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ABSTRACT

This short summary presents an outline of major findings of the feasibility study and makes recommendations for future directions. The study attempted to determine whether the model is pedagogically, administratively, economically, and technically feasible, whether clients whom the program is designed to serve are satisfied with the model, and how the model will update itself to insure relevance to teacher education in the 1970's. Conclusions are that the model is feasible in all respects, that clients are satisfied with it, and that a procedure exists for continuously updating the model. Central findings of the pedagogical feasibility study are 1) a large number of students are able to pass performance criteria without taking any instructional alternatives; 2) students enjoyed having a variety of instructional alternatives open to them, but often preferred regular classroom work; 3) no differences in achievement appeared between students who took different instructional alternatives. An important direction for future study is seen to be the articulation of relationships between curriculum areas. (The complete report of Phase II--Volumes I and II--is SP 004 259 and SP 004 260. Phase I final report is ED025490.) (PT)

Summary

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A FEASIBILITY STUDY ON THE MODEL ELEMENTARY TEACHER EDUCATION PROGRAM (PHASE II)

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Introduction

The Model Elementary Teacher Education Program (METEP) represents an innovation in organizational educational programming. Utilizing a performance based curriculum design as a central planning principle, the program employs a broad systems approach to new developments. The model is made up of a series of program components or subsystems (e.g., educator component, management subsystem, information subsystem, etc.). An objective of the study was to provide for systematic integration of the formal subsystems into a network of relationships. Basic in this concept is the notion of "wholeness" and the synergistic idea that the total program as an entity is more than the sum of the relationships of the various individual units.

Inherent in the entire METEP effort is the concept of a responsive and adaptive educational programming system which responds to changes in the environment and new demands by client groups. How responsive or adaptive is the present or traditional educational programming system? The traditional teacher education program is essentially a self-energizing system. There are no organizational mechanisms whereby the clients can effectively make demands on the program for changes to meet their needs. There are no internal processes within the system that will automatically generate demands for a new program. In the absence of an effective sensory apparatus it is characteristic of the traditional teacher education program to respond tardily and incompletely to changing environment. The present educational crisis has emphasized the inadequacy of the traditional educational programming system in terms of its organizational structure, processes, techniques, functions and value system.

Program development in the METEP model will be an integrated process in terms of assessing both the external environment as to client needs, running through the entire educational programming system to program review, and then looping back to research and development for program modification or financial analysis. New and improved existing organizational functions are recommended (e.g., client demand analysis, research and development of educational programs, financial analysis using computer simulation) in order to prevent newly generated programs from receding in time into the ranks of the well established and frozen form which is not responsive to clients or the environment they were intended to serve. The structure of the educational component is designed to allow for constant revision and upgrading. The specific performance criteria required of the trainees and the accompanying instructional alternatives are tentative hypotheses about the required training for elementary teachers. They are not interpreted as fixed, but rather subject to change based upon evaluation analysis. One of the underlying assumptions of the METEP system is that schools of education exist to serve society rather than society existing to serve schools of education.

Purpose of the Study

Utilizing the basic design developed during Phase I, the University of Massachusetts' study attempted to answer six questions regarding feasibility:

1. Is the model pedagogically feasible?
2. Is the model administratively feasible?
3. Is the model economically feasible?
4. Is the model technically feasible?
5. Are the clients, whom the program is designed to serve, satisfied with the model?
6. How will the model itself insure updating and maintain its relevance for teacher education in the 1970's.

The purpose of this paper is to present a summary of major findings of the study and to make some recommendations for future directions.

Basic Assumptions Underlying the Model Elementary Teacher Education Program.

1. For education to be truly responsive to the changing needs of both society and individuals, educational goals are an integral part in in the initial planning and programming process.

2. The criterion of time currently used to measure the educational progress of a student is at best only incidently relevant to the students ability to perform intellectually.

3. The process of change must be institutionalized so that it becomes an integral part of the educational structure. The first step in this endeavor is the thorough analysis of educational roles, tasks, structure and objectives.

4. Optimal individual learning conditions may be created if educators learn to correctly match teachers, materials, structures, and students.

5. A flexible teacher education structure is required if new alternatives for learning opportunities and experiences are to be conceived, implemented and evaluated. Variable entry and exit points, performance criteria, multiple instructional routes for individualized instruction, differentiated staffing patterns, formative and summative evaluation, micro-teaching, and continual in-service training programs become the unifying elements of the program.

PEDAGOGICAL FEASIBILITY

The central purpose of the feasibility testing was to determine whether or not a performance based curriculum model, utilizing performance criteria and instructional alternatives as organizing elements, could successfully be adopted as a planning principle in designing and developing a new model of elementary teacher education.

Since there is no real evidence of the efficiency of any one major strategy of teacher training, the feasibility testing included as many widely differing overall strategies as possible in order to examine training consequences, to gain insights into relative training efficiences, and to discover relative acceptance and appreciation of the processes by trainees.

The five teams exploring pedagogical feasibility were divided into social studies, language arts, science, mathematics and human relations. Each approached the problem of feasibility from a different perspective. The language arts team, for example, tested all performance criteria with all elementary students involved

in the teacher training program over a five week period of time. Mathematics, on the other hand, completed a detailed evaluation of only one week's study material; in this way, useful information on the aptitude-treatment interactions was gained. Human relations was testing totally new constructs and needed to determine if the constructs did indeed exist and were measurable.

As such, the five reports summarized here are very different in their nature. Purposely, they answer different aspects of the performance curriculum's workability. The question is whether or not the individual investigators believe that student interest, accomplishment, and achievement merit further effort on their part. The answer to this question appears to be a resounding, "yes".

Summary of Findings and Recommendations for Future Directions

Without going into detail on each area the following conclusions seemed central:

1. A large number of students are able to pass performance criteria without taking any instructional alternatives. This would suggest that much of the work in regular classrooms in educational methodology is not a useful exercise for many students and professors. The pre-test system permits students to avoid needless repetition of material they already know and frees them to move to more advanced concepts.

2. Students enjoyed having a variety of instructional alternatives open to them, but surprisingly often chose regular classroom work rather than other, more innovative approaches. It may be that students and professors both need more experience with less common instructional alternatives such as videotape and other multi-media approaches. Students clearly seemed to like the idea of choosing their own approach to learning and this seemed to motivate them better in the regular classroom.

3. No differences in achievement appeared between students who took different instructional alternatives. One explanation for this may be that the individualized approach emphasizing pass-fail criteria resulted in each student achieving the objectives. Further, each student may have tended to select the instructional alternatives most suitable for him as a way to achieve the common goal of passing the performance criterion. Aptitude-treatment interactions did not appear, perhaps for the reasons cited above.

4. Students and professors seemed to enjoy the performance curriculum approach. One qualification to this was the science staff who felt that the PC selected did not allow for sufficient creativity on the part of the student. They expressed concern over some students who

seemed more concerned with passing the criterion than learning the material. Seemingly, a performance curriculum approach does not always end this old problem.

5. The specific behaviors identified by the human relations team, such as relaxation, non-verbal skills, etc. seem measurable and definable for purpose of instruction. Students appear to be interested in this new area as a part of their elementary teacher education. In addition, specifying the precise expectations within a performance curriculum seemed to lead to more creativity and individuality.

Some future directions for the performance curriculum in elementary education seem apparent:

1. An entire elementary education program centered around the concepts of performance curricula seems feasible. As such, efforts in the future should center on improving specific curriculum areas, defining performance criteria more precisely, and conducting further research into the area.

2. Articulation between the curriculum areas is necessary as there are important relationships between them. As the several teams have developed specific performance criteria, it is increasingly apparent that some overlap exists. More important, however, is the discovery of structural similarities between fields. For example, the human relations construct of decision making is closely allied to creativity within science and language arts or to model building in social studies. It may eventually be possible to restructure the elementary curriculum around new skill constructs.

3. Important research areas have been opened. The present study has raised more questions than it has answered. We are interested in further studies of aptitude-treatment interaction, the effectiveness of varying instructional alternatives, the transfer of performance based learning to the classroom, and other questions. After completion of this pilot phase, all participant investigators felt they were now ready to ask and seek answers to important questions. A knowledge and experience base for further investigation has been built by the several teams.

4. The METEP Program seems applicable not only at the University of Massachusetts, but in other teacher education programs as well. Important in this conclusion is the fact that relatively precisely defined curricula and associated materials are easily transferred to a wide variety of settings. Once a performance curriculum is established, it is our subjective belief that paraprofessionals and aides can handle much of the specific supervision of daily management of the program. Evidence in several areas indicates that the performance curriculum can be arranged to foster creativity and change, as opposed to repetition and rote learning.

MANAGEMENT SUBSYSTEM

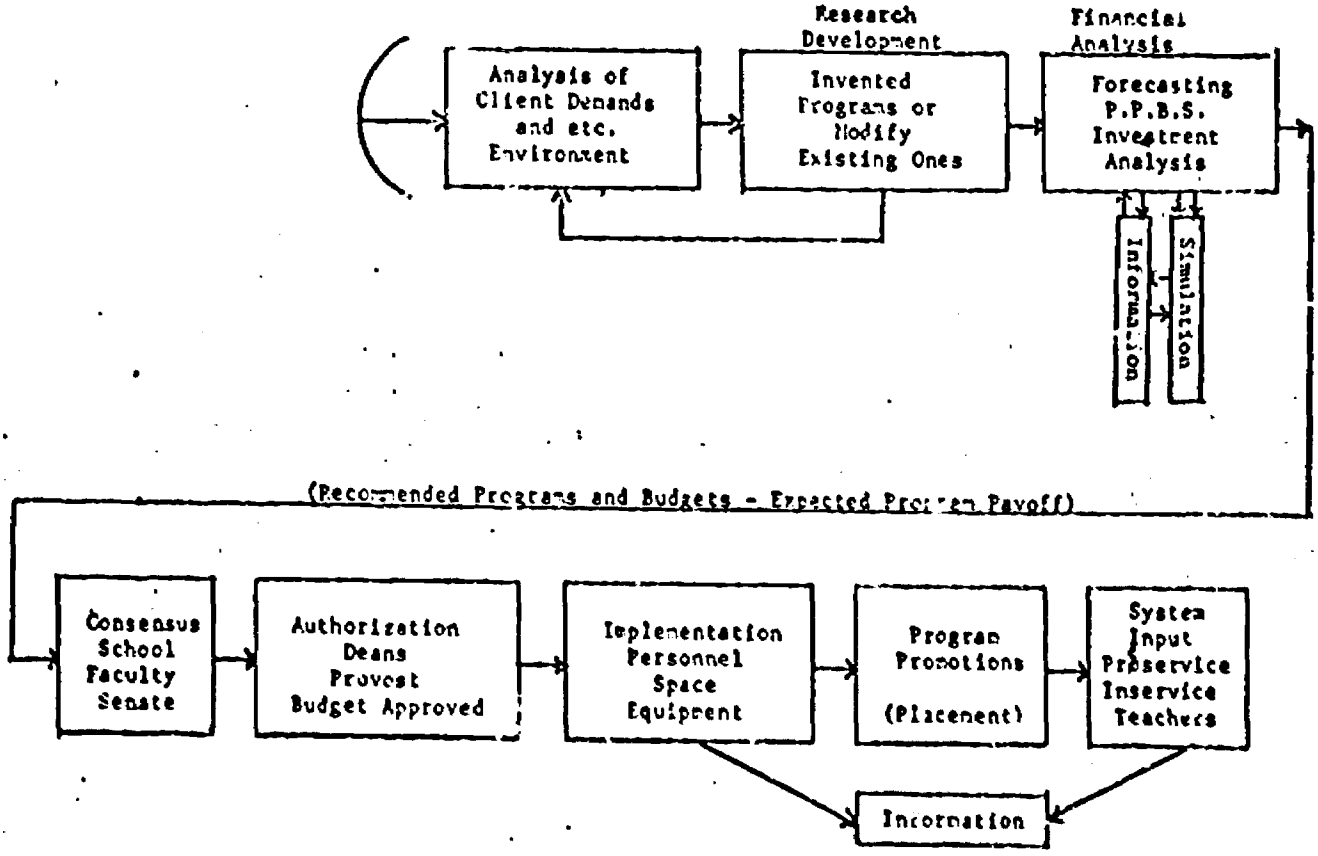
The METEP model represents an innovation in organizational process, function, structure, and values in terms of educational programming systems. This model is directed toward the correction of the deficiencies found in the traditional teacher education model. The entire model is viewed as a learning system or one which on the basis of its experience can self-correct its operations. The management subsystem is no exception, in that a management redesign capability would be considered a permanent part of the METEP model in the form of organizational planning.

The primary question to be answered by the management subsystem is whether or not the management system that emerges over a five-year period can feasibly solve the organizational problems that the METEP model will generate. Figure 1, METEP Organizational Programming Sequence, provides an overview of the proposed educational programming system.

Under the rubric of clients, one should note that a series of groups whom the system is to serve has been delineated - students in the program, public school administrators, public school teachers, state department of education, parents of children in school, children in public schools, academic community educational centers, etc. Data as to characteristics of the clients, their demands and needs, are assessed by a function which, on the chart, is noted as the analysis of client demands. This function presents a central monitoring effort on the part of the organization, or an intelligence unit to ascertain what the external demands are, insofar as the system is concerned. It is assumed that the nature of the clients will change over time, that their demands will change, and this unit will, through appropriate monitoring procedures, sensitize the system to such changes. In addition, this unit will be concerned with more general changes in the environment which relate to what other educational schools'

FIGURE /

METEP ORGANIZATIONAL PROGRAMMING SEQUENCE



research units are doing, what new technology is emerging in the field, and, in general, will concern itself with the overall problem of changing societal demands on the educational system.

Given the analysis of the intelligence unit as to changing environmental demands, such analysis will be sent to a research and development unit with concurrent recommendations that either new programs have to be invented, or existing programs have to be modified to meet changing environmental demands. It is expected that this research and development unit will develop educational programs in a fairly rigorous fashion, in the sense that prior to their implementation, compatibility with the rest of the system will have been demonstrated. Within such a unit one would, of course, encourage as much creativity as possible. In other words, insofar as research and development is concerned, the initiative for the development of new programs can originate either on the client side in the form of new demands or in the research and development unit.

New programs or modifications of existing programs are then sent to the financial analysis unit or function. In terms of new programs, modifications of existing programs, or those ongoing programs that will not be changed at all, financial analysis would make a forecast over some reasonable period of time, for example, five years, as to the number of students who would be expected to utilize each program. In other words, financial analysis would have to ascertain the size of the program. Given the number of students and given the technology of the program, the financial analysis can ascertain the required staff, space, equipment, etc. Financial analysis then, in turn, can formulate a program budget for each program. For each program there would be certain expected outputs in terms of numbers of students, program characteristics, output specifications of the program, etc. For example, if one of the programs were mathematics, with so many modules, one could ascertain the expected cost per student unit of output in terms of acquiring the requisite unit of mathematics.

Assuming that funds were not unlimited, the financial analysis would have to carry out an investment analysis of all programs, both proposed and current. Presumably such investment analysis would be done in terms of attempting to maximize the decision function of producing more education with less cost. The financial analysis unit, on the basis of their review, would provide a set of recommended programs and budgets which would delineate the expected total program payoff in terms of the entire program and in terms of individual program components.

Assisting in financial analysis will be two basic sub-units -- the information subsystem and the simulator. The information subsystem will be constantly storing basic data, client demand characteristics, program characteristics (particularly output specifications), cost and resource data, numbers of students, etc. The simulator will also assist in investment analysis through alternative allocation strategies which search for minimum costs.

Recommended programs will be submitted to the faculty decision making body by the financial unit. Or, if such recommendations do not have to be voted on by a faculty group, they can be submitted directly to the dean and provost for budget approval.

With budget approval, programs can then be implemented in the form of acquired requisite personnel, space, equipment and material. Concurrent with such implementation, where required, new programs or modifications of existing programs will be promoted and/or explained to potential client users.

The last function to be performed is program review or a determination of actual program payoff. It may be recalled that financial analysis, in recommending programs or drawing up its program budget, had a set of expected program outputs in terms of cost and client benefits. The question now is, was the actual program payoff the same as that which was expected. If not, the apparent error then is sent back to research and development to modify

the program or to financial analysis to correct. This reporting back to these two units closes the system and assures that programs will be modified or resources reallocated so as to meet client demands.

MANAGEMENT INFORMATION SYSTEM

One of the most striking characteristics of the METEP program is that its information needs demand greater information variety and handling volume than do current educational processing systems.

For example, one educational principle in the METEP proposal is that students have a variety of instructional alternatives (IAs) available to them for each step in a chain of instructional progress. The increments in progress, which consist of passing specified performance criteria (PC), form an increasing student history. At some designated level of total competence, achieved by the completion of a given number of PC (many of which are elective), the student graduates. In this progression no time limit is imposed and PC may be demonstrated by several means, including pre-tests which can obivate IA participation.

The reader can see that keeping track of performance criteria passed and instructional alternatives chosen, as well as the demands on faculty, facilities, equipment and research data necessitates a computer-based information system, which we have designed for the program.

The information system offers a number of features not easily obtained from present methods of record keeping. Since the cross-reference between the four files (Student, Resource, Performance Criteria and Instructional Alternatives) provides flexible combinatorial analysis of results, the system provides a data base for later analysis of what was planned versus what actually occurred. This comparison forms a basis for management adjustment and control of the system as a whole. Moreover, the system provides continuing plan versus accom-

plishment records for the student so he may monitor his own progress on a more frequent basis than is usual in present academic record keeping. It is our belief that with this additional information, the student will in many cases be his own self-correcting agent, thereby stimulating student motivation and self analysis which might not otherwise be prevalent.

Another benefit is the provision of intermediate data for short-term planning and control of resources and an analysis of their utilization, including some advance knowledge of future student demand to permit planned flexibility in the scheduling effort. Finally, the proposed system provides sufficient detail for statistical analysis of the student population versus planned offerings and the results obtained in total. This form of data will itself be useful for both educational purposes, e.g., student projects, and academic research, e.g., faculty analysis of teaching methods, sequences, and timing of modular presentation.

Testing, Counseling and Guidance: The METEP Intelligence Service. Like an international intelligence system in miniature, the METEP information operations involve many areas of specialization in which detailed data must be known. We have, in fact, a "Mathematics Desk," a "Language Arts Desk," etc., where the intimate detail of those specialities and their operation will be best known.

For example, for detailed counseling within the mathematics area, it is clearly desirable to talk to the mathematics expert.

On the other hand, we also have another form of specialist who looks across the disciplines: the expert in testing method, the counselor who follows an individual student rather than a subject area, the resource scheduler who must avoid conflicts in commonly used facilities and between assignments of students to activities.

And, finally, we have the generalized administrative functions of policy

development, evaluation of overall plans, and the anticipation of future needs.

In addition, as is the case with most intelligence systems, the METEP Testing and Guidance functions confront a range of data input types from the "hard" results that may be obtained say, in the Mathematics Area, from pencil and paper tests organized by item to evaluate detailed segmented objectives, to the less structured evaluation of human behavior, as in Human Relations. And, in the hierarchy of testing and counseling efforts, we have various forms of pre-tests and current tests of detail (for student self-help), and post-tests.

Since the information gathered by the testing and counseling process is of both immediate and historical interest, the inputs and outputs needed by the Testing and Guidance operations directly influence the Management Information System and vice versa.

For example, when the number of testing segments becomes larger for a given educational activity, the transaction load placed upon the system's users and the information system itself quickly increases, and so it is not feasible to maintain excessively detailed records on a continuing basis for all students or activities without eventually degrading the entire intelligence effort, or even the objective of the METEP proposal, regardless of cost considerations. If, in addition, the cost of record-keeping, testing, and counseling is introduced, excessive segmentation of the testing, counseling, and achievement-monitoring effort soon drives data processing costs beyond reasonable bounds. Where such detail is needed for research purposes, devices such as statistical sampling have been employed successfully to adjust costs and benefits. But for everyday operation, the design of the intelligence system must be adjusted to provide what realistically can be obtained.

To hold down transaction rates while at the same time maintaining the desired vertical and horizontal intelligence levels, a combination of both decentralized and centralized counseling and testing is proposed. In some areas such as Language Arts, the more decentralized form of effort will predominate, whereas in others such as Mathematics, a more centralized approach will be natural. We see no reason why such flexibility of organization is not desirable, particularly when the data input characteristics of such areas differ so widely.

Although we have not estimated nor planned for the computer generation of individual test schedules in addition to automated grading and item analysis, we anticipate that such schemes may be needed if the test transaction rate at the centralized center cannot be held to modest proportions. This is another argument for the decentralization of as much counseling and testing as possible in the system.

ECONOMIC FEASIBILITY

The Budgeting Subsystem. The METEP budget is a financial reflection of the project. It is the dollar statement of values and priorities, indicating both direction and speed of movement toward project goals. It is proposed that the success or failure of the METEP program not be measured explicitly in dollars, but rather by the degree to which structured goals are achieved.

Planning-programming budgeting (PPB) is the technique proposed as the METEP budgeting process. It is a technique which emphasizes the end objectives (outputs) and the control of costs needed to achieve these objectives. It focuses on the budget decision-making process, particularly on problems relating to resource control, allocation and use. PPB promotes comparisons between the resource requirements of competing areas of the program. This is possible because resource alternatives and programs are expressed in a common denominator: the dollar.

The Accounting Subsystem. It is recommended that the proposed general framework of the accounting subsystem follow from the PPB subsystem. It incorporates the current public school practice of utilizing a "Federal Accounting System" with program accounting. Each fiscal transaction within the system is coded to: (1) indicate the purpose of the expenditure or action, i.e., the activity - Instruction; (2) describe the materials or services acquired, i.e., the object - Salaries; (3) indicate the area or subsystem of the activity, i.e., the program area - Social Studies. This three-dimensional accounting subsystem will provide cost data necessary for PPB preparation and control.

Cost Effectiveness. Cost-effectiveness analysis, a process which relates cost and effectiveness (achievement data) will provide the administrators with data which relate the cost and effectiveness of alternative courses of action. The data necessary for performing cost-effectiveness analysis are provided by the management information and fiscal subsystems. The cost-effectiveness data will be used in developing area PPBs and in evaluating the design of the system. Cost-effectiveness may be analyzed at a program level, in each educational area within the program, or may be further broken down to be associated with costs of the various instructional alternatives (IAs) within the educational area. These costs may be both fixed and variable. Cost-effectiveness data can be used in making decisions pertaining to the deletion, addition and/or alteration of instructional alternatives.

It is extremely important to point out that the cost-effectiveness data is a necessary but not sufficient base for making decisions. For example, an instructional alternative may have a low utilization rate and a high per student cost, while other IAs for the same PC may have high utilization rates and low cost. Based entirely on the cost/utilization data, consideration would probably be given to deleting the high cost alternative. However, examination of the

type of student who successfully completes the high cost alternative may provide additional data which would indicate the desirability of maintaining the high cost instructional alternative. One of the inherent dangers of using cost-effectiveness analysis in education is the misuse of data by cost-oriented instead of student-oriented administrators.

The concept of a flexible structure for institutionalizing change integrated with the concepts of formative and summative evaluating, PPBS approach, cost-effectiveness analysis, and simulation modeling provide for an economically feasible teacher education program.

Operating Cost of METEP

By the fifth year of development METEP will be an operating system capable of handling 800 students in the system. The current expenditures for the Elementary Teacher Education Program is approsimately $1,580 per student figured in 1970 dollars. The estimated cost for operating the METEP system, not including developmental costs, is $1,969 per student, also figured in 1970 dollars. This represents an increased cost of 24% over the existing Elementary Teacher Education Program. However, it should be noted that the major increase in cost is a result of additional personnel necessary to operate METEP.

SIMULATION MODELING IN METEP

Simulation and modeling techniques allow planners to see how certain aspects of an operation might work without actually going through that operation. The success of these techniques is highly dependent on the ability to describe the proposed operation well enough to allow it to be decomposed into simple parts, the behavior of each of which can be clearly understood. It further depends on the ability to be specific about the inter-relationship on the parts, and to supply reasonable data for the operation of each part.

A simulation model is properly validated when its total behavior in some way matches the real world. This is difficult to claim when the simulation

model is to be used for constructive planning of something that doesn't yet exist. The value of constructing a simulation model in the planning context may be summarized as:

a. The exercise of creating a model is very valuable in helping planners think through the consequences of their assumptions.

b. To the extent that parts and relationships have been correctly specified, the consequences of system operation with hypothesized data may be explored.

c. The cost of simulation is relatively low compared to the cost of a major error in planning.

d. The process of simulation can materially speed the process of developing a management control system for a complex, new operation.

Our concern is not with individual components as much as it is with the entire entity -- students, faculty, resources, management strategies. By analogy, pulleys are simple components. However, the linking together of a number of pulleys with cord may produce a system whose behavior, when a weight is hung at one end and a force is applied at the other, is by no means intuitively obvious. The benefits of simulation modeling include gaining an understanding of the complete system through detailed descriptions of relatively simple parts and the hypothesized relationship between these parts.

For the purpose of developing and testing the Model Elementary Teacher Education Program through simulation, it appeared obviously desirable to try to think through what would happen to individuals under various circumstances. If reasonable experiences cannot be provided for one or more types of students, or some segment of the faculty, there is something wrong with some part of the proposed program. Further, aggregation of the requirements for individuals should give a good measure of the resources needed by the institution.

Against this background, the simulation team has produced and used four computer models (a fifth is under development). The technical details of these models, including flow logic and examples of data used, will be included in a Technical Report to be published separately. These models may be summarized

briefly as follows.

EDSIM I. This is an elementary model whose main purpose is to explore time to completion. The instructional program developers in each pedagogical area are asked:

a. The probability of passing pre-tests for performance criteria in that area, and hence, needing no instruction for a student.

b. The probability of passing post-tests after instruction has been taken. One additional instructional alternative is needed for each post-test not passed.

c. For up to ten types of instructional events, how many there are of that type and the estimated time for completion of that type by average students.

In addition, an EDSIM I run requires the number of students to be processed and the per cent of the available instructional events in each pedagogical area to be taken (in one "profile"). The model then generates the required number of students, one at a time, and has them take a number of randomly selected instructional events in each area, based on the indicated number to be taken minus the number probabilistically pre-tested out, plus the number probabilistically failed on the post-test. The student's time to completion, in hours, is tallied, and the hours typically spent in each pedagogical area is computed.

The primary use of EDSIM I was to start the METEP modeling process. However, initial runs did show rather unexpected amounts of student time in different areas, which resulted in a shortening of time requirements in some areas for some profiles.

In EDSIM I, there was no attempt to see if students actually could be scheduled so as to complete their requirements in the number of hours indicated, nor was there any attempt to keep track of individual instructional alternatives for individual students.

EDSIM 2. This was the major model produced during the feasibility study phase of METEP. It required the specific identification of all instructional alternatives, including resources of various types required and estimated student time to completion. Other data used in EDSIM 2 included:

a. Probability of passing pre-tests in each area.

b. Numbers of students entering METEP at various times (e.g. start of semesters).

c. Number of hours a week students were assumed to be willing to work.

d. Amount of each resource assumed to be available.

e. Per cent of the performance criteria to be met before completion of the program.

For each run of EDSIM 2, specific students were generated, with specific sets of instructional alternatives to be taken. For each two week period within a semester, instructional alternatives were offered, depending on student demand and resource availability. A record was kept of each individual student's taking and completion of instructional alternatives. When a student completed the specified per cent of the instructional alternatives, he was graduated.

Output data from EDSIM 2 includes time to graduation for students, resource utilization by two week periods, and a tally of student disappointments due to such factors as insufficient demand, no space, no staff, or more demand than the resources permitted meeting.

Data was collected from the pedagogical teams for use in EDSIM 2. Undoubtedly, this data represented best guesses at the time it was collected, but unfortunately, the time needed to collect and process a large amount of input data and run EDSIM 2 prevented refining the data to reflect experience gained by trying actual instructional alternatives this fall. Our separate technical report will document the data collected to indicate the working of EDSIM 2. This data, and the results presented, do not now represent our best knowledge of how METEP might work in practice.

From the use of EDSIM 2 with the data as collected, several valuable interactions with pedagogical teams and management refinements were generated. One of the major indications from the simulation experience was that some kind of scheduling of instructional alternatives in advance, rather than in unforeseen response was necessary. Alternatively, some form of advance scheduling of instructional alternatives, perhaps into a select but varied number of consistent and efficient routes to program completion, might get around the "idle time" problem, and at the same time speed student progress.

EDSIM 4 is still being created. It will use the same data as EDSIM 2 and try to provide answers for the same kinds of questions. The present intent is that EDSIM 4 will have a sounder theoretical and data base (profiting from experience in building EDSIM 2), will be more flexible, and, hopefully, be easier to run.

There is much that remains to be done with the EDSIM type of simulation modeling. Revising the input data to reflect experience gained during this feasibility study is, of course, the most obvious and necessary activity.

The results of EDSIM 2 show that curriculum simulation allows the rapid examination of key theoretical and functional questions, and that a capability has been established for making better decisions as the METEP plan progresses.

As the METEP organizational process is further developed during Phase III, the simulator will be integrated into the proposed educational programming system. Interfaced with the financial analysis unit the model provides a tool for forecasting and analyzing alternative allocation strategies in terms of program size, facility utilization, and economic feasibility (investment analysis).

CLIENT ACCEPTABILITY

Any teacher education program has several sets of clients. These include: students, parents, teachers, school administrators and state certification personnel. If a teacher training model is to successfully satisfy the needs and concerns of these clients, it must involve them in the creation and early evaluation of the program. The goal of the Client Acceptability component of the feasibility study was to inform a representative sample of interested lay people and professional educators of the proposed METEP design, and then to obtain their reactions to the program as well as their suggestions for improvements.

Client acceptability of METEP was determined by using three different methods:

a. A client conference was held in July 1969 to present the METEP design. At that time, the clients' reactions and suggestions were gathered via reaction panels, questionnaires, and the Delphi Technique.

b. State departments of teacher certification were contacted and asked to respond to METEP's compatibility to existing certification requirements.

c. Undergraduates participating in the pedagogical feasibility studies were surveyed, and asked to give their reactions to performance criteria and other instructional procedures. Reactions of students in the program are presented in each of the pedagogical reports.

Data collected during the client conference showed unqualified and qualified approval to the METEP program; the survey of the directors of teacher certification departments showed that there appears to be no problem for graduates of the METEP program in meeting certification requirements.

EVALUATION AND RESEARCH

The purpose of evaluation in this project is two-fold: first, it provides a way of making decisions concerning revision, refining, and discarding facilities, materials and methods; this is referred to as

"formative evaluation". The second purpose of evaluation is to determine the overall effectiveness of the project; this kind of decision making is referred to as "summative evaluation".

The purpose of the basic research component will be to add to the knowledge of the practices and methods of education. In order that useful, generalizable research results be obtained, attention will be given to the specification of treatment and experimental designs.

In order to facilitate the proposed evaluation model, it will be necessary to administer a diverse battery of tests to students entering the program and to define a variety of aptitude, achievement and personality variables; including tests to measure intelligence. To supplement this, biographical and high school records on students will be collected.

The purpose of formative evaluation will be to suggest improvements for the project while it is developing. The formative evaluators will observe the workings of the project, intervening as little as possible. Such evaluation will be in the form of teacher reports, student interviews and discussions, questionnaires, observations, test results, and outside professional views of produced materials.

The formative evaluation will have its effect in many areas of the program. Raw data collected by the Management Information Subsystem will be available in the data bank for research in the various content areas and for research in the areas of time studies and cost analysis. The cost benefit and cost effectiveness analysis will be integrated with the procedures designed as part of the Planning-Programming-Budgeting System.

Summative evaluation techniques will be applied in making an overall evaluation of the project. Whereas formative evaluation will be conducted primarily during the first two to three years of the project, the emphasis will shift in the third year towards summative evaluation. Data will be

collected on large samples of graduating students from other teacher-training programs for purposes of comparison.

HOW WILL THE MODEL INSURE AND MAINTAIN ITS RELEVANCE FOR TEACHER EDUCATION IN THE 1970's?

Recognizing that an elementary teacher education program developed in 1968 may not be completely relevant for the 1970's we have taken several steps to insure that our program does not become static and inflexible in response to changing needs. The first precaution is the assumption that the program we have designed for 1968 will not be the same program in 1975. The structure of our program is designed to allow for constant revision and upgrading. Highlights of our program consist of behaviorally stated outcomes expected of the trainee, multiple instructional alternatives for achieving these expected outcomes, and the ability to select areas of specialization. The specific performance criteria required of the trainees and the accompanying instructional alternatives are tentative hypotheses about the required training for elementary teachers. They are not interpreted as fixed, but rather subject to change based upon evaluation analysis.

The METEP system is designed to systematically assess both its internal and external environments. Feedback from the external environment is necessary in order to continually assess METEP goals with those clients who are affected by the program and the teachers who graduate from the program. By continually collecting information relating to societal changes and the changing role of the elementary teacher, the major aspects of the environment can be systematically assessed.

One function to be performed in METEP is the analysis of client demands. This function represents a central monitoring effort on the part of METEP to ascertain client needs and demands. In one way or another, all of the above

client groups are affected by the METEP program and their needs and demands should be systematically collected and considered in the decision-making process vis-a-vis curriculum components, instructional alternatives, etc. Since clients and society will change over time, their needs will also change. The monitoring process of METEP must be sensitized to such changes.

In addition to monitoring client needs, there are other phases of program development which need to be systematically assessed to insure relevancy for the future.

Pedagogical Plans for the 70's. The most important feature of the performance curriculum as developed and envisioned by the pedagogical teams is continual short-term and long-term planning and action for constant change and revision in performance criteria and instructional alternatives. The very process of curriculum development is a dangerous procedure for when one commits oneself to action (no matter how wise), alternative organizational and action plans are simultaneously committed to inaction. In another unique situation these same discarded plans (or new ones which may be synthesized) may prove more relevant than old plans. As such, constant change, development of new approaches, and program evaluation are vital.

Already the pedagogical teams have been engaged in large-scale reorientation of curricula. At the immediate level, for example, the mathematics and language arts teams are developing new instructional alternatives and new performance curriculum hierarchies. The science team is developing a new, flexible way of utilizing space for laboratory work in science education which combines elementary children and beginning teachers in new ways of learning. The social studies and human relations team are beginning preliminary explorations of articulation and coordination between the curricula.

Important in this change process is student feedback and participation. For example, the human relations team at the completion of each performance

curriculum hierarchy solicited suggestions from the students for changing and sharpening the material they had just completed. These same students during the coming term will serve as a team which will help in the development of new hierarchies of training in human relations.

Thus, several important dimensions of maintaining short-term relevance and changes can be summarized;

1. Staff evaluation of program and change through evaluation and research.

2. Student participation in decision making and curriculum development.

3. Development of articulation between programs to ensure smooth coordination.

4. Equally important will be feedback from the support and maintenance teams in terms of computer scheduling, guidance of students, and data on the use of instructional alternatives.

Long-term planning requires a more complex program of evaluation and coordination. Perhaps the most important and interesting of these involves potential restructing of the entire concept of elementary teacher training.

SUMMARY

The METEP feasibility study was designed to answer six questions:

1. Is the model pedagogically feasibly? Our experience would indicate that students can achieve the performance criterion and enjoy having alternative instructional modes available to them. Student attitudes regarding the program were quite encouraging.

2. Is the model administratively feasible? Through our management and information subsystem designs we feel confident that the complexities of the program can be managed.

3. Is the model economically feasible? Beyond the initial development, operational costs for METEP appear to increase 24% over the present program. This increase is small enough to make the model appear economically feasible.

4. Is the model technically feasible? Our study has assured us that we have the technology available to support the management subsystem in operating the program.

5. Are the clients, whom the program is designed to serve, satisfied with the model? All indications from the various client groups are not only positive but extremely encouraging. Students, public school personnel, parents and state officials all have expressed their approval of the model and its underlying principles.

6. How will the model itself insure updating and maintain its relevance for teacher education in the 1970's? The answer to this question is to build a regenerative system which systematically evaluates itself from many sources, both internally and externally, and utilizes the evaluation data to update the program. We believe this is what we have done with METEP.