough, similarly trained people can be made available to the system for use elsewhere in the school. Conferees repeatedly stated that the training program should be designed to produce trainees useful in any subject matter area in the school in the event that the schools do request additional persons like our trainee.

While it is planned that the trainee limit his major efforts to the language departments, this does not preclude some attention to dissemination within the school and community. The projects which he originates in the language departments can provide ample and dramatic material for discussions of curriculum change, educational technology, etc., with references to particular cases. Such discussions in the school and community could provide fertile ground for further growth.

In Retrospect

It should be obvious from the foregoing pages that, as the preface suggested, stimulation and originality were, indeed, characteristic of the conference. Besides the major objective of the conference--the delineation of guidelines for further planning--there were other specific positive outcomes.

Interactions.--Most of the participants volunteered the observation that the conference had been a unique opportunity for an exchange of views between instructional designer and behavioral modifier. Since the participants were able to live at the conference headquarters, extensive informal discussion occurred in the evenings, allowing unstructured conversations on a great variety of relevant topics.

As well as providing a chance for participants from different institutions to get together, the conference was an opportunity for informal meetings of people from the same institution. It may seem paradoxical, but it is not unusual for conferences and conventions to supply much needed and desired exchanges among a single delegation. (That was a consideration in our attempt to invite at least two participants from each contributing campus.) The Ann Arbor contingent followed the above course. Several different campus centers were represented and, while the work is similar and problems overlap, too few opportunities are presented during the year to allow adequate briefing.

Similarly, the many members of the FLICS staff as well as some state language representatives had a chance to interact not only with the out-of-town participants but, importantly, with the AST staff with whom they would be in contact in the coming year. The conference also served as an orientation to our approach and strategy for the other FLICS directors.

Finally, on this point of interaction, the conference served as a needed unifying stimulus for the AST staff. It gave the staff a task and immediate purpose early in the planning year.

Information.--The report, so far, must have demonstrated the wealth of information that has come out of the conference. Problem areas were enumerated and described. The broad spectrum of interests that the list of participants implies guaranteed that almost all relevant problems would be raised, discussed from various points of view and assigned different relative importance by different participants.

Solutions and strategies were proposed in connection with many of the problems. Again, at each session several proposals might be advanced and the merits and drawbacks of each discussed. These discussions, especially when an attempt was made either to produce specific recommendations of an almost technical nature or to produce major generalizations or principles, repeatedly demonstrated what had been suspected: the technology of instructional design and behavioral modification is as yet fairly unsophisticated--a growing, noisy, healthy, strong youngster, but still a youngster. Rather than being discouraged by this confirmation of our suspicions, the conferees agreed that the planning of the project and the conference itself were activities typical of those that are essential to the maturation of that technology.

Contacts.--Although some of the participants were known by the AST staff, many were not. Since the staff looked forward to requesting

their help in the future, the conference was planned, in part, as a prolonged chance for participants and staff to get to know each other. It has been easy to continue discussions started at the conference and to call upon particular participants as consultants. The "return" on such consultations should be greater than usually is the case, since future consultants have, via the conference, already become acquainted with the project's aims and problems.

Finally, AST staff contact with the graduate student observers and the students' contact with the participants should be mentioned. These students represent the up-and-coming technologists in the area, and their attendance at the conference hopefully enhanced their education and professional skills. Less altruistically, since we knew all too well of the shortage of personnel for the jobs to be filled on this and similar projects, we thought, for now and in the future, it was to our mutual advantage to get to know one another.

Chapter III

CONTRASTS WITH EXISTING PERSONNEL IN THE SYSTEM

A review of the working papers and discussions of the Haven Hill conference provided a rough sketch of the trainee's role--some details were filled in, many were missing. It was nevertheless possible soon after the meetings to begin contrasting the emerging role of the AST trainee with existing roles in the school system, in order to make explicit the skills of the trainee which overlapped those of present school personnel. Such a contrast would, of course, help those who would be designing the training curriculum. But, importantly, since brief descriptions of the trainee might be perceived by those in the school system as seriously overlapping existing personnel, points of difference as well as similarities needed to be spelled out early in planning.

Information for such a contrastive set of descriptions was gathered in a number of ways. Interviews with teachers and with members of the FLICS staff (several of whom had had experience in the jobs being studied), and discussions with the Detroit school psychologists and Ann Arbor school personnel, provided valuable information. A review of the literature provided additional facts. Finally, Dr. Louis Heger, professor of Elementary Education at Drake University, was consulted for verification and for general comments. (Dr. Heger has recently been active in developing a graduate program for training curriculum coordinators. Although the content area was not the one with which FLICS projects are concerned, Dr. Heger's extensive experience in examining roles similar to the one he was designing proved most helpful to the staff.)

Eight existing roles in the school were selected for contrastive analysis: 1) School Counselor; 2) Social Worker; 3) School Psychologist;

4) Curriculum Coordinator or Assistant Superintendent for Instruction; 5) Foreign Language Coordinator; 6) Foreign Language Department Chairman; 7) Teacher Consultant; and 8) Foreign Language (Second Language) Teacher.

There are two approaches to defining a role. The first focuses on the formal goals of the role, i.e., the intent of a serious performer. The second relies on the observation of difference between the formal and the functional descriptions of one role. Our sources of information have been of both kinds. We do not intend to criticize present school personnel by pointing to differences between intended and actual activities. It is clear that the constraints of actual school situations prevent many intentions from becoming actual performances. We expect that some of our own intended goals will encounter obstacles, but we are trying to anticipate these by this comparison activity. The following brief descriptions of the first seven types of school personnel are the result of attempting to describe actual performance on the job. They represent only a precis of the rather extensive documentation now available to the AST staff. The interviews were sometimes a step removed from the person whose role was being discussed and did not include direct observation. Our questions asked for descriptions of an average day, examples of products resulting from job performance, rates and location of teacher contacts, sources of decisions about hiring, firing and expenditures, and similar matter-of-fact information open to little speculative interpretation.

Counselors.--These are advisors in Junior High and High Schools. They help students choose subjects for next term and they dispense information about college. They give vocational tests and advice.

Social Worker.--In Detroit and Lansing, the school social worker visits the homes of students referred to the psychologist. The social

worker uses the report of the psychologist as a guide to some therapy and leads the family to resources such as public welfare and specialized agencies for retardation or emotional problems. The focus is on the family and away from the classroom.

School Psychologist.--In Detroit and Lansing, the school psychologist has a very limited role. He does not supervise other personnel in the school. He does not work in a classroom. He does have considerable contact with students and teachers. Teachers, especially, come to him to talk about problem children. Most often, the teacher wants a child tested for mental retardation or emotional disturbance. The psychologist is a test-giver for the most part. These are standard tests (including the W.I.S.C. and Stanford-Binet) which he never adds to or modifies. After administering the test, the psychologist writes a report summarizing the results and making a recommendation. Recommendations are generally limited to three categories determined by his superiors: the child can remain in the classroom; the child should be moved to a special class for the retarded or emotionally disturbed; or the child should get help outside the school such as institutionalization or therapy.

Assistant Superintendent for Instruction and Curriculum Coordinator.--In those school systems we know of, and according to the literature reviewed, this person is responsible for visiting the classroom once or twice a year to offer advice on instruction. He is responsible for the most general level of administration, short of the Superintendent of the whole system. While ideal definitions of such roles include expertise in problem-solving related to classroom instruction and evaluation of learning, as with our proposed trainee, some significant differences between our trainee and the Curriculum Coordinator are noted: (a) the Curriculum Coordinator engages in evaluation of

teachers for the purpose of hiring, firing or merit wage increases; (b) the coordinator is a generalist, being concerned with the whole system; (c) the coordinator is an administrator - he is, as his name implies, responsible for coordination; (d) the coordinator is much more concerned with relating the school's work to the public in order to justify its civic benefits.

Foreign Language Coordinator.--This person usually has responsibility for coordinating language courses and related materials and personnel for a whole school system. Such a coordinator in one medium-size city (population 80,000) said that the main activities were seasonal. Hiring teachers was the spring work, and examining textbooks was the main winter work. Budgeting for all language activities, making speeches to the public and other school systems, and preparing an annual report are regular major activities. The duties which come close to (but do not overlap) those of our trainee include: (a) helping staff members, (b) working with administrative staff, and (c) developing curriculum and instructional policies. In one area, helping in the evaluation of learning, there is some overlap.

The following examples of the problems and concerns of one coordinator elaborate the content of the last four duties:

- How to improve the balance in foreign language offerings by allowing students wider choice among available languages in 7th grade.
- How to improve the articulation of grade levels within a language.
- How to help obtain proper certification of FLES teachers.

The coordinator does try to visit classrooms in each language at least once a year and to answer teacher requests for help. Since only large-school systems have coordinators, this function can have only minimal impact on classroom instruction.

Teacher Consultant.--The teacher consultant about whom information was available (in the same medium-size city mentioned above) is in natural science and mathematics, works and has his office in the central administration building. He responds mainly to phone calls from teachers. About two-thirds of these calls are from new teachers. The calls come with a frequency of 12-20 a month. A frequent request is to locate material for natural science demonstrations (e.g., where can one get material for a barometer?). The teacher consultant may run the errand to pick up material and bring it to the teacher. He often conducts demonstration classes. The teacher consultant often goes to the teacher at school in order (a) to pick up serendipitous information, (b) to build rapport, and (c) to offer help to other teachers. It is important to note that the teacher consultant works almost exclusively with elementary teachers (400 in all) because it is said that the high school teachers feel more expert. In elementary school the teachers are generalists; in high school they are Science Teachers. The most difficult problems often come from a principal. These are problems of a teacher demonstrating a marked deficiency - e.g., not able to control the class.

Language Department Chairman.--This position is defined by location in a school building. The department chairman has a role similar to the language coordinator but is responsible only for the activities in one building. The building principal and the coordinator are above the chairman in the school hierarchy, usually with the direct line of authority running from the principal to the chairman. In the local school system, many of the chairmen carry a half-time teaching load.

Summary of Contrast with Counselor, Social Worker and Psychologist

These persons are similar to our proposed trainee in having some behavioral science training and in being concerned with individual differences among students. They differ importantly in two ways. They

deal primarily with major behavioral and discipline problems that exceed the limits teachers are expected to handle. While our trainee will help with some of these problems, these are only a small part of his concern. Secondly, their contact with teachers does not involve extensive cooperative development of solutions. Our trainee would work out solutions to such problems, as they seem appropriate, in close cooperation with the teacher.

Summary of Contrast with Curriculum Coordinator, Foreign Language Coordinator, Foreign Language Department Chairman, and Teacher Consultant

These persons are similar to each other and to our trainee in their content concern with foreign languages. They differ significantly from him in the following areas. In all of these areas the AST trainee is closer in concept to the teacher than to these non-classroom persons.

-If one were to total up the time in administrative and supervisory activities and compare it with total time in instructional problem analysis and design of solutions, there would be differences among the various positions examined. The ratio for coordinators and department chairman would be largest. The ratio for teacher consultants would be smaller. The ratio for the AST trainee would be smallest. It is planned that he spend almost no time on administrative and supervisory activities.

-The AST trainee is more concerned with specific solutions than with the larger goals of the school or department.

-The present personnel examined are more concerned with language as a content field than as the subject for particular instructional activities. The teacher shares this interest with these persons, but he or she has the major responsibility for teaching students. The AST trainee shares this concern for instruction. In fact, it is his main focus.

-He is much more dependent on the teacher for guidance in choosing goals. The other persons are more responsible for defining educational goals at a general level and communicating these to teachers.

-These persons are usually free to or expected to initiate contacts with the teacher. The AST trainee is conceived of as receiving requests for help, requests initiated by the teacher.

-The distinctions between the trainee and other school personnel include skill areas to be recounted later. Importantly the trainee's method or strategy of change differentiates him from other persons in the system who are concerned with innovation.

We are anxious that the teacher gradually assume at least some of the innovating procedures of the trainee. For example, we would like her to absorb and internalize the problem-solving routine described below. Furthermore, we look to the teacher as the major maintainer of successful innovations. To meet these goals, the behavior of the teacher must to some extent be changed. The array of successful dyadic interactions which are aimed at changing the behavior of one member of the dyad range from consultant-client to therapist-patient pairs. Generally it is held that the production and maintenance of change, as well as the sustaining of a desire for change, require a subtle interaction of the two persons. If the change agent attempts to legislate, to force a change, the effort is likely to fail. Rather, he must guide and encourage change which, when it occurs, seems more like a self-realization than an imposition. Behavioral change, then, is more permanent when "arrived at" than when imposed.

We take this strategy seriously. Our trainee will be guide and helper. He will aid the teacher in arriving at new ways to view the problems, new techniques to solve them and new means of evaluating success. Since other personnel in the system involved in change are often superior in the hierarchy to the teacher, an implicit authoritarianism is hard to avoid when they suggest changes. The AST trainee's role has been designed as different than but equal to the teacher's in order that his suggestions will not be viewed as authoritarian or as impositions. His mode of operation must be cooperation. He will listen more than talk; he will offer suggestions rather than request or require.

Summary of Comparison with Foreign Language Teachers

Although many of the activities of the trainee and the teacher are similar, a clear contrast can be made. One obvious difference between the trainee and the teacher is that the trainee will not teach in the classroom. His work will take place, for the most part, outside the classroom, though cooperatively with the teacher. In our proposed trainee, the teaching function (including the time spent teaching) is to be replaced by an emphasis on those functions that are presently peripheral for the teacher, if they exist at all. Setting goals for and executing classroom instruction remains the teacher's responsibility; the analysis of instructional problems, suggesting alternate means for their solution, and the evaluation of the effectiveness of proposed solutions are the foci for our trainee's efforts.

The superficial difference of the classroom/non-classroom location of activities reflects a more basic distinction. Insofar as the sole skill areas of the trainee are the peripheral ones of the teacher, it is natural to expect that he will be more sophisticated in them than she is. Since they are the core activities for him, he will spend most of his day involved in them. These are areas that are not presently well represented in the school.

His skills are seen not as a random collection but as organized consciously and systematically in a way that suggests to us the appropriateness of a descriptive phrase such as "instructional systems analyst and designer." The demonstrated effectiveness of the systems approach in other areas is beginning to be recognized in education. Bringing a systems approach to the school in order to improve second language instruction is the major function of our trainee.

In general when a problem arises in the classroom, or indeed anywhere in the school, it is not processed systematically through a rational, rigorous routine. That is, the teacher cannot often logically describe, analyze, propose solutions for and implement tentative solutions for classroom learning problems. Most solutions are hastily concocted; often they are directed at non-problems or at least aimed at the outer ring, rather than the center, of the problem target. It seemed to us that the major contribution to instruction that we could make would be to provide the means for the development and application of a systems approach to problem-solving at the local school level.

During the planning year we have spent a great deal of time on a systems analysis of educational problems. Two tangible products have emerged. The first is a series of papers on the topic, a sample of which, involving economically slanted systems analysis of education, may be found in Appendix C. Also emerging from the systems approach is the training curriculum itself, described in elaborate detail in later chapters.

The systems analysis has led to the detailed analysis and explication of an ideal problem-solving routine. As a result, the curriculum is built around the training of this routine. The AST trainee should emerge from the course with the specific skills relevant to

problem-solving but, importantly, he should also be equipped with a regular routine for explicating and solving instructional problems.

The array of specific skills used to process problems according to our scheme is large. Outstanding among these subsets are those skills which may be lumped under the phrase "behavioral modification" (including instructional design). Educational practices have only on occasion had a filial connection with the basic behavioral sciences. In education, little that is basic to the system has changed over the years, while modern psychology has almost burst with new approaches, techniques, principles, etc. In particular, the area of learning has in the past 30 years become a cauldron of ideas, experiments and theories. Recently there has been an emphasis on application of the findings and methods of psychology to training and education. Our trainee will bring into education a knowledge of these new developments. His skills in problem analysis will be paralleled by those in problem solution. An intimate knowledge of the principles and techniques of behavioral modification (especially the emerging technology of instructional design) will enable him not merely to explicate problems but to offer alternative solutions. Bringing up problems can certainly be aversive if such solutions are not available or at least possible.

The curriculum, then, is designed to produce a problem-solver with skills in behavioral modification.

Chapter IV DESIGNING THE CURRICULUM

Overview of Curriculum Design

The temptation, given a general picture of the trainee's role and skills, might be to begin collecting materials and designing exercises. Such an activity seemed premature. Instead, much staff effort and time was devoted first to formulating a clear description of ideal instructional problem-solving, and then to specifying criterial trainee performances for each step in the problem-solving process. Later, from these criterion statements a topical outline of the curriculum was "factored out" and, finally, a course outline, along with a list of sample materials and exercises, was generated.

Several members of the staff had had extensive experience in explicating and proposing solutions for instructional problems originated by teachers. (Some of that experience has been gained from campus workshops in instructional design conducted for University of Michigan faculty members, previously referred to.) Continued contact with teachers in primary and secondary schools during the planning year allowed the staff to adjust and alter their views in light of the existing instructional system. Literature on systems analysis and design as well as on problem-solving was repeatedly consulted.

The Instructional Problem-Solving Process

Bit by bit flow charts were constructed illustrating particular aspects of an ideal instructional problem-solving process. Two staff members (RS and SK) were primarily responsible for the original drafts of each process description. At weekly meetings the new revisions were reviewed by the entire AST staff (sometimes with a consultant present). The comment and criticism at those meetings were noted and further revisions made and presented for review.

As a particular segment of the process was sketched out, it was examined and "tested" by means of role-playing episodes. Thus, one member of the staff would play foreign language teacher and another, AST trainee. (When a flow chart had been repeatedly reviewed and was thought to be adequate, a real foreign language teacher often was used as a consultant in these exercises.) Repeatedly the "teacher" would present sample problems and would attempt to provide challenges, obstacles and criticisms.






In this way, then, each segment of the proposed process underwent numerous simulated tests. And, of course, revisions were made on the basis of the exercises. Finally, a general overview of the process and a number of detailed routines were made explicit and survived repeated review and testing.

A caution should be stressed at this point. We are concerned with all problems of language learning, but many of the large and complex ones cannot feasibly be attacked by one person in one school with the limited resources we expect to be available. Nor are many problems approachable, given our present state of ignorance of basic processes: behavioral and linguistic; much more research must precede an attack on them. We have in mind an attack on many small (and in some cases, unique) problems. Though the problem-solving model can be applied to large-scale projects, it is conceived of in the context of our program as being applied to those which promise solution given a comparatively small investment of time and personnel.

We will present the problem-solving process in two different ways. The first is a prose summary of the process, without much detail (Exhibit 4). The second is a graphic presentation in the form of a flow chart (Figure 1). This flow chart and the accompanying notes describe the problem-solving process in considerable detail. The flow charting

method has been used as a convenient way to present visually a large amount of material with easily discriminable indications of temporal ordering and alternate paths. Additional flow charts have been constructed for each of the numbered activities in the routine. These are not included in this report since they are extremely detailed and have been designed primarily for staff use.

The basic symbolic conventions used in the flow chart are these:

-  = after x go on to y
-  = operation performed; processing
-  = predefined process (a separate flow chart provides a detailed description of the process)
-  = requires a yes or no decision
-  = the parallel process concurrent with the problem-solving routine

Major routines are indicated by whole numbers (e.g., 2.0), while sub-routines are indicated by whole numbers plus decimals (e.g., 6.2, 6.3).

Criterion Performance Specifications

The strategy of curriculum development employed in this project has been the reverse of that often used in textbook or course development. It began with a detailed description of the job. At this point, test (or criterion) items were designed. For each activity denoted by a number on the master flow chart (and on the more detailed working flow charts), several problems or test items have been written. These "criterion frames" serve a variety of purposes.

-They are pre-tests. They allow determination of the trainee's entering or prerequisite skills. If the trainee can satisfactorily answer an item, there is no need for him to go through the

AN OVERVIEW OF THE INSTRUCTIONAL PROBLEM-SOLVING PROCESS

Stages in Problem-Solving

1. The teacher brings a problem to the trainee.
2. The problem is transformed into a series of behavioral statements.
3. The problem is assigned a rank on a hierarchy of importance.
4. The existence of the problem is verified.
5. A solution for the problem is designed.
6. The solution, upon approval by the teacher, is specified.
7. The solution is implemented.

AST Trainee Activities

- The trainee continuously provides an atmosphere which encourages trainee/teacher contact.
- The trainee and the teacher cooperatively arrive at an objective statement of the problem. Together they devise a set of criteria which describe successful student performance.
- The trainee considers a variety of weighting factors such as feasibility, cost and impact. He then determines whether or not to tackle the problem at this point.
- The trainee and teacher construct a measuring instrument (e.g., a test). The test is administered to the appropriate population to determine whether or not the problem, as now defined, is a real one.
- The trainee makes an analysis of the problem, attempting to isolate relevant contributing variables. He divides the problem into subtasks. He examines existing student repertoires and the existing instructional system. He designs a trial solution.
- A search is made for existing materials, etc. which might be useful. A search of present teacher practices is made for any applicable materials and practices. Appropriate materials or procedures are selected, or if necessary, new materials or procedures are planned.
- Developmental testing is begun if new materials are to be constructed. Small-scale tryouts are conducted.

Stages in Problem-Solving

8. The efficacy of the trial solution is determined.
9. If successful, the application of the solution is expanded and maintained.

AST Trainee Activities

Pre- and post-testing is used, as well as student interviews, to find out if the solution works. Later, larger tryouts of a "field-test" sort are conducted.

The solution is applied to the whole target population (e.g., the class, the course). The results are disseminated to other interested parties. An appropriate maintenance system is devised and implemented.

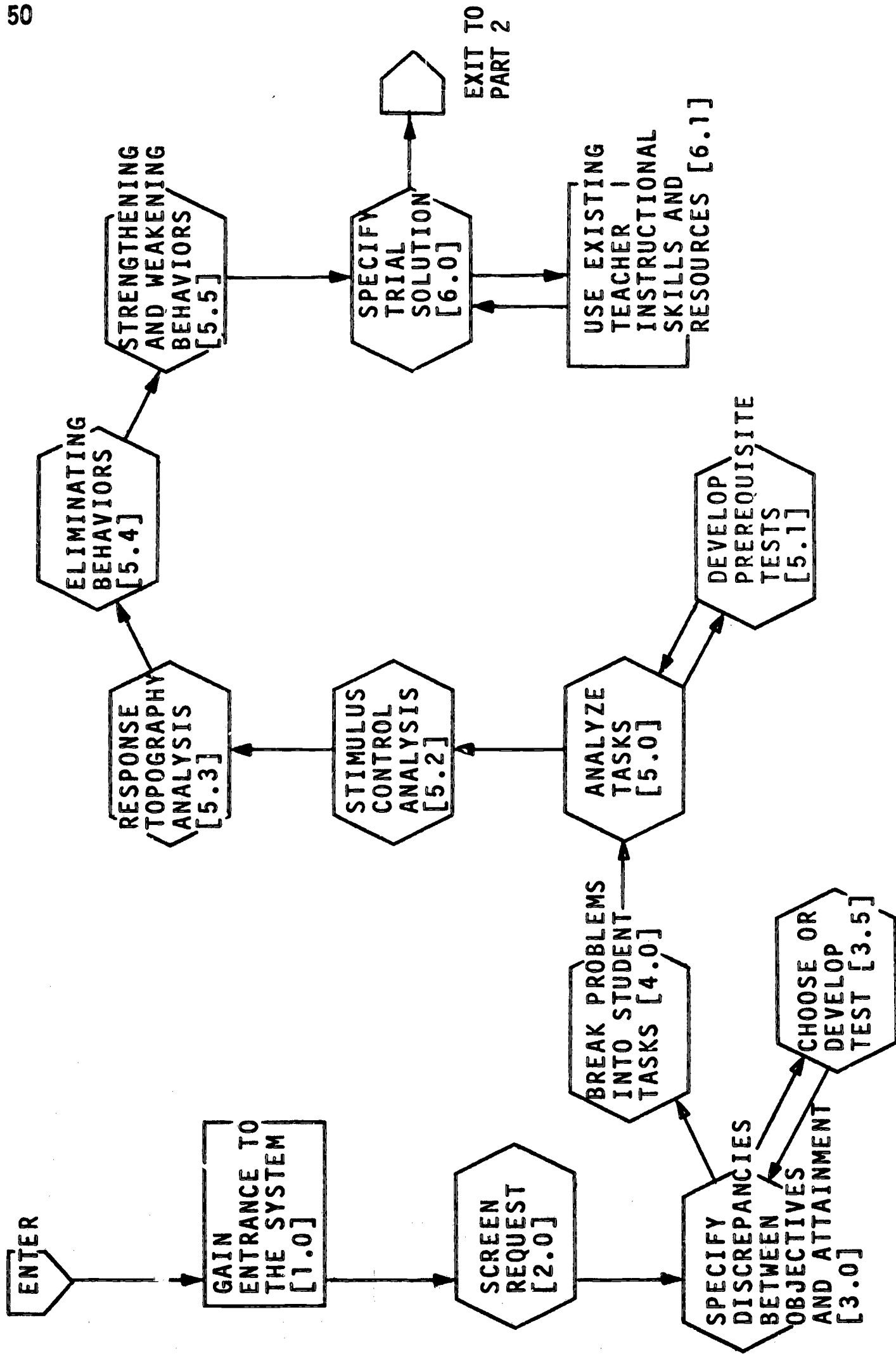


Figure 1. OVERVIEW FLOW CHART, Part 1

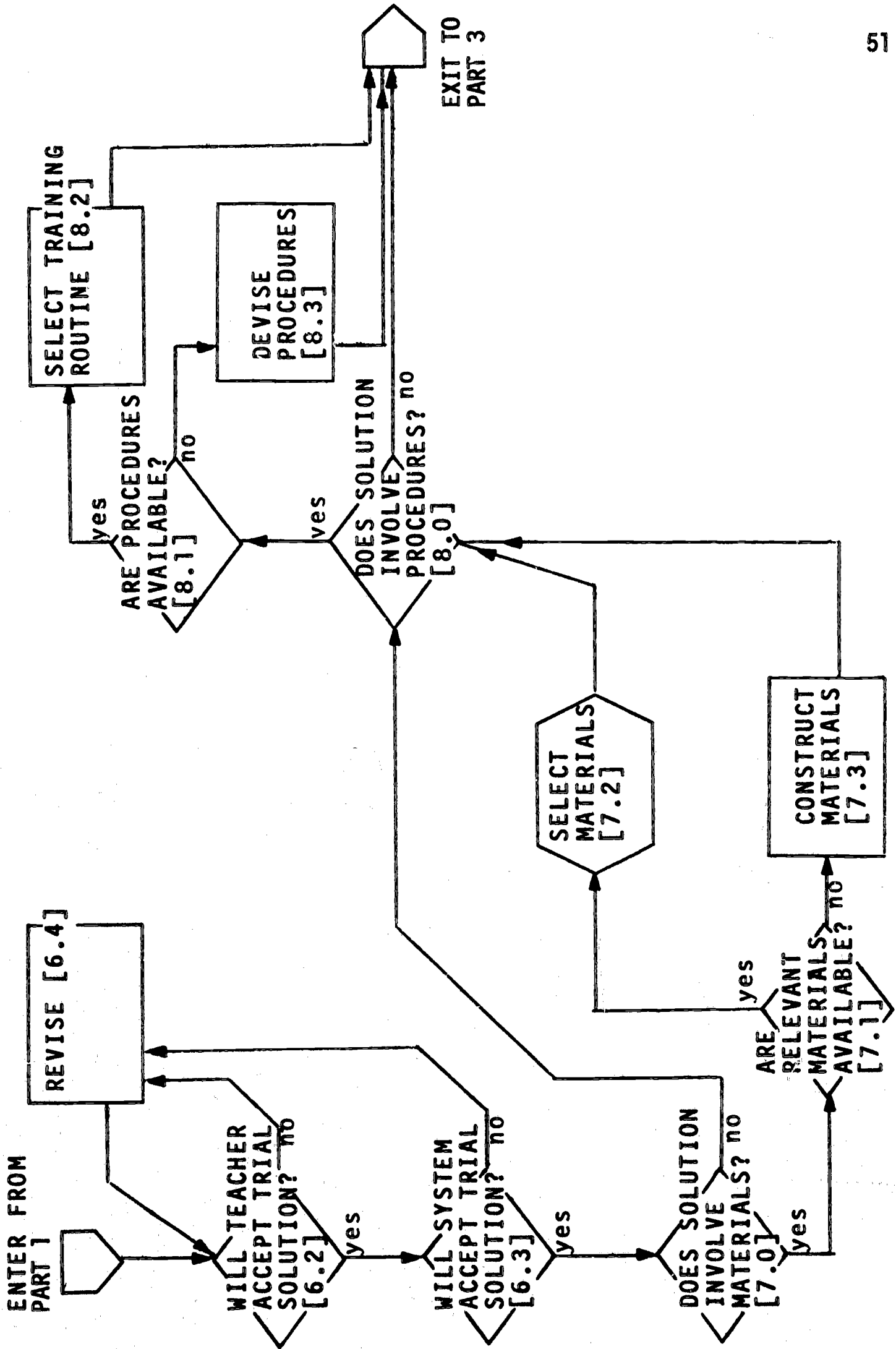


Figure 1, Part 2

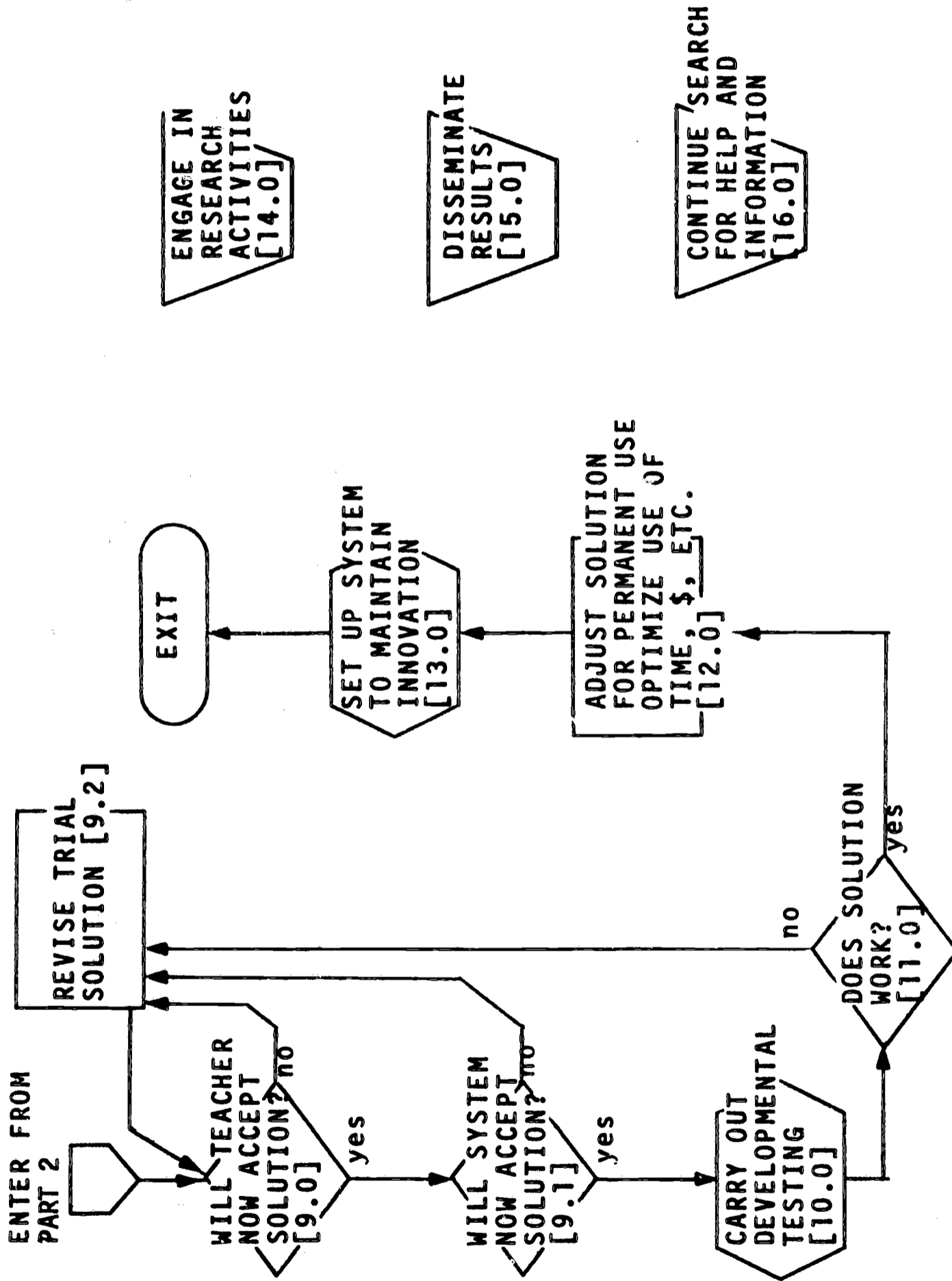


Figure 1, Part 3

NOTES to Figure 1

1.0. Since the trainee will be working over a period of time in intimate contact with the teacher and other members of the school system, it is important that he gain entrance to and secure a good working relationship within the system. Some of the later routines in which he will engage may prove to be at least mildly aversive to the teacher, and therefore he must build up good will within the system.

2.0. Typically a teacher will bring a request to the trainee. The request might involve anything from the specific and immediate (e.g., a request for a bit of information) to the long-term and general (e.g., a request to help improve a course). The first activity of the trainee will be to determine the probability of success in terms of some characteristics of the requester and the system. For example, the trainee would determine whether the requester had direct influence over student foreign language behavior. Thus, he would be less likely to engage in prolonged instructional effort when the request came from a teacher outside the foreign language area, or if the teacher making the request was soon to leave the system. He would determine the probability of success in terms of the teacher's willingness to evaluate the solution that the two of them evolve. If he determined that the request came from a source that was likely to prove cooperative and remain interested for as long as the problem-solving process would take, the trainee would then engage in those activities indicated in 3.0.

3.0. An instructional problem becomes real when it is defined. An objective definition of the problem, in terms of student behavior, precedes any attempt to solve the problem. As obvious as this seems when stated, experience has shown that many solutions are developed for problems that either don't exist or are so ill-defined as to prevent measuring the effectiveness of the solution. In 3.0, then, the problem will be turned into an objective statement. Specifically, a measuring instrument will be selected or devised which allows objective determination of the desired performances. In order to determine whether the problem exists, the measuring instruments will then be applied to the appropriate student population or sample of that population. The results of this "test" will indicate whether the deficiency truly exists. This determination precedes formal acceptance of the problem for further study. Once it has been determined that the objectives as indicated by the measuring instruments are not being met under the present instructional procedures, the trainee and teacher will work together to set more precisely the minimal performance standards acceptable to the teacher. Thus, in 3.0 a statement of objectives will be made explicit and operational, and a measure will be taken of present student attainment vis-a-vis those objectives.

Notes to Figure 1 (continued)

4.0. The next step is further and more precisely to define the performance in terms of tasks. It is crucial to know what parts of the performance the students may already have in their repertoire; teaching them what they already know is, at the least, inefficient. It is also important to know whether a good part of the performance decrement is due to a lack of separate responses in the student repertoires or to an unacceptable sequencing of those bits of behavior when the student performs. Thus, when speaking a second language, many of the sounds or words or phrases may already be in the student's repertoire but are not emitted with the speed and smoothness expected of a speaker. In the routine of 4.0, the performance is broken down into specific tasks preparatory to (a) developing a prerequisite test and (b) performing a more precise analysis of the tasks.

5.1 represents a sub-routine for developing a test which produces a precise determination of the expected entering behaviors of the student at this point in the instructional sequence. The teacher and the trainee will work together to specify what the student is expected to bring to the instructional sequence and to develop a test for these prerequisites. Experience, again, has shown that instruction may fail because of a lack of entering skills of the student or, on the other hand, may be immensely inefficient if it does not take advantage of the skills that the student already has.

5.2 represents the beginning of a short sub-routine in the analysis of the performance expected of the student. Sometimes the student fails to emit the appropriate performance because the conditions of training differ from the conditions prevailing at the time of performance. To put it succinctly: he fails to generalize to new conditions. On the other hand, the student may be making errors of commission due to over-generalization. Conditions which the teacher sees as quite dissimilar may appear as identical to the naive student. In sub-routine 5.2, an analysis is made of those environmental circumstances under which the behavior might be appropriately emitted and under which the behavior would be inappropriately emitted. From this analysis might emerge a rule or appropriate set of conditions for emission.

5.3 continues the analysis, this time concentrating on the formal properties of the behavior in question. An example might be pronunciation of sounds in the second language. Suppose that the student does not have such productions in his repertoire; during this sub-routine, a sequence of successive approximations, beginning with the raw material of the student's repertoire and working toward the target performance, would be devised.

Notes to Figure 1 (continued)

5.4. An analysis would be made of the conditions for eliminating undesirable behaviors (commonly, aversive classroom behaviors). Depending upon the analysis of the situation, techniques such as extinction through removal of reinforcers, physical removal from the problem environment, punishment, or setting up a contingency contract would be advised.

5.5. The analysis would concern behaviors which are to be reduced (not eliminated) or increased in frequency. This sub-routine calls for identification of student reinforcers, setting up reinforcement schedules and developing contingency contracts.

6.0. A trial solution is developed on the basis of the statement of objectives and analysis of tasks previously completed. Even in this rough state a check is made of the acceptability of the trial solution to the teacher and to the rest of the system. It would be wasteful, indeed, to go on into the process of developing materials or procedures if at the outset it can be determined that either the teacher or the system would reject the proposed solution for any of a variety of reasons such as cost and time constraints.

6.1 indicates the process of searching the materials the teacher has already produced before generating a new set.

7.0. This step and the next (8.0) depend on the nature of the trial solution. If materials are to be used, available materials will be considered first. If appropriate materials are not available, the trainee and teacher will engage in the construction of materials.

8.0. If procedures rather than materials are to be devised as part of the solution, available procedures are examined and a training routine, perhaps involving teacher retraining, might be selected. If the procedures are not available, then the trainee and teacher will engage in devising appropriate ones.

9.0. After the procedures or materials have been selected or devised, a check is again made of the acceptability of the solution to both the teacher and the system. If both the system and the teacher indicate their continued acceptance of this more detailed solution, developmental testing is begun.

10.0. The procedures or materials are tried out, probably on a very few students, and revised until either the solution is working satisfactorily or the indication is that the solution simply cannot work. If the

Notes to Figure 1 (continued)

solution is found to be unfeasible or unworkable (11.0), the trainee retraces his steps and reviews the original problem and test material.

12.0 and 13.0. If the solution does prove to be workable, it is adjusted for more permanent and efficient use in the school. At this point, information concerning the solution is disseminated in order to increase the impact of the particular teacher-trainee innovation.

14.0. Part of the information "input" to the trainee is contact with, and participation in, related research. The trainee periodically will be attached to a research center and will engage in more basic research than he is able to do in his school-based job. The need for this refreshment and stimulation is discussed elsewhere in terms not only of the skills and knowledge acquired via such activities but also in terms of the benefits resulting from the attachment to communities other than the school.

16.0 indicates another additional activity. The trainee will continue to engage in searches for information which may prove of aid to the foreign language teacher. Thus, he will familiarize himself with the relevant literature, be aware of sources and references, be acquainted with educational research and development personnel, etc.

Activities in addition to problem-solving are indicated in 15.0 and 16.0. The trainee will disseminate to other teachers, schools and organizations (e.g., research centers) the results of his efforts. It is expected that he will not only report successful innovations but also describe the procedures involved in those efforts, the failures he has experienced and reasons for them, and the materials which he and the teacher have produced.

It should be clear that all of these routines would not be gone through by the trainee and teacher for each problem. Yet, especially for a complex instructional problem, it is likely that this description is close to the appropriate activities.

instructional materials designed to teach the skills or knowledge the item samples. If, on the other hand, the trainee fails on the pre-test, it is clear that instruction is needed.

-They serve as guides to instructional design and development. The instructional units (and coordinated materials such as the checklists described in Chapter V) will be aimed at producing the behaviors sampled by the criterion frames. Thus, the targets of instruction have been devised. The development of instruction involves aiming at those targets with repeated correction and adjustment until a hit is scored.

-They serve as measures of effectiveness of instruction. Alternate forms of the same test item, given after instruction, are a measure of performance change due to instruction (i.e. gain scores). More detailed error analysis may provide the basis for revision of defective instruction.

-They serve as exit visas. The trainee continues in the instructional cycle until he demonstrates his proficiency in a particular unit. The minimal acceptable performance is stated by the answers to the criterion frames. A failure of the instructional sequence to produce that performance leads to revision of instruction, as mentioned above, and also to re-instruction of the trainee.

-They serve as convenient and specific descriptions of curriculum goals. A precise and objective definition of the curriculum is useful when describing the project and its goals to others. Engaging the interest and support of teachers, school personnel and possible trainees may be made easier by such a behavioral catalog. The "consumers" of our trainees should, and will, be able to know what they might expect from our trainees and our training course after consulting the catalog of criterion frames.

The sample test items presented below will illustrate the point that we are using the word "test" in the broadest sense. An item may require a written answer, a literature search, a simulated interview, even a practicum in the school situation. Some constraints have to be exercised, of course, but wherever possible a real situation is simulated and a real response required. While paper and pencil tests of book-learned knowledge are easier to write, easier to grade and, indeed, easier to teach toward, they seem inappropriate for most of the goals of this training program.

The criterion frames (as well as the instructional materials) utilize hundreds of realistic problems and examples. A great deal of staff time has been involved in collecting a library of examples. Teachers have been interviewed; the staff has role-played situations; the foreign language pedagogy literature has been searched. The problem and example file is not complete. [The first trainee (A.A.) is contributing many examples of problem situations for use later in developing instructional units.] However, the major activities and problem areas have been covered by at least a few case histories, problems or examples. Some typical criterion frames are presented in Exhibit 5.

Topical Outline

Criterion frames and the flow chart provide a description of the goals of the training program. A different descriptive approach is through a more conventional topical outline. The topical descriptions below do not represent discrete and successive segments of training as they would in a more traditional course outline. Rather, each is a collective summary of related information which will be taught within the context of the problem-solving routine. Activities denoted on the flow chart were examined with an eye toward extracting from each the component skills and knowledge. The resultant clusters were identified as topics and are briefly described below.

SAMPLE CRITERION QUESTIONS

[2.0]*

A teacher comes to your office and says: "Dr. Nelson (the assistant superintendent for instruction) asked me to see you. I don't know whether you can help me or not. I would rather talk to you, however, than to the other teachers about this. You see, I never had any training in teaching the audio-lingual method. I try to follow the manual for teachers, but, frankly, the kids are bored; they don't like to repeat so much."

You know this teacher did not come voluntarily. Do you need any other information before making a phase-out/retain decision? If so, what? If not, do you phase out?

Answer:

You need to know if the teacher will work actively with you and evaluate the change on the basis of student performance.

[3.0]

Of the following teacher-generated objectives, check those which are impossible to work with considering their present wording. (Remember these are "first-tries.") For each of the remaining instructional objectives, construct a sub-objective phrased in specific measurable style.

1. Develop effective ways of thinking.
2. Acquire important information, ideas, and principles.
3. Develop effective work habits and skills.
4. Develop increased sensitivity to social problems and esthetic experiences.
5. Develop appreciation of literature, art and music.
6. Develop an increasing range of worthwhile and mature interests.
7. Develop increased personal-social adjustment.
8. Understand a spoken foreign language.
9. Speak a foreign language well enough to communicate with a native.
10. Read and understand a foreign language without English translation.
11. Write in the foreign language.
12. Understand basic language concepts of structure and function.
13. Know some basic contemporary values and behavior patterns of native speakers.
14. Know significant features of the country.
15. Know significant literary and cultural events of the past.

Answer:

Objectives which are highly ambiguous are #1, 2, 4, 6 and 7. The others show a chance of being turned into behaviorally specified objectives. Check each sub-objective for:

1. relation to objective, i.e. would the performance lead to or be a part of the general objective?
2. a measurable action required of the student.
3. conditions under which the action is to occur.
4. minimum acceptable standards of performance.

[3.5] and [4.0]

You have been talking to a teacher about a discipline problem. Her first year (10th grade) Spanish class contains "four or five unmotivated goof-offs" who are making trouble. Miss Stimson (the teacher) describes the culprits as giggling while she is attempting to run the class, coming to class with chewing gum in their mouths, not doing homework, making deliberate errors during oral exercises, and doing anything in order to make their friends laugh.

Miss Stimson would like to have those students sit quietly in class and speak only when called upon. She would also like to have them voluntarily obey her rules about gum and homework and make a conscientious effort to learn Spanish.

1. Suggest a feasible plan for the entire pre-testing process. Describe the behaviors which the test would measure.
2. We will assume that all of the above behaviors show up on the pre-test. What would you do before analyzing the problem into student subtasks?

Answers:

1. Pre-testing should include some type of tabulation of the problem behaviors: gum chewing, no homework, deliberate errors, giggling and miscellaneous goofing off. Include: the method of observation, who is to perform it, how often samples will be taken. You should not do the recording (it would probably change the students' behavior to have you in the class). The method you devise for the teacher should be simple enough that the teacher can still run the class in her normal manner. All the steps in 1 through 11 in Checklist 2.5** should be documented.

2. Before analyzing the problem, you should:
 - a) assist in setting up minimum performance standards;
 - b) help select a high-priority problem.

[7.2]

A published test which you are considering reports a validity coefficient of .76 in its manual. List the questions which you need to answer before you can use the validity figure in a decision on using the test. (Don't worry about reliability at this point.)

Answer:

1. What is the performance with which the test scores have been correlated?
2. What population was tested?
3. What are the instructional objectives which the test is to measure?
4. What is the population which will use the test?

[7.2]

You and the school's German teacher have decided to use a test of second-year students' ability to pronounce the German language. You are especially interested in measuring accuracy in difficult intonations.

1. Using the Sixth Mental Measurements Yearbook, list tests which would be appropriate.
2. You need to test 87 students. Your testing budget for German limits the amount you can spend in this instance to \$58. List tests which can still be used (if any). Beside any tests remaining, list questions which you would need to answer before deciding whether the test could be used.

Answer:

1. MLA Speaking test - German, in the Yearbook.
2. MLA Test - is a tape recorder available?

*The bracketed numbers refer to segments of the flow chart in Figure 1.

**Checklists are discussed in Chapter V.

Problem Explication, Analysis and Selection.--This topic includes the skills needed for eliciting problems from the teacher, the development of criteria for judging a particular problem as acceptable for further treatment, and the means for refining a "raw" problem statement into a precise behavioral statement of objectives. The trainee will learn and practice appropriate interviewing techniques. He will, in addition, have repeated exercises which require him to turn non-behavioral objectives into behavioral ones.

Evaluation.--This topic includes the selection and designing of a variety of tests and the determination of their validity and reliability. The development of simulations and practicums, as well as the more common paper-and-pencil variety of tests, will be covered. Stress will be placed on the intimate relationship between testing and instructional development, and on using tests to diagnose performance before instruction as well as to measure achievement after instruction. Sources of available tests will be examined. Exercises will include the administration of tests and the analysis of test results.

Behavioral Modification.--This topic covers comparatively recent work on the application of psychological principles, including the collections of papers by Ullman and Krasner,¹ recent work in classroom

1. See, for example:

Krasner, L. and Ullman, L.P., editors, Research in Behavior Modification, Holt, Rinehart and Winston, Inc., 1965.

Ullman, L.P., and Krasner, L., Case Studies in Behavior Modification, Holt, Rinehart and Winston, Inc., 1965.

management by Donald E. P. Smith² and Lloyd Homme³. The trainee will become familiar with the basic principles of behavioral analysis and control; however, practical applications will be stressed.

Instructional Design and Development.--This topic includes the selection and generation of instructional materials and procedures. During his training, the trainee will engage in the iterative developmental process of design--produce, test, revise--which characterizes the development of valid instructional materials. The trainee will produce typical instructional materials as well as familiarize himself with sources of existing materials.

Systems Analysis and Design.--Methods of doing a formal and functional analysis of instructional systems, regardless of their size, will be examined. Literature on innovation and systems analysis will constitute the basic readings. Exercises will include the analysis of a variety of instructional systems.

Search.--This topic includes an introduction to, and practice in the utilization of, a great variety of sources relevant to the trainee's work. Library searches on a variety of topics will be made

2. Smith, D.E.P., and Kelingos, J.M., Manual: A Program for Teachers (Michigan Successive Discrimination Language Program), 1964, Ann Arbor Publishers; especially pps. 7-33.

3. Homme, L.E., C. de Baca, P., Devine, J.V., Steinhorst, R., and Rickert, E.J., "Use of the Premack principle in controlling the behavior of nursery school children," J. Exp. Anal. Behav., 1963, 6, p. 544.

Addison, D.E., and Homme, L.E., "The reinforcing event menu," NSPI Journal, 1966, V, 1, pp. 8-9.

by the trainee. He will also become familiar with institutions and people who may at times serve as useful resources to him or to the school. Emphasis will be placed on choosing the appropriate source for the answer to a particular question, the evaluation of the answer, and methods of confirming that evaluation.

Research.--This topic covers basic research skills including: formulating experimental problems, designing the experiment, conducting the experiment, and reporting the experimental results. The specific content to be stressed will be human learning and, more particularly, instructional design and development. The trainee will engage in designing experiments. He will also have at least one opportunity to conduct a small research project while in training.

Dissemination.--Training will be given in the preparation of a variety of dissemination materials. The trainee will write sample reports and memos and will have experiences in speaking to various groups.

Chapter V COURSE OUTLINE

Strategy

There are numerous strategies of curriculum organization. The general approach chosen for the AST Program is similar to that described by Bruner as a spiraling curriculum.¹ According to this instructional method, the trainee is assigned problem situations, the solution of which requires the correct application of the entire AST problem-solving strategy. The difficulty level and the complexity of the problem situations will be gradually increased as the training progresses. Thus, the trainee, during the course of his training, will solve a great many school problems varying widely along a dimension of solution difficulty. This approach also allows the trainee to practice problem-solving tasks according to the sequence of performance in the school. The alternative, a more typical approach, would artificially limit the trainee to performing a particular type of skill in a criterion situation.

Most training exercises will require the student to run through the problem-solving routines illustrated by the flow chart in the previous chapter. The routine should, in this way, become internalized and almost automatic by the end of training. Thus the "content" (e.g., testing skills, instructional design) is always being taught in the context of the problem-solving process.

The degree of problem-situation difficulty can be manipulated by two different methods. One possibility is to provide numerous cues or parts of solutions for complex problems in the initial training. As

1. Bruner, J.S., Toward a Theory of Instruction, Cambridge, Mass.: Belknap, 1966.

each new problem is presented to the trainee, fewer of these solution cues are provided. For example, an early problem for a trainee might provide the transcript of a teacher-trainee interview in which the teacher states that she will work actively toward the solution of the problem and that she will evaluate the solution against student foreign language performance. The trainee would be asked to describe the questions he still needs to answer in order to make a retain versus phase-out decision. A similar problem later in the training sequence would only provide an interview transcript in which the teacher does not make any statements relevant to a retain/phase-out decision. The trainee now would be required to request more information, in effect demonstrating mastery of more of the components of a successful solution. The final problems would be close simulations of actual school settings in which there is a problem which the trainee must solve and for which information and answers must be sought rather than being supplied as part of the exercise. (See below: Practicums.)

A second method of increasing the problem difficulty during the course of training is to increase the complexity of the presented problems. The trainee would first be given problems which, although requiring the application of all steps in the problem-solving strategy, would be small-scale, clearly stated difficulties requiring minimal trainee assistance. Successive problems would contain increasing numbers of variables which must be taken into consideration and manipulated in order to reach a solution.

Both of these methods appear to be feasible means of implementing a spiraling curriculum for the AST Program. At the present, we have avoided making an exclusive commitment to either strategy. In practice, both may be used. At any rate, the final strategy decisions are being delayed until we collect a more complete set of criterion problems.

Most of the criterion frames described in the previous chapter are approximations of those needed in either of these curriculum organization strategies. The criterion frames are now in the process of being expanded so that they require an application of all, or large parts, of the problem-solving procedures.

A trainee is faced first with a criterion frame, the answer to which involves all or part of the problem-solving sequence. If he cannot respond correctly, he is directed to appropriate sources of information and training. In this way, trainees will be asked to study only those materials which are relevant to their own particular areas of skill deficiency. After the trainee has finished a set of instructional materials, he returns to similar problem situations. If he still cannot perform at the desired skill level, he is directed to additional instruction. Eventually, the trainee must demonstrate successful performance on every difficulty level of instructional problem-solving.

Materials

There are several criteria being employed in the selection of materials. The first and most important question to ask, of course, is: Do the materials appear to teach the skills identified in the task analysis of the problem-solving strategy? In addition, the prerequisite skills needed for the successful study of such materials should be congruent with the anticipated initial trainee skills. The materials must be available for the program's use in the near future and must meet several types of economic criteria. The costs must be justifiable in terms of expected value to the trainee and in terms of the AST budget. The material must also be economically justifiable in terms of required trainee time, required supervisory time, and necessary hardware such as projectors, teaching machines, tape recorders, computer terminals, etc.

Other than the above criteria, no constraints have been placed upon the type of instructional materials which will be available for the use of the trainees. Material which has already been collected includes programmed instructional texts,² programmed audio and visual aids,³ traditional texts,⁴ collections of readings,⁵ as well as individual papers, charts, and pamphlets. In addition, the staff is beginning to prepare short units of instructional materials for inclusion in the complete course offering.

Checklists

The AST staff has prepared a series of trainee checklists which describes the entire problem-solving strategy. These checklists are based upon the detailed set of flow charts which graphically depict this strategy. The checklists serve multiple functions and are to be used during and after training.

Each checklist is designed primarily as an on-the-job performance aid. We envision the trainee using the checklist as a means of determining the next step in the solution of a problem, as a help in identifying criteria for a particular decision, as a source for checking the correctness of actions, and as a means of keeping a record of each project he becomes involved in. In order to make a valid training situation, the checklists will also be used by the trainees during training. An additional function of the checklists includes use by AST staff when

2. For example, Mager, R.F., Preparing Instructional Objectives, Palo Alto: Fearon, 1962.

3. For example, Popham, W.J., Validated Instructional Materials for the Continuing Education of Teachers, South West Regional Laboratory, 1966.

4. For example, Keller, F.S., and Schoenfeld, W.N., Principles of Psychology, New York: Appleton-Century-Crofts, Inc., 1950.

5. Ullman and Krasner, op. cit.

evaluating trainee performance and when selecting relevant materials for trainee instruction.

Two of the fifteen checklists are presented in Exhibit 6. Each represents a small portion of the problem-solving process. The numbers are keyed to the appropriate sections of the flow chart in Chapter IV.

Practicums

It is assumed that only a part of the training will take place at FLICS. Whenever possible, the trainee will go through an exercise in a school. These practicums will be gradually developed. At first, the trainee will be presented with "paper-and-pencil simulations," such as the criterion frames in this report. Later, teachers coached to present certain problems will be brought to our offices and present exercises to the trainee. Then, the exercises will be set up in cooperating schools. The first few will be short and well structured. Later ones will require a longer residence in the school, less information will be given at the outset, etc. In this way we hope to "fade out" the original training site as well as the supports it offered and "fade in" the real work-world. The technique should enable us to avoid the more common pitfalls associated with the case-history method, e.g., a lack of realistic distractions, a failure to require the student to search out some of the necessary information. The practicums also will serve a dissemination function, and they will be a means of early contact with the schools, a point to be elaborated in Chapter X.

A second group of sites for practicum experience is the other FLICS projects. At present it is our plan to involve our trainees in various aspects of the other programs with the triple purpose of: providing the trainees with experience in ongoing large-scale curriculum development activities, acquainting him with the specifics of the other projects, and enlisting as teachers and critics other members of the FLICS staff.

What percent of the students should show this minimum gain?

2.0.5. Determine sub-problems.

- Q.3. Can the problem chosen be broken into several sub-problems (tasks) which can be dealt with separately?
- Yes: Use sub-problems in priorities section (2.0.2), then on to Checklist 3.0.
- No: On to 3.0.

8.5 Task: Check the solution for acceptance.

- P.1. Check with the teacher to see if the solution (all the materials and techniques which will be used to solve the instructional problem) is acceptable. It may be necessary to explain terms, provide illustrations, and to give a rationale for procedures.
- Q.1. Is the solution acceptable to the teacher?
- Yes: Go to P.2.
- No: Read Q.2.
- Q.2. Can you modify the solution for acceptance and still have a high probability that it will work?
- Yes: Make the modification, then read P.2.
- No: This solution should be discarded. Go back to the analysis (Checklist 4.0) and make substitutions where the teacher conflict occurred. If this doesn't work, either revise the problem or bow out gracefully.
- P.2. Check to see if the solution is acceptable to the other components of the instructional system. More specifically, does the solution
- 1) foul up other classes,
 - 2) anger administrators or parents,
 - 3) anger other teachers,
 - 4) demand too much money or time,
 - 5) demand unavailable facilities?

Again, it may be necessary to explain and give rationales for the solution.

- Q.3. Is the solution acceptable to the system?
- Yes: You're ready to test the solution. On to 10.0.
- No: Re-read Q.2.

Chapter VI EVALUATION

As discussed in Chapter IV, the objectives of the training course were translated into behavior statements. Explicit measures of behavior, the criterion frames, are now being developed; roughly, these may be termed "tests." This important aspect of the project has required the attention of a half time evaluator for the last six months.

Traditionally, evaluation has involved developing and applying some measuring instrument after a curriculum has been developed. Such a static concept of evaluation minimizes its usefulness, providing little more than the conclusion that the curriculum is or is not effective. Effective curriculum development should start with, as well as end with, the spelling out of objectives in terms of specific test items. The definition of the curriculum is, in good part, the "final examination"; it is the behavioral target at which instruction is aimed.

In this project there has been a concurrent elaboration of curriculum and objectives specification, so that the evaluation instruments are acting as guides and monitors for curriculum development. The multiple functions of the explicit measures of student performance being developed, i.e. pretests, guides to instructional design, measures of instructional effectiveness, exit visas, convenient curriculum descriptions, have already been described in Chapter IV.

While the training course may appear interesting, objective evaluation may show it to be inadequate in several ways: (a) it may not change the trainee's behavior as intended, i.e. he may fail the tests at the end of an instructional unit. But even if he performs as expected at the end of the course, (b) when in the school, the trainee may not solve the intended problems. Assuming that the failures of

types (a) and (b) are avoided, still (c) the trainee may not be accepted by the school system, and, consequently, his impact will be diminished. The measurement strategy consists of three parts, each designed to test for success or failure at points (a), (b) and (c), just described.

During Training

Specific tests, checklists, practicums, etc. are being devised to measure each instructional unit in the curriculum. The major skill areas to be measured are those described in Chapter IV (Topical Outline).

Since some of the practicum work will be done in the school, information can be gathered on teacher, student and administrator reaction while the specific skill under study is being measured.

In addition to formal tests, the trainees will keep a diary during training and while stationed in the school. This log book will be structured by including a daily checklist on which the trainee will note the information or skills that he needed during training or which he lacked while in the school, and those required during training which have proven particularly useful.

This information will be supplemented by frequent short interviews, with the staff and trainees participating. These "playback" sessions will enable the staff to repeatedly review and revise the developing course. During training (and after entrance into the school), the trainee will be asked to write dissemination-like reports for review by the AST staff, and for possible use as real dissemination documents. These project reports offer another trainee output to be used in evaluation.

In the School

Observers and interviewers in the schools will be gathering data on the success of the trainee during and after the formal training course.

There will be questions designed to pinpoint specific deficiencies in the trainee (i.e. reflecting the failure of parts of the training course) and in the curriculum (i.e. reflecting content that is lacking, irrelevant or erroneous).

While in the school the trainee will be observed, and interviews will be conducted with teachers and others to determine his competence not merely with regard to skills being imparted by the course but also with regard to his general acceptability.

The trainee will depend upon the teacher to bring problems as well as to implement solutions. The number of problems brought to the trainee, the number he accepts to work on and the number of successful solutions (as judged by the teacher) will be recorded. It is expected that during the first few months in the school the trainee will experience an increasing number of requests and, possibly, an increase in the number of successful solutions he devises. (Obviously, the success measure should be qualified by the magnitude of requests brought by teachers. Thus, success in a few major problems might outweigh success in many small problems.) Teacher requests or problems will be identified along a scale of magnitude and importance with observer, trainee and teacher all agreeing on the location of the problem.

Measures of acceptability will include interview data from the teachers which will indicate the teacher's perceived benefit from the introduction of the trainee into the school, her rapport with him, her professional respect for him and his effect on her work load.

Additional measures might include:

- requests by language teachers to transfer to a school which has a trainee in residence.
- parent reaction to the trainee.

- assumption of financial support by the school for the trainee.
- requests by other schools for a trainee or permission to use the training package.

Language Student Performance

Of course, the crucial measure of the trainee's success will be in terms of student performance. While acceptance by the system is required in order for him to do his job, the purpose of his being in the school is to aid in the improvement of instruction.

He will be trained to devise tests for each specific problem brought to him. Copies of those tests will be reviewed and evaluated by the AST staff. Furthermore, he will continue to forward the data from those tests to the AST staff. Thus, the staff will have a record of his problem selection, his constructed or selected test and the success or failure of his trial solution. To this extent he is self evaluating.

The staff will utilize the MLA cooperative tests of the four language skills to sample performances of students in schools in which the trainees are operating. Gain scores will be compared with control groups from schools in which no trainee is present. Teachers and trainees will be consulted and asked to predict whether or not trainee-sponsored innovations should affect the retest scores of the experimental group and, if so, to specify those sections of the tests which should show improvement. This is important, because the MLA test may not be measuring those behaviors the teachers are attempting to change.

Finally, the trainee's efforts should show up in greater student interest in foreign language. Again, comparisons will be made between control and experimental groups on attitude questionnaires and such measures as election of another year of foreign language study.

Several measures of the trainees will be taken upon their entrance into the program. See Chapter VII, Selection.

In summary, it should be emphasized that evaluation is considered a continuing source of feedback to the AST instructional staff. Regular monitoring of the trainee's performance will be conducted with daily reviews of the information obtained by the evaluator and instructional staff. It is expected that repeated revision and adjustment of the curriculum will take place. This feedback system, which acts as a guide to direct the instructional efforts toward the target objectives, does not preclude more conventional evaluation of the final product, as the discussion above indicates.

Chapter VII

SELECTION OF CANDIDATES FOR TRAINING

Current Candidates

In keeping with the experimental tone of the AST Program, only three candidates will undergo training in the first operational year. This small number was chosen for several reasons, including the cost and a desire to keep careful track of, and intimate contact with, each trainee during training and while in school.

The small number of trainees of course precludes the use of statistical evaluation. But at this point it seemed more appropriate to pursue depth evaluation of single individuals, especially since, as has been mentioned earlier, continuous feedback is planned to provide a basis for curriculum revision.

With so much dependent upon each trainee, selection is a serious issue. As a result of discussions at Haven Hill and afterwards, certain criteria were developed:

1. The candidate should have had some professional experience with the school system. In order to limit the scope of training to feasible goals, it seemed wise not to choose candidates who were naive in this respect and would therefore need extensive orientation to the school system. Teaching experience, per se, is not a requirement.
2. Language skill is not a requirement for all candidates but will be for at least one. An argument already has been aired in this report between those who support a language-oriented instructional aide and those who support an aide whose primary if not sole talent is learning and instruction. The issue cannot be resolved in the absence of evidence. Therefore, it is planned to have contrasting trainees, enabling us to determine the contributions acquired and deficits incurred when each type of trainee is placed in the schools.
3. The candidate should be available for some time after training to work in the job for which he was trained. This seems obvious, but two possible factors mediate against a long stay in the new job. Any applicant for training is probably interested in moving

up or at least moving over to a new position. Such a person may be inclined soon to elaborate, up-grade or expand his job. Then, too, the training itself provides a set of skills which may prove extremely useful in the school system. It is sad but true that in most organizations a person demonstrating competence in high-need areas is often promoted out of the very job he proved to be so useful doing. To the degree that enthusiastic candidates have been selected and that the training course is successful, there is a danger that the trainee will swiftly move away from the teacher and classroom to a higher administrative position.

4. The trainees must be enthusiastic. The fact that they are volunteers for training helps insure some motivation on their part. Especially during this first year, they will be an integral part of the development of the training course, and so it seems essential that they feel inclined to contribute to the course as well as learn from it; that they feel, as the staff does, that this is an important model for educational innovation and not merely a job. A danger involved in voluntary selection is that the enthusiastic volunteer is a malcontent. We are anxious that our trainees feel discontent with many present educational practices. Yet they must incline toward positive solutions rather than negative criticisms.

5. A short list of miscellaneous requirements has been compiled and includes:

- the trainee should be a college graduate,
- the trainee should have, or be able to obtain shortly, teacher certification,
- the trainee should be free to travel and be able to settle for at least a year in an assigned community,
- the trainee should be in good health and not have demonstrated obvious moral or social flaws,
- the trainee should be of an age which will allow a number of years of activity before retirement.

These criteria describe different patterns when assembled in different ways. There has been a conscious attempt to specify requirements for three different trainees in order to observe the effects of differing backgrounds on their response to training and their field performance. The trainee patterns also represent the most likely sets of behaviors that future trainees will bring to the program, i.e. the populations from which future trainees will be drawn.

Trainee 1. It was decided she should be a language teacher, with several years of experience. This trainee (Alice Ahearne), a Michigan French teacher, has already been selected.

Trainee 2. He should not be a teacher or skilled in language but should have had some background in, and have shown continuing interest in, problems of behavioral modification. This trainee (Chauncey Smith) has also been selected. His background, happily, includes experience in working closely with school teachers.

Trainee 3. He should be skilled in the development of teaching materials. This trainee, who probably will have had some teaching experience, has not yet been identified.

For purposes of later evaluation, tests will be given each trainee as soon as training is begun. Obviously these are not selection tests but rather will help identify further the characteristics of successful trainees. The tests include the Strong Vocational Interest Inventory and the Miller Analogies Test.

Future Candidates

If a second operational year is supported, six to eight more candidates will undergo training under AST auspices. It is hoped that some of them will be totally trained in the field to test the independence and mobility of the training package (i.e. its lack of ties to the AST staff).

Chapter VIII

TEACHER-PERCEIVED PROBLEMS

The question, "What is wrong with (or, what are the major problems in) foreign language instruction?" can produce almost as many answers as there are respondents. Not only is there a lack of consistency in answers, but many will probably be invalid. The crucial specific questions and answers which must be generated before language instruction can be markedly improved are simply not available.

Nevertheless, for purposes of designing the present training course, it seemed particularly appropriate to expose the frequent questions and problems posed by one set of people concerned with second language learning: the language teachers. A catalog of these common teacher-perceived problems serves several purposes. Since our strategy will always be to begin with problems that the teacher generates, this is an especially relevant population.

First of all, such a list provides a guide for emphasis in training. The trainee might well concentrate upon those areas of particular concern to the teacher.

Secondly, the trainee repeatedly will have to engage in a cooperative transformation of originally stated problems into measurable behavioral statements. For purposes of determining the gap between teacher statements and those which provide the impetus and guide for the trainee, typical problems as stated by the teacher should be determined. These statements also provide material for "real-life" exercises in transformation skills.

They also indicate the areas of solutions which should be emphasized during training. Thus, it seems sensible to propose numerous alternatives to common problems during training, to equip the trainee with a variety of attacks on typical problems.

Finally, the catalog of teacher-perceived problems can be discussed with linguistic, language learning and instructional experts in an attempt to (a) generate solutions and (b) determine the true seriousness of the problem (indicating the suggested degree of involvement for the trainee).

First Questionnaire and Interviews

A first attempt at developing the problem catalog was via an open-ended questionnaire which was administered to eight teachers who volunteered at Grosse Pointe High School (Grosse Pointe, Michigan) and Bentley High School (Livonia, Michigan).^{*} While the results were suggestive, the answers were quite variable and the sample too small to provide a basis for firm conclusions. In preparation for construction of a second questionnaire, a meeting was held with the Bentley High School foreign language teachers. This face-to-face interview and discussion (which was tape-recorded for later review) produced more detailed statements than did the questionnaire. Furthermore, it became clear that the interaction between the teachers led to exposure and formulation of problems which might otherwise not have occurred. (It should be mentioned in passing that such contacts with teachers also provided an opportunity for informal dissemination: the AST Project was explained and teacher comments sought.)

During this time, the members of the FLICS staff who had had teaching experience were repeatedly interviewed.

Final Questionnaire

The face-to-face interview, while valuable, presents many problems: meetings of departments are hard to arrange; tape recordings must be

^{*}The full report on the questionnaires and interviews, written by AST staff member Stephen F. Knapp, can be obtained upon request.

analyzed for content; large groups cannot be sampled within a short period of time. Therefore, a final questionnaire in the form of an item checklist was prepared. Each item presented a sentence describing a situation or possible problem. The teacher was asked to indicate whether or not the situation was present or absent in her school and, further, whether its presence or absence was seen by her to be a problem.

Five sources were used to construct the items. Most items came from Language Teaching Analysis.¹ The rest of the items were fairly evenly distributed over the following sources: Evaluative Criteria,² the responses to the open-ended questionnaire, the Bentley interview and the FLICS staff.

Topics covered by the questionnaire, along with sample items from each category, are shown in Exhibit 7.

It should be reiterated that the teacher may indicate separately (a) whether or not a statement applies to her situation and (b) whether or not its presence or absence is a problem.

The target population for the questionnaire included all foreign language teachers in five areas in Michigan (Alpena, Grand Rapids, Grosse Pointe, Lansing, Traverse City). A total of 70 teachers was contacted. Special care taken to encourage a high rate of return was apparently effective, since about 87% (64) of the teachers responded.

Several constraints on generating conclusions and extrapolations from the results should be borne in mind.

1. Mackey, Thomas, Language Teaching Analysis, London: Longmans, Green and Company, Ltd., 1961.

2. Evaluative Criteria, Washington, D.C.: National Study of Secondary School Evaluation, 1960.

TOPICS AND SAMPLE ITEMS FROM QUESTIONNAIRE ON TEACHER-PERCEIVED PROBLEMS

- I. Design
 - A. Lessons are carefully planned.
 - B. You are able to prepare drills and assignments.
- II. Physical Factors
 - A. The classroom:
 - 1. The size of the class is suited to the method.
 - 2. The type of room is appropriate.
- III. Personal Information
 - A. You have the necessary skills for the method you are now using.
 - B. Your language skills are suited to the method.
- IV. Audio-Visual Devices
 - The language laboratory contains:
 - A. magnetic tape recorders.
 - B. magnetic tape playback machines.
- V. Student Characteristics
- VI. Materials
- VII. Objectives
 - Foreign language program organization:
 - A. Foreign language courses are available to all interested students.
 - B. Adequate counseling is available to assist students in the selection of foreign language courses.
- VIII. Evaluation
 - Test uses:
 - A. Prognostic tests are used to predict how well a student will perform.
 - B. Achievement tests are used to determine how much material has been mastered.
- IX. Method
 - Pronunciation and oral expression:
 - A. Pronunciation is taught through minimal pairs drill.
 - B. Pronunciation is taught through oral reading.

X. Motivation

XI. Student Mastery

XII. The Educational System

A. Generally, there is ample time for teaching the foreign language effectively.

B. There is ample time for enrichment activities.

The checklist format, despite repeated pre-testing, appeared to be difficult and confusing to some of the respondents. When misunderstanding was obvious (e.g., the respondent so reported in a marginal note), the response was not counted.

Despite the generous cooperation of the teachers, it is recognized that they were often pressed for time and that the careful completion of the questionnaire may have been too great a demand on some of them. Therefore some carelessness might be expected.

Some bias (e.g., an attempt to make things sound better or worse than they are) is also to be expected when a printed questionnaire is filled out. Although every care was taken to insure the respondents' anonymity, some of the answers may have been given "for appearances' sake."

In addition, the teacher may honestly misperceive parts of her environment. She may, for example, believe that a large part of her class time is devoted to a particular topic when, in fact, it is not.

It is with these cautions in mind that one should examine some general conclusions based on the survey. "Major" problem areas will arbitrarily be designated as those which 25% or more of the respondents indicated as problems. Exhibit 8 presents these data.

Conclusions

Tentative conclusions have been drawn, based on the data in Exhibit 8 and an examination of the extensive data not reported here but available in the complete report.

Design.--The replies to this section indicate that the teacher is generally concerned that the materials and methods be designed for her class. However, the changes in lessons frequently are not based upon the evaluation of the success of the design.

HIGH-RANKING PERCEIVED PROBLEMS

(High-ranking problem statements are indicated, along with the percentage of respondents signifying each statement as an "absence problem." A mere "absence" is not included in the percentage if the absence is not perceived as presenting a problem.)

1. Time (i.e. adequate time is not provided for certain activities):
 - A. There is not ample time for enrichment activities. (58%)
 - B. There is not ample student contact time. (47%)
 - C. Generally there is not ample time for teaching the foreign language effectively. (42%)
 - D. Students cannot proceed at their own pace. (32%)
 - E. Not enough practice is given for mastery of the material being presented. (27%)
 - F. There is not ample time for test construction and validation. (25%)
 - G. Class time is not free of "school business." (25%)
 - H. There is not ample time for lesson preparation. (25%)

2. Personnel (i.e. personnel for particular tasks are not available):
 - A. Adequate counseling is not available to assist students in the selection of foreign language courses. (42%)
 - B. Not enough typing and secretarial help is available. (40%)
 - C. There is no language coordinator available. (38%)
 - D. The laboratory equipment is not promptly serviced. (36%)
 - E. There is no language laboratory technician. (35%)
 - F. Teachers' aides are not available for correcting homework, grading, etc. (35%)

3. Student Achievement (Some teachers report lack of stated achievement but do not consider it a problem. Those that do consider it so are indicated here.):
 - A. Most students do not learn to write well in the language. (32%)
 - B. Most students do not become fluent foreign language speakers. (31%)
 - C. Most students do not have a command of the foreign language grammar. (27%)

4. Materials:
 - A. There is not a variety of reading materials to provide for different abilities, interests and achievement levels of the students. (44%)

5. Facilities (The environment is inadequate.):
- A. The type of classroom is not appropriate. (42%)
 - B. The size of the classroom is not suited to the method. (31%)
 - C. The acoustics of the room are not good. (31%)
 - D. A language laboratory is not provided. (27%)
 - E. The language laboratory is not accessible when needed. (27%)
 - F. The language laboratory does not contain playback-record machines. (27%)
6. Evaluation:
- A. Prognostic tests are not used to predict how well a student will perform. (31%)
 - B. Appropriate standardized test are not used. (27%)
7. Financial:
- A. Teacher salaries are inadequate. (42%)
 - B. There are not ample funds for foreign language instruction. (31%)
8. Other:
- A. The laboratory work is not stimulating to the student. (29%)
 - B. There are long gaps between the student's termination of foreign language study and college. (25%)

Physical Factors.--Generally, teachers were dissatisfied with the classroom and the language laboratory for purely physical reasons: location, size, acoustics, etc.

Personal Information.--For the most part, teachers felt they had the necessary skills to teach a language effectively; however, a significant minority did not feel confident of their skills.

Audio-Visual Devices.--Teachers are generally dissatisfied with the mechanical defects, breakdowns, and difficulty of operation of A-V equipment.

Student Characteristics.--Teachers are generally concerned about the individual differences in ability, interest, experience, etc. of their students.

Materials.--Teachers rely heavily upon commercially prepared materials. As a result, there are difficulties in tailoring materials to the teacher's own approach.

Objectives.--There is some agreement on organizational objectives and on the four language skill objectives. Beyond that there is great variability in objectives.

Evaluation.--Testing programs are quite variable from teacher to teacher, and prognostic and diagnostic testing is virtually lacking. Validation (or "Is the test measuring what it is supposed to?") is not done, and records of student performance are not kept in many cases.

Methods.--Of all the sections, Methods showed the most variability on each item and from item to item. These data amplify the conclusion that there are no clearly defined methods for attaining course objectives.

Motivation.--Although parental and outside pressures are present, they do not seem to be a problem. Students perform well in class but not in the language laboratory.

Student Mastery.--Teachers disagree on how successful their teaching is on the basis of their students' performances at the end of the course. Of those teachers whose students do not master the material, many do not see this as a problem.

The Educational System.--By far the most prevalent problems have to do with lack of time and funds. Secondly, teachers seem to want more assistance, both advisory and secretarial.

Although the results are variable and the conclusions tenuous, a profile of a typical teacher might be drawn. He or she is, first of all, concerned with the state of the educational establishment, both administratively and physically. He is concerned with the severe constraints on his attempt to teach effectively. Secondly, he is concerned with the goals of foreign language learning and how they are met. He is concerned with the tools he is given to teach with, namely materials and methods. Most importantly, however, the teacher indicates that he has been constrained by both lack of time and assistance. It is to each of these points that the AST Project is directed.

In conclusion it should be noted that many of the teachers indicated that they would welcome extensive changes in foreign language courses. Their comments on this item ranged from "controlled change" to "YES" written in large letters. The results of the survey as presented here are not astounding. Yet the detailed picture of teacher problems provided by an examination of all the data has proven most useful in guiding curriculum development and in supplying large numbers of "real-life" examples which have been used in generating and trying out the analysis of instructional problem-solving described earlier.

Continued interviewing with teachers has taken place. Two University High School (Ann Arbor, Michigan) foreign language teachers have been used repeatedly as consultants. Their major job has been to supply the staff with examples of day-to-day teacher problems. The AST staff includes a former public school teacher, who supplies more examples. (One reason for including a language teacher among the first set of trainees is to provide still more examples of teacher-perceived problems.)

Future plans include more interviews with linguistically skilled members of FLICS and CRLLB in an effort to determine more specifically what they see as major problems in language learning and to determine the gap between teacher-perceived and linguist-perceived problems in foreign language learning.

Chapter IX
STRATEGY OF INNOVATION: GENERAL CONSIDERATIONS

That major changes are beginning to take place in education is self-evident; many of the reasons for such changes are also obvious. The Knowledge Explosion either has increased the total amount of material to be learned or, at least, has produced pressure on the educational system to teach to quite different ends than it previously has. At the same time, an increasing population puts more and more strain on the present system. The size of the population to be taught is being enlarged not only by the naturally growing numbers of new infants; adult education, education in emerging nations, the extension of education to previously excluded groups (e.g., retarded children) - all of these make the world's population of educational consumers enormous and still growing. A special factor in increasing the size of this population is the upgrading of skills. With the drying up of markets for unskilled and low-skilled workers, a greater percentage of the population must be educated longer in order to acquire more sophisticated skill repertoires.

An increasingly effective new technology has grown rapidly in education, and it adds an important impetus to change. Education systems cannot satisfy the growing demand for change merely by adding a piece of hardware. Innovations are being designed which, when implemented, involve changes in attitudes, procedures, roles--changes that permeate every area of the existing system.

It has been observed that, historically, periods of rapid social change tend also to be periods of educational reform. The innovations in education that we have recently seen may be only the first rocks to fall, precursors of what will be an avalanche of change. If the first rumbles of innovation are being heard, so are the groans accompanying failures of innovations.

A keen awareness of the failures has led the AST staff to review the literature in the area of innovation rather thoroughly. (A selected annotated bibliography appears at the end of this chapter.)

A distinction should be made at the outset of this discussion between the innovation itself and the process of adoption; to use Matthew Miles' terms: substantive and adoptive problems of innovation.¹

The reasonable, rational approach to innovation has been prescribed by writers on innovation and carried out by innovators. It attends almost exclusively to substantive problems. It is based on a simple premise such as: "virtue is its own reward" or "goodness will triumph." The innovator works hard to produce what he, at least, believes to be a remarkably good product. Its merit alone, the innovator feels, will recommend it to the systems for which it was designed. Power figures in that system, being all honorable men, will readily adopt the innovation.

In practice, the strategy fails on several counts. First, evaluation of the substance is rarely carried out. Good intentions vis-a-vis evaluation precede the development of almost all innovations. Occasionally feeble attempts at evaluation are actually carried on; pitifully weak measures are taken (e.g., student opinion). But, for the most part, the merit of the innovation is not obvious nor objectively demonstrated.

Even if there were data, there is a serious question as to the effect of such evaluative data on the system. Repeatedly observers of the innovative process make comments such as this one:

"A kind of axiom seems visible in almost any of the studies reported (in this book): educational innovations are almost

1. Miles, M.B. (ed.), Innovation in Education, New York: Bureau of Publications, Teachers College, Columbia University, 1964.

never installed on their merits. Characteristics of the local systems, of the innovating person or group, and of other relevant groups often outweigh the impact of what the innovation is."²

Indeed, the failure to evaluate innovation, so commonly observed, may be in part traceable to this factor, i.e. the system does not attend to data, therefore it is a waste of time to collect it. Furthermore, obtaining data might reveal substantive faults in the innovation itself.

It appears, then, that for the most part educational innovations are not evaluated. Furthermore evaluative data have little or no relevance to the problem of adoption.

Therefore, innovators ought to become familiar with those characteristics of the innovative process which seem essential to the eventual adoption of an innovation. Unfortunately, comparatively few descriptions of the adoptive side of the innovating process are available. The literature on innovation is weighted with descriptions of building a particular innovation, rules for developing an innovation, characterizations of people who tend to develop innovations, and some prescriptive materials on the innovative process. Only a sprinkling of articles concern themselves with matters relevant to our search: characteristics of environments in which innovations are likely to be adopted and maintained, characteristics of persons who could be called adopters of innovation, crucial variables to be considered when attempting to produce adoption. In summary:

"The dominant focus in most contemporary change efforts...tends to be on the content of the desired change, rather than on the features and consequences of change processes."³

2. op. cit., p. 635.

3. op. cit., p. 2.

While some general observations concerning matters of adoption are regularly made, they are rarely more than organized "common sense." Thus: the value system of the adopter should be considered; initial and upkeep costs of the innovation are important factors considered by the adopter; environments which repeatedly adopt innovations seem to be "open," have an authority hierarchy based primarily on expertise, have many lines of communication to other communities, etc. The innovative process simply has not been studied enough to provide more than these most general guidelines to innovators.

One observation we had previously made has been confirmed by the literature: the teacher or administrator is unlikely to generate innovation, at least without special impetus and support. Paradoxically, though the apparent purpose of the school is to produce change, it is, itself--in both organization and personnel--characteristically undynamic, inflexible and conformist. The school personnel not only lack time, skill and facilities for innovating, they also are, unhappily, constrained by a set of reward contingencies which cannot but eventuate in conservatism. There are payoffs in the system for doing today what you did yesterday. That might be enough to discourage creativity and innovation. But to make matters worse, the environment does not merely withhold reward for originality, it often metes out punishment for trying something new. One who makes a comparison of characteristics, even generally stated ones, of innovating environments and people with those of the school and personnel in the school cannot help concluding that most school systems are unlikely to adopt, much less produce, innovations in education.

It should be stressed that these remarks are not intended as a polemic, or attack upon schools, teachers or administrators. Rather it is an attempt to describe accurately what appears to be a comparatively infertile environment for the seeds of innovation to fall on. Such a

description further reinforces the need for studies in, and careful design of, the innovative process.

Though the process for producing adoption of innovation remains essentially unexplored, nevertheless there is some indication that certain kinds of innovations may have a higher probability of adoption than others (i.e. there may be an interaction between the substantive and adoptive factors).

At a general level, there is some agreement that merely passing on to the practitioner the principles and findings of the basic science laboratory will not produce successful innovations. Attempts to increase innovation and the adoption of innovation by making research findings more readily available seem doomed to fail. At least two critical aspects of successful innovations have been missing. The first is: something more than basic principles and research findings must constitute the substance of innovation. There has not been a technology of instruction analogous to the engineering sciences and applied arts. There is every likelihood that such a technology and its population of engineers is forming. B. F. Skinner made this observation, relevant to this point:

"It is always tempting to argue that earlier ideas would have been effective if people had only paid attention to them. But a good idea must be more than right: it must make its own way because of what it does. Education does not need principles which will improve education as soon as people observe them; it needs a technology so powerful that it cannot be ignored. ...we are on the threshold of a technology which will not only be right but effective."⁴

Surely without a technology--a translator of basic research and a generator of engineering research--the spoken phrase, "We must apply

4. Skinner, B.F., "Reflections on a decade of teaching machines," in Teaching Machines and Programmed Learning, II (Glaser, R., ed.), Washington, D.C.: National Education Association, 1965, p. 16.

laboratory findings to the classroom," has all of the force of "Someday I must clean the attic." The statement can only serve to mildly alleviate our despair over the present lack of an effective engineering science in education. It cannot substitute for real innovation.

One output of this new technology is self-instructional, or programmed, material. Some of our consultants and staff have repeatedly advised that our strategy of innovation should involve almost exclusively the production of self-instructional second language materials. They argue that such a strategy avoids many of the problems we are presently faced with. Further support for their view comes from the innovation literature. It was mentioned above that certain products of innovation might a priori be more likely to succeed than others. There is some indication that, for a variety of reasons we will not go into here, innovative materials are in this class. Well-designed materials that are not too costly and that aid (or constrain) the teacher by providing script-like teacher's manuals, ready-made tests and the like--these may well be the easiest innovations to introduce and maintain in the school system. However, for reasons already stated, and for some to be recounted below, we have committed ourselves to another route of innovation.

Returning to Dr. Skinner's earlier remarks and to the second necessary facet of innovation: perhaps even a powerful technology will not in and by itself lead to widespread and rapid adoption of its products. It has seemed to us there is a need for the technology to grow up from within as well as from without the school. Despite the difficulties of training the innovator and placing and maintaining him in the school, the present project is based on the assumption that such a guide for innovation is crucial if the growing technology is to affect the school, teacher and student rapidly and maximally, producing minimal perturbation in the system. This is not to suggest drastic changes in the system

will not occur; they will, but hopefully as a result of the cooperation from within and without the school.

Actually, as an innovation the AST trainee might be considered a secondary or "meta-change," which provides conditions for other changes. Not coincidentally, several writers on innovation have suggested the secondary innovation strategy as the more powerful and most likely to succeed.

Since the AST staff is sensitive to the process of adopting innovations, plans for the coming year include:

- Using outside consultants who will review our plans and progress in regard to adoption strategies.

- Once-a-week staff meetings and reports are to be devoted to the problems of adoption.

- Beginning in the early fall, increased dissemination efforts, both formal and informal, will be started. These include talks to teachers and administrators in a number of schools.

- Contact with schools beyond dissemination efforts will increase as a result of contact with the school during trainee practicums. In addition, school administrators and language teachers will be used much more extensively as advisors and consultants.

More specific details of the innovation plans with regard to placing the trainee in the school and maintaining him there will be found in the next chapter.

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ADDITIONAL ITEMS which complement the above bibliography can be found in:

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Chapter X

STRATEGY OF INNOVATION: SPECIFIC CONSIDERATIONS

In the previous chapter, stress was placed on problems in the adoption of innovations. More specific adoption problems--how the AST trainee will enter and be maintained in the school--are discussed in this chapter.

The schools in the state will become more familiar with the AST project in the coming months through increased dissemination efforts, including a brochure, this report, and a series of informal talks at various schools. Schools which show some interest in the concept of the trainee will become further acquainted with the project, and with the trainees themselves, as the trainees take part in practicum exercises at those sites. School personnel will be involved in the planning of the exercises and will be asked for comments and criticisms of the exercises and the trainees' performance. These in situ exercises are planned as important contacts with possible permanent sites for trainees.

As a school becomes better acquainted with the project and with the trainee, the teachers and administrators will be queried in order to discover whether or not the trainee might take up a somewhat longer residence, a kind of internship, in the school. If the school agrees and the trainee's performance is satisfactory, negotiations and planning will be undertaken to aid the school in attaching the trainee to its staff and assuming an increasingly greater part of the trainee's financial support.

We cannot estimate accurately at this point the ease or difficulty of securing cooperating schools for practicums or the extent of that cooperation in terms of final trainee placement. The expressed interest and cooperation of schools so far is highly encouraging.

We have not yet decided upon any specific desirable or ideal criteria for the first schools or school districts hiring the trainees. It might even seem premature and overly optimistic to do so. However, we plan to outline the distinguishing characteristics of schools within the state, so that if several alternative spots become available the trainees might be placed in schools which represent different major types.

Acceptance is, of course, only the first step. A more serious problem is that of maintenance.

Gaining Acceptance and Continued Support

Since the teacher is conceived of as the main person to be working with the trainee, most of our thinking about support has concerned her.

The trainee, hopefully, will be enthusiastic about his job and about the broader view of innovation from within second language learning. Yet it might prove disastrous if he assumed that the school system, and in particular the teacher, have been waiting breathlessly for the implementation of the ideas the project represents. A somewhat cynical, but perhaps safer, view is that the major motivation of most classroom teachers is simply survival. The AST trainee must realize that, while innovation is his business, the teacher may not consider it hers. Indeed, she may perceive change, and particularly change personified by the trainee, as threatening. Even a secure, most willing teacher is not likely to have the required time to engage in continuing innovations. Others may feel that the trainee has joined the staff "to show the teachers how to teach," "to update them," etc. Such perceptions are bound to place difficulties in the way of pleasant trainee-teacher interactions.

The basic emphasis of the trainee's activities--evaluation--is, in itself, threatening. In the previous chapter mention was made of the

failure to evaluate many innovations. One reason suggested was the danger that evaluation poses: it may expose the innovation as a failure. Our own experience in persuading instructors to set goals and then measure how closely their teaching produces those previously described "terminal behaviors" in the students supports the generalization being made. A folie a deux between the teacher and society currently exists with regard to teacher effectiveness. Measurement of effectiveness of instruction can easily upset this balance. The pressure to evaluate must be introduced gradually and with great care. Immediate benefits of an evaluation activity must be seen and enjoyed by the teacher. (For example, a frequency count of classroom disturbances which shows a decline after the introduction of a new behavioral management technique). The technique of concurrent evaluation and development must be demonstrated and used so that materials or techniques emerging from trainee-teacher interactions are as nearly as possible in the "fail-safe" category. The use of evaluative techniques for better individualization of instruction can be stressed. A variety of means, in other words, must be used to successfully handle this most delicate problem.

Looming important in the selection of problems to be dealt with is the immediate "payoff" for the teacher. The trainee may view as trivial the problem which a teacher brings to him, or even see it as tangential to problems relevant to improvement of instruction. Yet he will consider very seriously the teacher's perception of the problem. If it is important to her (e.g., a discipline problem which produces a highly aversive classroom environment for the teacher), it is likely to rank high on the trainee's problem list. He will sometimes have to trade problems which he sees as core and crucial for ones whose solution the teacher will find more rewarding.

A new arrival in a system sometimes alienates by what others see as a flaunting of his unique skills. Our trainee, on the contrary,

will be guided not only in entering quietly and with a certain reticence but also in encouraging the teacher to join him in many of his activities. He will spend time in training her in some of his own skills. He will also endeavor whenever possible to utilize the skills the teacher brings to the problem. With the teacher, as with the entire system, the trainee will search for some existing approximation to his planned solutions and build upon them. This movement from what is given toward what is required is an important aspect of the strategy which seeks to involve the teacher without any threat or chance of alienation.

In addition to offering the teacher a chance to acquire new skills, the trainee will provide useful skills of his own. For example, he will have information or access to information which may often be useful to the teacher. Thus, the trainee will be able to find out quickly and easily the specifications of certain equipment, the availability of tests, the newest available textbooks; he will be in touch with other professionals and be a source of "trade gossip." In general, he will be able to aid the teacher in assuming a more informed, more professional role.

Finally, he offers the link to new roles for the teacher, a point already made several times in this report. The obvious pressures for change and innovation, some of which were recounted in the earlier chapter, may prove threatening to the teacher (for every euphoric, evangelistic article on teaching machines there is a tranquilizing counter-article in a teacher-directed journal assuring the teacher that she will not be replaced by a piece of sophisticated hardware). A teacher who sees herself endangered can fight back by criticizing proposed changes, by attacking the innovators, etc. But an alternative, and we think attractive, route involves changing along with the changing world. The

trainee will supply the means by which the teacher can assume roles other than that of the medium of instruction. We have previously discussed some facets of these new roles (e.g., managing instructional systems, evaluating components of that system, administering efforts to individualize instruction). Some of these activities may well strike certain teachers as more exciting, challenging, and satisfying than their present ones. In addition, the opportunity to learn the skills for and to assume these new roles may alleviate the fear of the almost relentless move toward innovation.

Problems of acceptance by the administrator have not yet been explored as thoroughly as those concerned with teacher acceptance. However, a few observations may be made.

The success of the trainee involves, in part, dissemination of his activities (see the next section). Recognition by professional groups of a school's progressive efforts to improve instruction may be a satisfactory reward to that school's administrators. As their peers remark on the school's activities, praise and admire them, the administrators may become more enthusiastic about the trainee.

A more concrete return for the school might come in the form of grants and other funds which the trainee may be instrumental in securing.

A problem mentioned previously is that of the trainee's being moved away from his original role by the administrator's exerting subtle and unconscious controls. Thus, to an assistant principal it may not seem at all inappropriate to request the trainee to substitute for an absent language teacher, to take over a study hall, or to take on some minor administrative duties. Such job-irrelevant activities must be avoided and the demands discouraged. Yet there are at least two reasons for the trainee to occasionally engage in these kinds of tasks.

He may sorely need to gain support, and to do so he is willing to sacrifice his time and possibly future problems in role definition. On the other hand, the requests from administrators can be viewed in the context of his job if such requests seem to have relevance to the problem of improving instruction. A request from a superintendent for information on a new set of materials might be in this class, as might a request for advice on a new system of student testing. Other activities instigated by the administrators, while not directly related to instructional improvement, are clearly within the purview of the trainee. For example, the trainee might address a group of visitors on the topic, "New Media."

Maintaining the Trainee as a Professional

We have stressed in this chapter and in the previous one problems of adoption and maintenance of innovation--the innovation being the AST trainee. Of equal importance to us is that the trainee develop into and continue as a certain kind of professional person, i.e. that the innovation preserve its integrity.

Training is only the first step in producing a performance. The activities in which the trainee will engage daily will, in the long run, be a function of the contingencies of reinforcement he must live with (i.e. what he does that provides him with satisfaction or, at least, avoids threats). If his reinforcement, his "payoff" in terms of salary, prestige, etc., does not depend upon his being a guide to successful innovation, he will not continue to be such a guide, regardless of the effectiveness of his original instruction.

The factors which maintain or which alter a professional role have been no better studied than those which produce or maintain innovations. Certain things, however, do seem important to consider even without supporting data on their criticality. Surely the safest assumption to make with regard to the school system is that it will not be adequately supportive of innovation. That is, the system will not consistently reward

innovation for its own sake. And, in the light of observations made in the previous chapter, it is likely that if the system occasionally rewards an innovator it will not do so on the basis of data indicating the effectiveness of the innovation. This may not always be the case. It may be predicted that with continued success the trainee will develop in the administrators and teachers a different attitude in this regard, thus, in a sense, creating a more rewarding environment for himself.

One is forced to conclude that at least some of the reward for effective innovation must come from elsewhere. We have mentioned earlier that the trainee is to interact with and be responsible to several "communities." Some of these will reward him for his innovative efforts. For example, he will be competent in writing reports and addressing professional meetings. It is hoped that publishing in recognized journals and delivering papers before professional groups will produce such rewards for him. In addition, these activities will help establish him as a professional--specifically, as a professional with status in groups outside the school. To this end he will be urged to associate with such professional organizations as the American Educational Research Association. Not incidentally such contacts will provide him with the kinds of information he needs in order to serve as a source for the teachers.

Another method to provide him with alternative or additional communities is to associate him with research agencies. We have mentioned this before in various contexts (e.g., research skills as a component of his training). Some of his time should be devoted to more basic research than the very specific "research and development" activities he will engage in in the schools. Contacts are already planned with research centers in order to acquaint them with the AST trainees.

Finally, we hope to set up informal networks which connect trainees with each other and with similar professionals (e.g., state language coordinators). The seemingly trivial trappings of professionalism (e.g., regular meetings, a newsletter) are being considered as part of an attempt to set up the tenuous beginnings of such a professional group. To the extent that the trainees see themselves as a group of professionals, distinct from but equal to teachers and administrators, they will become self-maintaining.

Of course, as the school garners prestige or renown for trainee and teacher activities, the trainee will be rewarded by the school itself. We are inclined to think that this will happen in time. However, the maintenance of quality (i.e. effective innovations) may not be possible with school support alone. We feel a discriminating audience of other professionals, all engaged in similar tasks, is needed for this finer control of his activities. These outside communities are not merely transitional but must be continuing inputs to the trainee's environment.

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Frederic L. Girardeau is Associate Director for Training of the Bureau of Child Research at the University of Kansas. He received his Ph.D. from George Peabody College in 1960. Dr. Girardeau's fields of major interest are an experimental analysis of the learning behavior of retarded children, including language behavior, and preschool educational procedures for retarded and normal children. He has published many papers in these areas. He and Dr. Joseph Spradlin designed and trained attendants to administer a token economy for retardates, as reported in "Token Rewards in a Cottage Program" in Mental Retardation, Vol. 2, 1964.

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Prior to the formation of SK Dunn Inc. she was Supervisor of Program Development and Evaluation for the Huntington Women's Job Corps Center. Among her interests are problems of implementation and contingency feedback, reading and verbal skills, and praxeonomy.

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Joseph H. Harless

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Leonard Newmark

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Todd Risely

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Joseph E. Spradlin

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Among his many publications is Spradlin and Girardeau, "The Behavior of Moderately and Severely Retarded Persons" in The International Review of Research on Mental Retardation, Vol. 2, 1964.

Kenneth Weingarten is Supervisor of Survey Research for Xerox, Inc., Education Division. Mr. Weingarten has a B.A. in sociology. His major interest is the experimental and functional analysis of social systems. Mr. Weingarten has recently developed the in-service training for teachers at Basic Systems, Inc.

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AN EXERCISE IN AN APPLICATION OF A SYSTEMS
APPROACH TO SECOND LANGUAGE LEARNING^{1*}

H. Wallace

In educational research as well as elsewhere, the systems approach is rapidly becoming fashionable. And for good reason. The systems approach has shown resounding success in the Department of Defense, so much so that it is now being applied to other government agencies such as Health, Education and Welfare. (Last year, for example, the Office of Health subjected its major accident prevention and cancer detection programs to a cost-benefit analysis.)²

Unfortunately, most of the advocates of the systems approach in education have spoken either in vague or in theoretical terms. Their papers and speeches have, for the most part, been only promissory notes.

In some cases the systems approach has actually been applied in the educational setting. For example, the Systems Development Corporation has for several years investigated the stimulus and response variables in computer assisted instruction. Unfortunately, such efforts have for the most part produced non-significant answers to non-significant questions.³ Lately, however, SDC has turned to what seems a more profitable line of inquiry,⁴ asking, for example:

- How much of the paper-shuffling currently done by guidance counselors can be better done by computers?
- Can a computer interact directly with students to handle routine counselling and decision-making such as in helping high school students to choose their next year's courses?
- Can computers predict the space, time, personnel and money requirements of proposed educational innovation within a specific school or school system before the innovation is implemented?
- Can computers reduce the work and aggravation of school administrators in preparing their upcoming budgets?

*References and notes are on p.145.

Ambitious as these problem statements are, they do not begin to exhaust the real potential of the "systems approach."

There are three major problem areas in which it appears application of the systems approach to education will produce major payoffs:

- What is economically worth learning?
- What is the most economical time and place to learn it?
- What is the most productive way to pay for it?

In this paper the application of the systems approach to these problems will be discussed in the context of second language learning (i.e. the production, distribution and consumption of second language behavior).

I. WHAT IS WORTH LEARNING?

The psychologist defines learning as a more or less permanent change in behavior due to one or more of a restricted set of variables. But to the economist learning is more like a product, one which fulfills a mission.

In the "systems approach" advocated here three types of missions are distinguished: consumer, productive and propaedeutic missions.

Consumer Missions

People do not need to be paid for or forced to do many things and, in fact, are willing to pay for the opportunity to do them: going on a vacation, to the movies, or to a concert. There are many things in life which are ends in and of themselves.

Some of these consumer missions involve learning. Many people, for example, are willing to pay for golf lessons, skiing lessons, dancing lessons, flying lessons, etc. in order to spend even more time and money in the pursuit of these activities.

In the same way, people who are learning French so as to enhance their enjoyment of European vacations, of visits to French restaurants in the U.S., or of their cocktail hour conversations are also engaged in the achievement of consumer missions.

Productive Missions

There are other things in life which are done primarily because someone else wants them done and is willing to exchange something of value (money) for their performance. Most of what we call work fits into this category of missions. About half of our work force would probably "kick the work habit" within a year or two if they (and their descendants) could be assured a high standard of living. Only a few "nuts" would be left and we would be more likely to say that they were addicted to weird hobbies than that they were working.

Productive, like consumer missions often require learning for their achievement. (For example, in 1965, IBM administered 10 million man hours of instruction to both its own employees and those of its customers.⁵ Unless IBM's own employees learn certain things, it will fall behind its competitors in technology and production. And, unless the customer's employees learn to use the IBM equipment, IBM will lose sales.

Most of what we call vocational, technical, and professional training is learning in order to achieve productive missions. In the same sense, learning French, to be an interpreter, translator of technical journals, or secretary for an internationally active corporation is learning in the pursuit of productive missions.

Propaedeutic Missions

Propaedeutic learning is learning which is a necessary prerequisite to some other learning. For example, teaching medical students to use chemistry glassware properly is propaedeutic. It is not an end

in itself nor will most doctors ever exhibit this behavior in their work. But, handling glassware properly is a prerequisite to laboratory work which in turn will produce behavior directly involved in the achievement of a productive mission.

Similarly, for most of us, reading and mathematics are propaedeutic in that they are generally prerequisite to the learning needed for many consumer and productive missions.

Linguistics, the study of culture, the relation of thought and language structure can all function as propaedeutic missions, which are necessary prerequisites for, or reduce the cost of, later learning for achieving future consumer and productive missions requiring second language behavior.

Implications

Imagine a national study of second language behavior needs organized by mission. It would seek answers to these questions:

- What are the consumer missions requiring second language behavior?
- What are the productive missions requiring second language behavior?
- And, finally, what truly propaedeutic missions can be culled from the consumer and productive missions?

If we were next to take the findings of this imaginary national study and use them as the basis for curricula design, we would probably end up generating very specific courses designed to produce specific second language behavior for specific missions. For example:

- A consumer course to enhance one's enjoyment of travel in French speaking countries. It would concentrate on the situations most likely to be encountered by Americans which require different actions, attitudes, etc. than those which are natural and normal in America.
- A consumer course to enhance the enjoyment of French cuisine, wines, art and social graces in America or French speaking countries. This course would concentrate on the culture, history, and critical skills

- needed for dining at French restaurants, visiting French night clubs, etc.
- Productive courses, concentrating on the French needed to transact business in French speaking countries in the areas of banking, insurance, and general import-export.
 - Productive courses in the translation of written technical French.
 - A propaedeutic course concentrating on the linguistic analysis of language, the encoding of information and meaning into sound patterns and the interrelations of language structure and thought structure.
 - A propaedeutic course combining French and African Studies for inner-city Negro youth. This course would concentrate primarily on the scientific and cultural achievement of the great African civilizations, and the potential and future of Africa, its resources and needs.

Additional missions can be easily imagined as a result of many changes in our modern world. For example, increased pleasure travel, an increase in the number of international branches for U.S. companies, greater government activities overseas, and reciprocally, more foreign visitors to the U.S.--all these suggest language missions. The increase in easy communication barely begun with, for example, the establishment of communication satellites, suggests still others.

Curriculum design following from a mission analysis of the second language behaviors needed and used in our society would result in course offerings radically different from the second language courses now available in the public schools.

II. WHAT IS THE LEAST EXPENSIVE WAY TO LEARN?

Assume that we have decided what is worth learning. The next question is, "What is the best (least expensive) time and place to learn it?" This is resolvable into at least three questions:

- A. What is the best time to learn it?
- B. Where is the best place to learn it?
- C. Which organizations will be the best administrators of the learning?

What is the Best (Least Expensive) Time to Learn?

The cost of learning (in the system sense) is very much a function of the time interval between when something is learned and when it is actually applied. In fact, there are at least five ways in which the cost of learning is directly related to what might be called the "application lag": the time interval between learning and its real-world application in the pursuit of some important societal mission. These relationships are:

1. The Cost of Future Uncertainty
2. The Opportunity Cost of Technological Change
3. The Cost of Maintenance
4. The Time Cost of Money
5. The Opportunity Cost of Other Learning

The Cost of Future Uncertainty.--How many of today's 4th grade French students or Ph.D. candidates will ever use their newly acquired behavior in the pursuit of an important societal mission?

The resources spent acquiring behavior which is not used must be counted in the "per unit" cost of that which is used just as a factory counts the cost of "scrap" and "rejects" as part of the per unit cost of producing the good units. Uncertainty about the future can lead to two kinds of second language scrap and waste:

- The wrong language is learned. The student learns whatever was in vogue at the time (perhaps French) and 10 years later discovers that something else (perhaps Russian) is what he needs.
- The language is right but the mission is wrong. The student learned the translation skills of a productive mission (reading technical articles in French) when preparation for a consumer mission (a summer in Europe) would have been more useful.

Implications: An obvious way to reduce the costs of future uncertainty is to reduce the application lag. The smaller the application

lag, the more likely we are to predict accurately which students will need which second language behaviors. When thinking about reducing application lag, it is important to discover any points in time in which the probability of using second language behavior makes a significant jump. Some examples of these "probability jump points" are:

- When a student's family decides to go to Europe for the summer.
- When an adult makes a plane reservation for Europe.
- When a secretary is hired by an import-export firm.
- When a college student makes a career decision to become an interpreter or translator.

The Train-as-Needed Strategy: If we now move second language learning forward in time (put it off) until one of these probability jump points occurs, we can reduce the waste and scrap without precluding any significant amount of useful second language learning. For example, instead of giving French instruction in the 4th grade, wait until students sign up for cultural exchange programs or their families decide to take trips abroad. Then offer very intensive self-instructional courses designed to enhance foreign travel and living experiences.

The Opportunity Cost of Technological Change.--For many years engineers and economists have estimated rates of technological change (increasing productivity) for different industries. These rates have then been plugged into mathematical formulas along with other cost and profit factors to determine which of several plans would be the most profitable.

Example: "Widget" making technology has been changing at the rate of 10% each year. Should Company "A" buy 10 new "widget" making machines today or overhaul their present "widget" machines at \$X per machine and buy 8 new machines in two years?

Real industrial problems are much more complicated than this; product demand, machine life, resale value, interest rates, opportunity costs,

are a few of the many variables to be considered. Education has not had to deal with, or at least has not dealt with, even the simplest form of the question: "Shall we do it today or wait until tomorrow when it may be easier?"

Now, however, there is starting to be technological change in education. To the extent that technological changes are foreseeable, we should try to estimate their probable economic consequences. In some cases it may pay to use the Train-as-Needed Strategy because less expensive (more effective and efficient) training procedures will be available tomorrow.

Example: The Center for Research on Language and Language Behavior at the University of Michigan is developing a computerized self-instructional system (the SAID system) for "shaping out" vocal behavior with the eventual aim of devising a self-instructional system for developing phoneme and word production in second languages. ⁶

Implications: We need to forecast the likely spread and cost impact of innovations (such as the SAID system) in education, considering the impact of technological change on later as well as immediate instruction (e.g., the effect of a computerized 4th grade on graduate instruction). Whatever the rate of technological change in second language learning turns out to be for the next 10 years, 100%, 50%, or only 10%, it cannot help but add to the economic attractiveness of the Train-as-Needed Strategy.

The Cost of Maintenance and Depreciation.--If machinery is left idle, it rusts and becomes clogged with dust and dirt. Similarly, forgetting can be thought of as a kind of corrosion of acquired behavior when not in use. Whenever there is an application lag, there will be corrosion, forgetting. The cost of this forgetting can be measured in two ways, as a maintenance cost or as a depreciation cost.

To determine the maintenance cost of forgetting, we would ask:

"How much continuous review will be needed to maintain the desired behavior at close to full strength until it is actually used?" And then, "What will be the cost of this continuous review?" (It is assumed that when behavior is being used, maintenance is automatic.)

To determine the depreciation cost of forgetting, we should ask:

"How much relearning will be needed just before application to bring the behavior back up to full strength?" And then, "What will be the cost?"

Determining these maintenance and depreciation costs may turn out to be quite complicated because of factors like interference by later learned skills, overlearning, skill plateaus, etc. Yet, we can probably make some reasonable predictions with respect to the decisions which need to be made.

Implications: Like the opportunity cost of technological change, the costs of maintenance and depreciation cannot help but make the Train-as-Needed Strategy more viable and attractive economically.

The Time Cost of Money.--If money is placed in a bank or government bonds for a period of years instead of being spent immediately, it accumulates interest so that there is more to spend when it is finally used. This is another factor which should be weighed in decisions about when to teach what, especially when those decisions span many years.

Suppose money has been invested in teaching second language to a grade school student who will only make non-school use of his language skills when he is, say, twenty-five. That money might better have been, in a sense, "earning interest" over the years, for it would have increased by a sizeable amount had it been invested when the child was in grade school and then spent (on language instruction) when he was an adult.

The Opportunity Cost of Other Learning.--The decision that French shall be learned in the 4th grade precludes the learning of other things. And, to the extent that economists have been able to measure it, education, in general, appears to yield about a 10% rate of return as an investment. Several things logically follow from these two facts. As we said before, delaying learning with a low probability of use until the probability of use is higher will reduce costs by eliminating waste. But, the curriculum vacancies left by such delays can now be filled by other learning which will yield a positive return averaging 10% or more. This may be through new additions to curriculum or faster movement through the present curriculum. If society, on a larger scale, invests its second language resources in low rate of return investments (French in the 4th grade), it simultaneously gives up the opportunity to invest at higher rates of return (adult consumer missions or translating foreign technical journals).

As with the Cost of Forgetting, this cost can be calculated in two ways: as a cost of foregone working time (e.g., finishing high school less quickly) or as a cost of foregone production or consumer skills (not having more time for reading; math or sports).

Implication: Again the Train-as-Needed Strategy is favored.

In each case, the cost factors described clearly favored a Train-as-Needed Strategy in making curriculum decisions. This is a radical departure from present strategies.

Several cogent arguments which might mitigate strong support for the strategy have been ignored and deserve mention though they will not be discussed in this paper. For example, the usefulness of language has been portrayed here in specific terms. Some educators would contend that studying a foreign language is generally educative and liberalizing, that the benefits are similar to those produced by other "liberal arts"

disciplines. Turning from objectives to techniques, there are many claims that language learning should be begun when the student is young, regardless of predicted "use" age, for at least two reasons: the student is more amenable to acquisition of another language at that time and, furthermore, the process of teaching a second language is quite time-consuming. A full discussion of these and other traditional language positions would require a diverting rebuttal whereas the paper is designed to present an argument in its total rather than contrast it with others.

Where Is the Best Place to Learn?

The best answer to this question depends upon the answer to another question, "Where is the learner when he has a known high probability of needing second language behavior?" If the learner is in school, school is probably the best place for him to learn second language skills. But, if we fully apply the Train-as-Needed Strategy to second language learning, many (if not most) learners will not be in school. The learners will be typically:

- The secretary who has joined an internationally active corporation.
- The translator who wishes to start working in a new technical area.
- The adult who wishes to enhance the enjoyment of his European vacation.

In these cases the "where should it be done" and "who should be responsible" questions are open questions. They should be decided on the basis of economic factors similar to those outlined for the "timing" question. In some cases, total cost to society (not just to the Public Schools) will be reduced if the learning is done in a productive organization or by an organization that specializes in consumer missions:

Example: Imagine that banks need many secretaries and tellers with second language skills. Imagine further that banks throughout the nation collaborate through an industry association which they then use for in-service training. Their second language needs (due to

turnover, new business, etc.) are so variable, so immediate, and so thinly spread geographically that public schools could not meet them as efficiently as the banks themselves, through their own industry association.

Example: Imagine that the major airlines and steamship companies have formed a national non-profit corporation in partnership with the Federal Government. This corporation does the analysis, generates (or contracts for) and administers self-instructional courses for the enhancement of foreign travel to adults, children and family units. The services of the corporation are offered at the time inquiries are made and again when reservations are placed. In every major United States city the corporation has a tape bank which is accessible and operable by telephone to handle all of the passive audio materials and an advanced version of the SAID system for all active audio sections. The corporation's offerings would also be available through learning centers on all member steamships.

This exercise in imagination may seem utterly fantastic. Yet consider that air lines are offering up to six hours of free phrase instruction on transatlantic flights and that cruise ships regularly offer lessons. (They have their "students" in residence for days.)

The Train-as-Needed Strategy becomes feasible only when the new technologies of education are considered. In computer-based systems, for example:

"the student is connected to the teaching program and materials--to the teacher--by a thin electrical umbilical cord . . . (traditionally) educators have held a banker's view. The college or school has on deposit knowledge and the means of transmitting knowledge and producing skills. The student in order to make a withdrawal must appear in person and remain in residence for a long time. The possibility of opening the vaults, of moving out to the student, comes just at the time when such a change is sorely needed. Continuing education--education as a continuing part of everyday life throughout one's lifetime--is only possible on a large scale when the rigid geographical and temporal limits of current education are removed."⁷

One key to the feasibility of Training-as-Needed is the development of systems which do not necessarily require classrooms and teachers. Such systems are now available. The "where" question, then, can be answered with this new freedom in mind.

III. WHAT IS THE MOST PRODUCTIVE WAY TO PAY FOR LEARNING?

"Productive" here means two things. First, those strategies and policies which generate the greatest amount of second language mission achievement in and of themselves. Second, those strategies and policies that provide the most economic surplus (e.g., profit margin) to be reinvested in improving second language learning, for example, in research and development and in expansion of second language learning capability.

The Financing Problem

Since most second language learning now takes place in public schools, the financing problems of second language learning are largely those of public education as a whole. As a system, the public schools have the same financing problems as local government. They both are heavily dependent on local property taxes which are not increasing as rapidly as costs and demands for service. As a result, both local government and local schools are regularly forced to go to the voters pleading for a rate increase or a bond issue. From 1965 to 1966 the success rate of school millage and bond issues nationally dropped from 73% to 66.3%.⁸

Greater reliance on state contributions may help but state revenues are not growing as fast as needs either, and state legislatures are finding themselves increasingly in the same uncertain, embarrassing position as local governments.

As the states move towards state income taxes, the pressure may ease somewhat, but not much and not for long. An income tax is more likely to stay in step with increasing service demands. This is especially true of progressive income taxes (the Federal income tax) as opposed to flat rate taxes (most state income taxes). And, in fact, it is at the Federal level that the revenue situation looks most promising. Some social planners are calling for as much as \$10 billion in Federal aid to education within ten years.

While there is reason to hope for increased revenue for public education there is not reason for optimism. It is true that at each successively higher level of government there is more money, but it is also true that the dispersal of that money involves drawbacks such as these:

- revenues become more sensitive to the gross quantitative aspects of education: pupil days, poverty based on census data, etc. than to qualitative changes: new methods and programs.
- education will have to compete against powerful economic and political interests for surplus federal funds: space programs, the military, and tax-cuts.
- even if all other hurdles were surmounted, there might not be enough new federal and state revenues for school needs. The Department of Health, Education and Welfare projections are that education will require more revenue over the next 10 years (from \$38 billion in 1965 to \$60 billion in 1975).⁹

User Taxes

There may be some things that public schools can do internally (on their own) to ease their plight. Schools might, for example, follow the lead of local government and begin instituting user charges. User charges are taxes which are applied directly to those individuals who use specific services and are directly proportional to their use of those services:

Example: The cost of local sewage systems used to be paid for out of general property taxes. The cost of the local water system, however, was paid for through

user charges. Recently, however, city administrators and city councils have realized that a person's use of the sewage system is roughly proportional to his use of the water system. A sensible plan would be to increase water rates to cover the costs of both systems. Or, to use water consumption as the basis for a second charge, a separate sewer use tax.

Once the concept is grasped, there are many public services which can be fully supported by user charges:

Example: A city discovered that its dog license fee in fact covered only a small portion of the full costs of dog control. After some cost accounting studies, the dog licensing fees were raised to cover the salaries of those engaged in dog control; the costs of supervision by higher city administrators; the operating and depreciation costs of the equipment used; the maintenance and depreciation costs of the office space and other space used.

Example: The City of Los Angeles recently conducted an extensive study of its costs and found that about 50% of its expenses could probably be financed through user charges.¹⁰

Advantages of User Charges

In contrast to general property taxes, user charges:

- Can be quickly increased in response to increases in costs.
- Generate increased revenues as fast as service demand increases.
- Eliminate the need for bond issue votes for "plant expansion." Money can be borrowed on the open market at the going rate because it will be repaid out of the increased user charge revenue, not general tax revenue.

In short, user charges can give public services some of the demand responsiveness that we prize so highly in the private sector of our economy.

To date user charges in education have been confined to very small expenses with a low rate of return for the user: school lunches, textbooks, athletic equipment, etc. In contrast, the City of Minneapolis

recently increased the fee for driver training from \$25 to \$42.50 when a tax increase failed. The program is now self-supporting.¹¹

An Example: Advanced Placement Courses

There are many large expense items that would lend themselves to user charges. Advanced placement courses are a good example.

When a student takes advanced placement courses in high school and receives credit for them in college, many benefits accrue to him and his family. It is more expensive to attend a school away from home: tuition, room and board, travel, etc. Advanced placement can be viewed as reducing the number of semesters required for a degree and, hence, the total expense. Advanced placement gives the student an edge in competing for scholarships, stipends, and fellowships. The student has already demonstrated academic prowess at the college level. He needs aid for a shorter period of time. And, since he will spend less time on his undergraduate degree, the chances are higher that he will enter and finish graduate school. In short, success breeds success. Whatever the student's chosen career, advanced placement means that he will go to work sooner. He will earn full wages during the time saved by advanced placement, and all future salary increases will come that much sooner on the average.

Advanced placement means a substantial cost reduction for the student and his family and a substantial increase in income at the same time. There is no reason, then, why public schools should not institute user charges to cover the full costs of advanced placement courses.

User charges need not mean increased financial risk for the student and his family or less opportunity for the economically disadvantaged. Advanced placement courses could be offered with a money-back guarantee. If the school did not do a good enough job, or the student did not go to a college that gave credit for advanced placement courses, the student

and his family need only obtain a signed affidavit from the college registrar. The local school system would then cheerfully refund their tuition. Similarly, if college work is being done in high school, it seems logical that appropriate state funds be used.

Public school revenue would, of course, be increased. This would mean more money for innovation and improvements within the advanced placement program. It would also mean that more money was available for improving instruction in the rest of the system. It would also provide a financial incentive to the school system to improve instruction in the earlier grades, to increase its efforts to identify students with college potential, and to work on the motivational and study problems of the bright under-achiever.

For the state, it would greatly reduce the direct costs of providing education at the college level and of giving scholarship support to economically disadvantaged students. It would also create broader political support for tuition scholarships for college work.

For the economically disadvantaged student (and others) it would mean a dry-run on college level work. He could become surer of his ability to do college work. Moreover, the anxieties and guilt feelings about accepting financial aid could be reduced by successive approximation.

User Charges and Second Language Learning

Where second language learning is merely to meet the requirements for college graduation, it should quite clearly be paid for out of tuition charges for advanced placement courses.

A less clear area is second language learning for consumer missions. However, two approaches would be equitable. The first would be to separate out all consumer learning and pay for it with user

charges as with private ballet or riding lessons. The second would hold that learning to consume is a necessary part of socialization in a consumer-oriented society and set aside a given percentage of the day, and school revenues, for consumption learning.

This second approach raises an interesting and serious question of "free choice vs. class colonialism." Unless one is free to choose the activity it is not a consumer activity; it is work. Enforced consumption of ballet, art, French culture, or anything else is forced labor. Forced labor is economically justified only if it contributes directly to some propaedeutic or productive mission.

If schools wish to allocate resources to the development of the whole student, to consumer missions as well as propaedeutic and productive missions, then at least logically several conditions should be met:

- The student must be free to do nothing if he so wishes. If French courses are offered as a consumer product, the student should be free to choose to spend his time in the library, gym, auto-shop or even leave school completely. It is not consumption if it is a forced choice (a choice among a few alternatives selected by others).
- The cost per student of the various consumer-oriented programs of the school should be approximately equal. Those students wishing to pursue hot-rodding or badminton should be able to use just as many school dollars in pursuing those activities as the students who elect French.

The further logical extension of the above two points is that a student who wishes to pursue bicycle riding as consumer activity should be provided with a given amount of money (the amount to be spent on consumption) and turned loose. In short, much of what passes as consumer learning today could be viewed as the imposition of elitist consumption tastes upon non-elite populations. While the sons and daughters of the elite are engaged in consumer learning (fun), these same experiences are merely extra work (forced labor) for the children of the non-elite. In some respects this analysis seems particularly appropriate to second language

learning, especially if the previous narrow definition of use is employed.

On a larger scale, the analogy of instituting consumer charge in education is shifting organization responsibility for education. Those who benefit most bear most of the costs and those who do not benefit are not asked to sacrifice. Traditionally in our society we have asked consumers and producers to pay directly for what they consume in the pursuit of their respective missions. Our rapidly changing technology is upsetting this convention. A more sophisticated technology requires more formal training for successful application whether the mission is consumption or production. Formal training, however, has traditionally been assigned to the public domain. Thus, as the demands for formal training have increased, most of the burden has fallen on the public schools. The school has become the site of all kinds of training and educational functions to the extent of already sorely straining the entire system. We have asked the local community to sacrifice through taxes and to think of training the young as an investment in the future.

Today, however, the demands for trained expertise are growing so rapidly that training can no longer be considered only as an investment in the future. Now we must start thinking of being a student as the largest occupation in our society and of training as a cost of current production. This is already happening in many areas:

- IBM alone carried out 10 million man hours of instruction and planned to distribute 90,000 self-instructional kits to customer employees in 1966.¹²
- Control Data Corporation started its own school for computer programmers. \$1,600/year tuition.¹³
- The "Big Three" auto companies are developing their own training programs for auto mechanics. 50,000 men per year.¹⁴
- In 1965 Business and Industry spent about \$4.5 billion on formal internal education and training with another possible \$15 billion on informal training.¹⁵

A beginning is being made on re-assigning responsibility for certain training and education. Unless there is a substantial reallocation of non-propaedeutic learning functions to other organizations (producer and consumer) and/or a great increase in the application of user charges, the supply of education and training will continue to fall further and further behind demand. And the schools will be further strained.

It is of special interest in light of the earlier mission analysis of second language learning to contemplate the shifting of the training for certain language missions to organizations outside the school.

IV. CODA

A number of arguments have been advanced and elaborated, providing one (heavily economic) analysis of and (somewhat implicitly) a series of suggested solutions for problems of second language education. The major point of the paper is not to propagandize the particulars of the analysis and solution. Rather it is to demonstrate the power of a systems approach in generating new analyses and solutions. While this is not meant as a disclaimer of the content, it is a plea for contemplating this paper as a demonstration of the application of a systems approach to education.

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2. "Research: Putting a dollar sign on life," Business Week, 21 Jan., 1967, 86-88.
3. Silberman, Harry, "Overview of CAI at SDC," News About CAI (ENTELEK Inc., Newberryport, Mass.), Sept., 1966, 1, 2.
4. Cogswell, J.F.; Bratten, J.E.; Egbert, R.E.; Estavan, D.P.; Marsh, D.G.; and Yett, F.A., Final Report: Analysis of Instructional Systems (Systems Development Corp., Santa Monica, Calif.), April, 1966 (TM-1493/201/00).
5. Melloun, George, "Company Profs: Businesses Speed Up Formal Training Efforts for Employees, Others," Wall Street Journal, Feb. 26, 1965, 1.
6. Buiten, Roger and Lane, Harlan, "A self-instructional device for conditioning accurate prosody," Int. Rev. Appl. Ling., 1965, 3, 205-219.
7. Geis, G.L., "Education, The Modification of Behavior," Proceedings of the Twenty-Second Meeting of the American Conference of Academic Deans, Philadelphia, Pennsylvania, 1966.
8. "School Budget Pinch," by David Vienna, Wall Street Journal, Thursday, 13 April, 1967, 1.
9. "Technology in Education," Hearings before the Subcommittee on Economic Progress of the Joint Economic Committee, Congress of the United States, Eighty-Ninth Congress, Second Session, 65-724 O, U.S. Government Printing Office, Washington; 1966, 210.
10. Barlow, R., "New Sources of Municipal Revenue," The Citizen's News, Ann Arbor, Michigan, May, 1963, Vol. 25, No. 11, 9.
11. Vienna, op. cit., 1.
12. Melloun, op. cit., 9.
13. Ibid., 1, 9.
14. Miller, N.C., "Auto Repair Wrangle: Mounting Complaints of Poor Dealer Service Spur Factory Action," Wall Street Journal, October 11, 1965, 19.
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APPENDIX C

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TWO PATHS TO INNOVATION--IMPOSITION AND EVOLUTION¹

G.L. Geis

A considerable part of the efforts of the Center for Research on Language and Language Behavior is devoted to studying problems of language instruction. The Center was conceived of by both its founders and sponsors as, Janus-like, looking simultaneously to the laboratory and to the language learning student. One group at the Center is devoted solely to the problem of the modification of language behavior.

We are concerned that our innovative efforts do not end up merely as "another approach to language pedagogy." We are interested in the problem of educational innovation itself. In this paper I will attempt to propose some characteristics of successful and unsuccessful educational innovations; and to describe briefly one project in which members of the Center and associated groups are involved--a project which illustrates our present strategy for innovation.

Commonly the problem of educational innovation is viewed as a rather simple one. Thus, there are really only two parties to be considered when innovating: the psychologist who works in his laboratory to produce those basic laws, or principles, which allow him better to predict and control behavior and to develop a system of explanation--a theory. On the other hand, there is a teacher who faces the practical task of producing behavioral changes in a variety of human beings (incidentally, to produce such changes while allowed only minimal control over the important variables which affect behavior). Both roles are clearly encapsulated. The problem, according to this view, is to build a bridge between the psychologist and the teacher, between the laboratory and the classroom. A great deal of effort has been expended

1. This paper was originally presented as part of the inauguration ceremonies of CRLB on October 17, 1966, Ann Arbor.

in developing this connecting link across which principles of behavior can be transported to the educational engineer. At best that bridge has been little more than a thin verbal strand across which no idea can safely cross.

It seems to me that the problem lies not with construction, but with conception. The bridge-building solution requires several assumptions which I believe are quite unwarranted. Indeed these incorrect assumptions may, in good part, have accounted for the sad history of failure that has characterized almost every innovative effort in education. There has not been an important change in human education for the past 2000 years except for a steady increase in the student-teacher ratio.

The first assumption made by the bridge-builders is that the psychologist has available in his laboratory cupboard a collection of laws, principles and behavioral techniques which clearly and precisely describe the dynamics of behavior and behavioral change and the procedures necessary to produce behavioral modification.

A second assumption is that these principles can be applied almost immediately and directly to the specific, daily problems of instruction which the teacher faces.

A third assumption is that teachers learn by exposure; the psychologist need only state his findings to the teacher and she will apply them to her work.

A fourth assumption is that the teacher and the classroom represent the basic and possibly the only units of instruction.

A brief glance at the literature of psychology makes us question the first assumption. If the psychologist does have an epistemological closet, it resembles Mother Hubbard's cupboard rather than Amalthea's cornucopia. As psychologists we can say very little about the

basic principles which govern behavior. We have few quantitative laws of the sort that characterize the other sciences. We are not without some laws and principles. Indeed, in recent years major advances have been made in establishing a solid, systematic science of behavior--advances in technology, in generating principles and in reformulating traditional problems. Nevertheless, it is premature to picture psychologists as a shy group who have the answers and are coyly waiting to be asked the questions.

Those laws or principles that psychology has generated are usually not directly applicable to complex situations, just as the basic principles of physics are of little use to the mechanical engineer. Thus, Thorndike's Law of Effect, or its more recent restatement as the principle of reinforcement, is a powerful, all pervading principle. It states that the consequences of a bit of behavior affect the future probability of occurrence of that behavior. But such a statement is of little use to the teacher. Surely, to the extent that she affects students, the things she does cannot violate that law; if she is to be effective, she must reinforce her students. But how? With what? The principle is very general. (Indeed, that may be an important feature of principles.) On the other hand some psychological laws are too specific. Marbe's law, for example, which states that a logarithmic relationship obtains between individual reaction times for free associations and the frequency of occurrence of these responses in the population, may fascinate and prove useful to some psychologists, especially psycholinguists. Obviously the precision of the law and the highly controlled conditions under which it was generated prevent its application by the practitioner in a classroom. The second assumption of the bridge-builders: that the findings of psychologists can be directly applied to instructional problems, is also, I think, patently false.

A third assumption was that if principles of behavioral modification were available and were applicable, they could be infused into the

educational system merely by informing the teacher of their existence. Psychologists typically give talks to teachers, publish articles for general dissemination, and so on. The assumption is that exposure to information not only brings about behavioral modification (in the teacher) but that such changes in the teacher will automatically be maintained in her daily routine. I have pleaded earlier that we psychologists do not know much about behavior. But I also indicated that we are not completely ignorant. The principles that we have established, like the principle of reinforcement, and the observations which led to those principles strongly suggest that mere exposure never has and never will teach anyone anything. Harlan Lane, in a paper called Models of Learning and Methods of Teaching,² has elegantly described the misconception this way:

"The basic tenet of (this) sunburn model is learning by exposure. The teacher, the prime source of knowledge and light (and occasionally heat), 'exposes' the student to the material. The brighter students 'soak it up' and eventually 'see the light.' Dull students, who fail to learn, are not sensitive or receptive."

There is simply no evidence that an exact application of the sunburn theory by the teacher will lead to, analogously, mental tanning. Psychologists are the first to point this out. But they do so usually by talking to teachers, that is, by exposing them to information, that is, by applying the sunburn theory of learning.

Despite the derogatory student comment to the contrary, we teachers act like other humans and learn in the same way they do. Attempts at innovating in education which use as the major innovative procedure exposure of the teacher, administrator, parent or student to the new information seem likely to fail, no matter how beneficial the innovation might be. In short, if the psychologist does have something of value

2. Lane, H.L., Models of learning and methods of teaching. Experimental analysis of speech production and speech perception, 7. Ann Arbor: Behavior Analysis Lab., 1965.

which can be applied by the teacher, he will fail if he tries to produce changes in her behavior using the very methods of teaching he is attempting to get her to discard.

The last assumption concerned the basic unit of education. Innovative efforts, almost without exception, have been contained by the limits of the teacher and the classroom. As we begin to find out more about human learning, as we face a multitude of increasing pressures ranging from the pupil population explosion to the information explosion, as we view the black history of failures of attempts to improve the existing educational system, we must consider innovations which involve, if not development of new systems, at least drastic modifications of the old. Educational innovators have been like men who, when faced with the problem of developing a better means of transporting people from New York to Los Angeles, breed faster race horses rather than inventing jet airplanes. Self-instructional materials involving only one active human participant are demonstrating their effectiveness in replacing the student-teacher dyad. Computer-assisted instruction such as our own SAID system here at the Center or Dr. Moore's talking typewriter are proving to be beneficially inhuman, in the sense of super-human, tutors. Truly innovative efforts in language teaching and elsewhere in education must at least pay heed to the development of new instructional systems. The staggeringly complex task of producing a major behavioral change in a student (e.g., teaching him to speak a second language) most likely requires at least effective management of the whole learning environment and very possibly development of a new environment for learning.

The consequence of incorrectly assuming that psychology has a complete, precise, systematic set of laws and principles of behavior; that these laws and principles are directly applicable to the problems in applied areas such as education; that all that need be done is communicate

the basic principles uncovered in the laboratory to the teacher in order to modify the teacher's behaviors; and finally, that all innovation must be limited to retreading the present instructional system, has, of course, been the repeated failure of innovative efforts in education. Unhappily accompanying this cumulative record of failure has been, I think, disillusionment on the part of each member of the dyad. The teacher has become suspicious of just how much the psychologist can do for her, and the psychologist has often concluded that when he does try to do something, his effort is not accepted, or certainly not maintained by the educational system.

However, I think that rapport can be established and successful innovation can be brought about. But a new set of assumptions is required and new strategies are called for.

Let us assume, for example, that psychologists engaged in basic research have not generated all of the answers to the problems faced by the instructional engineer. Let us assume further that almost nothing the psychologist does discover or invent can be applied immediately and directly to behavioral engineering problems. Let us assume not the need for a bridge between the laboratory and the classroom connecting two discrete groups of people but rather a fine-grained continuum stretching from the laboratory to the pupil. This continuum would include basic researchers working on typical instructional problems but in carefully controlled environments, applied researchers in the field, instructional systems designers, instructional materials designers, innovative agents who would guide on-site innovation, and behavioral engineers who would deal directly with the student. Picture a T with a spectrum of research and development experts ranging along the stem of the T, reaching from basic research to the student. The cross-bar represents another spectrum at the instructional site: a group of applied experts involved in the practical problems of student diagnosis and placement, guidance, evaluation, tutoring, content specialists, and the like.

Let me point out that this picture is quite unlike the present structure of instructional research: the stem of the T is missing and the cross-bar is represented only in outline--at present a shadow no bigger than the special education teacher's or guidance counselor's hand.

Every technology in the past has at least been accompanied by (and in some cases preceded by) the proliferation of specialists. Instruction, on the other hand, has traditionally involved primarily one person: the teacher. In former times we conceived of medicine as involving one person--the general practitioner, the family doctor who diagnosed everything, or attempted to, who set bones and rolled pills, who provided primitive psychotherapy and dabbled in surgery. Today we would be appalled at such a Renaissance medicine man. Similarly, it seems to me, there is developing rapidly increasing role specialization in instruction. There is no reason to think that teaching someone to speak Spanish should require less of a team and less of a sophisticated effort than curing him of a cough.

Now, concerning a different third assumption, let us assume that the teacher, parent, administrator all learn according to the basic principles of behavior that apply to the acquisition of behavior by the student. We would then suppose that innovative efforts if they are to be accepted by, and importantly, maintained by, the school must be accompanied by sophisticated planning for innovating.

Finally, a different fourth assumption: the basic unit of instruction consists of the student and some instructional system, one and only one of which is the teacher. The ineffectiveness of the teacher in a classroom as an instructional system surely need not be belabored with an audience interested in language learning and aware of its present sad state. But even if the teacher-classroom system were effective, being so temporally and geographically constrained it simply is not able

effectively to deal with problems such as continuing education, instruction in specific skills just at the time the student really needs those skills, and continuing adjustment of curriculum to changing social needs.

We have recently become allied with the secondary school system in Michigan in a project acronymically called FLICS (Foreign Language Innovative Curricula Studies). This Office-of-Education-sponsored planning project, directed by James McClafferty, could have been another of the many efforts devoted to developing methods or instructional materials external to the school system and then seeking, however subtly, to impose the new materials and systems on the school. We have taken another tack, one which is congruent with the new set of assumptions I have just outlined.

The project has several parts; I shall describe only one: the one in which I am involved, naturally enough.

The section I direct was charged with responsibility for staff training. We have interpreted the task this way. We have used this opportunity to design one of the many new instructional roles I mentioned before. We are attempting to develop a curriculum for the training of what has been variously labelled by members of our group as "educational managers," "innovative agents," or, colorfully, "midwives of change." Whatever the name of the job, let me describe its characteristics.

First, we see this person located in or very close to the school. We see the need for a full-time innovative agent in second language learning being on the spot. We place him there for several reasons; some have to do with the greater ease in guiding externally developed innovations; some have to do with the generation and evaluation of local innovations; some have to do with the generation of specific research problems which can be fed back to centers such as CRLLB.

The innovative agent will have several important skills and tasks. First, he will be sophisticated about specifying instructional goals. He will spend time probing teachers and administrators, students and parents, and, importantly, the final consumers of education--the people who hire our students--to determine realistic goals for second language teaching. This may well result in major curriculum changes. Clearly, part of the problem of unsuccessful instruction lies not merely in the methods used to teach but in the uselessness of what is being taught. This lack of correspondence between what is being taught and what the student will need once he is released from his academic confinement is all too clear to almost everyone but the teacher. The development of new materials which more successfully teach old curricula may often be inane and even socially irresponsible. The innovative agent is in a unique position to spend time considering the usefulness of the school's product.

A second role will be that of evaluator. Education has known change, almost continuing change, but it has remained whimsical and ephemeral. The educational system can make change cumulative, can turn change into progress, only when it incorporates adequate evaluation systems. "Our man in the schools" should be skilled in evaluation of goals--long-term evaluation (the psychologist's word might be validation). He should be equally skilled in short-term evaluation--skilled in evaluating particular innovations in terms of whether they do, indeed, produce the behavioral changes they were designed to produce or laid claim to producing. He will be the evaluative super-ego in second language learning. The positive side of this critical facility will be helping to construct tests, stretching the instructor's imagination to new and more adequate means of measurement, reminding the system continually of its primary commitment to evaluation. Though he may be labelled an innovative agent, I would predict more of his time will be spent shooting down suggested innovations than putting a data-based

seal of approval upon them. Like a good doctor, he will most often prescribe restraint from medication until that medication is proved effective and applicable.

A third skill he should have is that of a designer of instructional systems. I think that phrase is descriptive but is perhaps too elegant for many of the rather menial activities we have in mind. A system might consist of nothing more than a certain sequencing of assignments in the text, recitations, and the like. He can help produce a variety of such designs, and then, putting on his evaluator hat, compare the effectiveness of the different arrangements. Of course a system can also be something as complex and original as Dr. Moore's autotelic environment, involving programmed interventions of a variety of sub-systems including the teacher and the computer.

He may help develop such sub-systems and aid in the production of the teaching materials; as such, he assumes a fourth role of instructional materials designer. He will be able to at least produce models for the teacher of a great variety of materials; perhaps he will encourage her to become an author of self-instructional materials or to co-author text materials with another teacher of a different language.

Still another role we hope to prepare him for is that of behavioral engineer. Some of the jobs I have described might be called, correctly, behavioral engineering. But we have in mind a more limited use of the phrase to denote pupil management, an almost exclusive concern with the means of modification, the particular processes involved in behavioral change. Dr. Donald E. P. Smith of CRLLB and his staff have devoted themselves for years to examining more effective means of classroom management. (His report on some of that work is part of these proceedings.) As a behavioral engineer, our innovative agent would study classroom and learning problems which are commonly classified as disciplinary, motivational and the like.

He will be a disseminator--source of information about materials, methods and research for the school system. He will also be a source of information about researchable problems to the applied and even the basic researcher. The school system has traditionally taken from research, whatever worth the products of research may have been. But we see our innovative agent supplying to research people, who are removed from the instructional environment, descriptions of real-world constraints and needs, fueling, we hope, the furnaces of applied research.

The man I have described in some ways resembles the curriculum coordinator in some schools. But there are major differences. One is that he does not take the traditional classroom unit as a limit for innovative efforts; another is that he does not merely suggest: he works on innovations directly. Still another difference is that we have purposely planned a man with split allegiances. Hopefully not a man without a country, but one who garners reinforcers from two communities. He will spend time in, be in communication with, and be respected by research people at centers like ours. He will be accepted and listened to by the teacher and principal.

In discussing the FLICS proposal recently with a group of teachers, one asked me, "Where do you see this all ending?" Being a teacher, I gave a long and unnecessarily complicated answer. I think the correct answer would have been: If we are successful, our innovation, unlike so many others, will not end. Indeed, that is the point of the system we propose--the beginning of an innovative system that is self-maintaining and continually evolving.