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ABSTRACT

This first volume of a three-volume feasibility report on the Georgia model for elementary teacher education outlines the procedures used in conducting the study, and presents the theoretical considerations involved. The engineering strategy proposed for a 5-year development program is summarized, the essential characteristics of the program in relation to selected theoretical considerations are described, and the proposed implementation strategy is presented through a series of flow charts and timelines. Chapters 4, 5, and 6 briefly summarize the components of the subsystems, followed by the results of investigations designed to establish their feasibility, and the strategy proposed for the development of the subsystems is presented. Chapter 7 deals with economic feasibility, explaining how this was determined, summarizing the cost for development and sustained operation, and exploring the feasibility of development and operation costs. It also explores the possibility if the number of alternate paths for learning activities should be reduced, and investigates the cost of each phase of the program model independently. The conclusions of the study indicate that strategy presented is feasible provided that the necessary funds are made available. An appendix contains related data. (See also SP 004 182.) (MBM)

FINAL REPORT

Project No. 9-0477
Contract No. OEC-0-9-200477-4043

THE FEASIBILITY OF THE GEORGIA EDUCATIONAL MODEL FOR TEACHER PREPARATION--ELEMENTARY

Volume I Basic Report

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Athens, Georgia

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Preface

A feasibility study in education represents a significant and forward step by the profession. For the first time an effort has been made to design a blueprint for a teacher education program. (Phase I, U.S.O.E. Model Teacher Education Program--Elementary) Now the feasibility of developing, implementing, and operating the program has been studied. These first generation efforts will provide the basis for a more scientific and systematic approach to teacher education.

The study done by the University of Georgia has established the feasibility of developing, implementing and operating the Georgia Educational Model at the University of Georgia. The University Administration regards the results of this study as significant. The Georgia model can and will become the elementary teacher education program in this institution.

The staff members involved in this study have worked long hours in its preparation. The University is indebted to each of them. Special acknowledgements should be made to Dean Joseph A. Williams, College of Education, Dr. Gilbert F. Shearron, Chairman, Division of Elementary Education, Dr. Charles E. Johnson, Director, Feasibility Study, Dr. Jerold P. Bauch, Associate Director, Dr. Michael L. Hawkins, Associate Director, and Dr. Jerry B. Ayers, Associate Director.

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Chapter I

Purpose of the Study and Background

C. E. Johnson

This is a report of an investigation which sought to determine the feasibility of developing and operating a model and exemplary program for the preparation of elementary school teachers. The model educational program which is the concern of this report is fundamentally described by the specifications contained in the University of Georgia Final Report entitled, Georgia Educational Model Specifications for the Preparation of Elementary Teachers (Johnson, Shearron, & Stauffer, Oct. 1968). However, the study and review of that teacher education program which was required in carrying out this feasibility study resulted in certain extensions and modifications. These adjustments were deemed advisable in the light of the criteria which were established as essential to determining the conditions of feasibility, and are contained in the chapters which follow.

The Objectives of the Study

The objectives of this study are: (a) to validate within reasonable limits of confidence the feasibility of the Georgia teacher education model as projected in sustained operation, (b) to provide a strategy for the development and implementation of the model into sustained operation, and (c) to provide estimates for both the cost of development and the cost of operation.

A seemingly hidden product of this investigation is one which may ultimately prove to be of greater value to professional education than the study itself. It is the creation of a system, more efficient than any now existent, designed to develop and put into operation exemplary educational programs.

Background of the Study

In the fall of 1967, the United States Office of Education, Bureau of Research (USOE) published and distributed widely to concerned educational institutions Request for Proposal Number OE-68-4 (USOE, 1967) which called for educational specifications for a comprehensive undergraduate and inservice teacher education program for elementary teachers. The purpose for this action was stated to be the utilization of new knowledge, materials, and methodologies produced by research and development activities in the creation of a variety of sets of detailed educational specifications which could be used as guides in developing sound teacher education programs.

Among approximately ninety proposals submitted by interested institutions and organizations was The Georgia Plan for Developing a Model System of Teacher Education--Elementary (Johnson, 1967). Its goal was "to produce teachers with the common characteristics of optimum effectiveness" (Johnson, 1967, p. 5), and its objective was to describe "a system which if implemented would over a period of seven months produce documents containing the specifications for one model of a comprehensive undergraduate and inservice teacher education program for elementary teachers" (Johnson, 1967, p. 1).

On March 1, 1968, USOE announced that the Georgia proposal was among nine which had been funded. For approximately seven months the staff under the supervision of the Dean of the College of Education pursued its objectives. The project was aided by an executive committee of outstanding educational specialists from the University of Georgia and an advisory board composed of representatives from the University of Georgia, the State of Georgia, and the nation. The product was a final report containing the promised detailed specifications for a comprehensive educational program for the preparation of elementary teachers. It was published in October, 1968 under the title, Georgia Educational Model Specifications for the Preparation of Elementary Teachers (Johnson et al., 1968).

On October 31, 1968, the USOE circulated a request for proposal for what was called "Phase II of the Bureau of Research Elementary Teacher Education Project." This was to be a study of the feasibility of undertaking the development, implementation, and sustained operation of a model educational program. On February 28, 1969, the University of Georgia submitted a proposal entitled, A Feasibility Study for Developing the Georgia Educational Model for Teacher Education--Elementary (Johnson, 1969.)

The Georgia proposal along with seven others was accepted and funded by the USOE. All eight projects began on or about May 1, 1969. The assigned date for submission of the final report was January 1, 1970.

The Products

This final report is the product of the contract between the USOE and the University of Georgia resulting from the aforementioned proposal. As promised in the proposal it describes procedures by which the feasibility of developing the model teacher education program were determined. Also, it is designed to be used by institutions wishing to implement the model program or parts thereof: (a) to estimate the resources, plans, and strategies necessary for carrying out a major program for the development of the specifications, (b) to estimate the resources, plans, and strategies necessary for the development (over a five year period) and sustained operation of the specifications as proposed, and (c) to estimate the cost of such development and sustained operation with attention to those variables which might provide alternate cost estimates.

In addition, should the described procedures of this report be successfully implemented in a third phase, the product of that effort would be twofold: the specified objective of the sustained operation of an exemplary model program for the preparation of elementary teachers would have been reached and a by-product of equal, or perhaps even greater, importance would be provided--a system or strategy for engineering into sustained operation a carefully designed educational program.

Georgia Educational Models

Georgia Educational Models (GEM) is the research and development organization which carried out this feasibility study. This organization also prepared the specifications for the educational model. Only a few changes in key personnel were made when the present study was initiated. Figure 1 shows the administrative organization of the project staff. It should be noted that the Dean of the College of Education served as administrative head of the entire

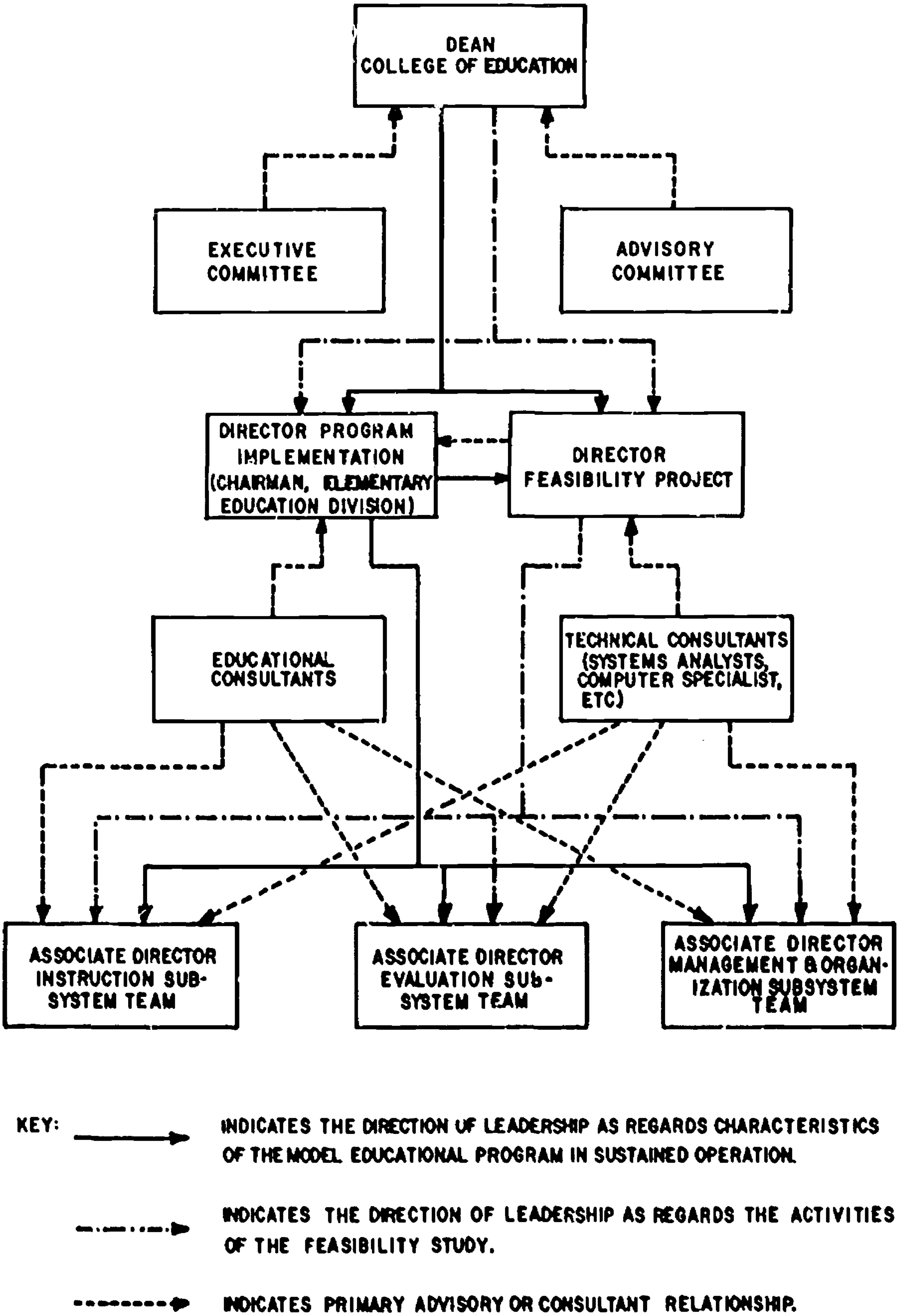

Fig. 1. Administrative organization of feasibility project.

operation. To advise him were the aforementioned executive committee and an advisory board. The Director of the Feasibility Project and the Director for Program Implementation of the model program worked cooperatively with varying concerns and obligations. The Director of the Feasibility Project was concerned primarily with feasibility study management and operations and with the broad applications of the findings of the project and their implications. The Director of Program Implementation was concurrently Chairman of the Elementary Education Division of the College of Education and will manage the model program as it reaches sustained operation. His concerns centered in the educational program outlined in the model specifications and its operation within the State of Georgia and particularly at the University of Georgia. When problems arose regarding procedures to be used in studying feasibility, final decisions were made by the Director of the Feasibility Project. When problems arose regarding refinements in the nature of the educational model, decisions were made by the Director of Program Implementation.

The three associate directors headed three separate teams, each with special concerns for what are defined as subsystems of the program. The associate director in charge of the subsystem for instruction with his team of co-workers was concerned with learning activities and materials, instructional procedures, program sequence, teacher performance specifications, student advisement, and staff preparation. The associate director in charge of the evaluation subsystem worked with his team in studying the feasibility of candidate selection, orientation and induction, student performance behaviors, and program evaluation. The associate director of the subsystem for management components and his team focused concern on personnel and facilities, scheduling, legal concerns, and mutual arrangements with other professional units.

The core staff of GEM made extensive use of consultants both from within professional education and outside professional education. The skills of colleagues within professional education were enlisted primarily in developing and testing prototypes of the innovative educational materials required by the model program, and providing time and cost estimates for specified professional activities. Consultants outside of professional education were called upon to recommend and develop strategies for development of the model, to provide information and services for computer programs and to supply selected cost data. These consultants included systems analysts who had been involved in designing programs for industry, space and military operations who, for the first time, were applying their expertise to engineering curriculum change in an institution of higher learning. In addition to these systems analysts were consultants on computer usage from both Univac and IBM.

Definitions of Terms

Initial planning seminars revealed the need for definitions of terms. This became increasingly evident as consultants who had been advising industrial, space, and military operations began applying their technological expertise and vocabulary to the problems of this project. Whenever fairly well established definitions could be found in references that fit the needs of this particular project, these were used. However, in some instances such definitions could not be found and had to be developed. The definitions included in this section of the report are judged the most important for the reader in order to understand the content of this report. Others will be found in the appendix.

Feasibility. The extent to which an occurrence or specific condition is possible or likely to take place.

Theoretical feasibility. The possibility of the attainment of a specific condition or occurrence prior to its demonstration in reality. A hypothesis based on principle. (Example: Some scientists maintain it is feasible for man to travel at a speed exceeding the speed of light.)

Technical feasibility. The extent to which technology (both systems and mechanical) is available to accomplish a condition or occurrence which is regarded as theoretically feasible of being accomplished. (Example: Although theoretically feasible it was not technically feasible for man to travel in space until the rocket had been developed and perfected.)

Socio-psychological feasibility. The extent to which the people involved in accomplishing an occurrence or condition (which is theoretically and technically feasible) are ready or can be made ready to carry out the occurrence or maintain the condition when consideration is given to such socio-psychological factors as values, education, experience, and emotion. (Example: A social or political revolution is usually successful when it is designed to provide the people with conditions identical to those which they are seeking provided the people have knowledge, skills and values to maintain themselves in these new conditions.)

Development phase. The period of time during which the sustained operation model of the instructional program or a particular phase of it is being made ready for operation. Also defined as a period during which the model educational program or a phase of it is being engineered into operation. It includes activities of planning, designing, preliminary piloting, revising initial designs, final piloting, initial or trial operation and final revision. It concludes at the "turnover point" which is the defined dividing point between development and sustained operation.

Sustained operation. Refers to an indefinite and continuous period (after the development phase) when all subsystems and components of the instructional program, or a selected phase of the instructional program, are functioning as intended by the specifications of the model for sustained operation.

Proficiency module (PM). A published guide which is designed to direct individual student learning toward acquiring desirable behaviors associated with a particular set of related skills, an area of learning, topic, or system of values.

Preservice phase of model program. The segment of the sustained operation model of the instructional program which provides the students with competency for paraprofessional service as assistant teachers in elementary schools. It is normally accompanied by the associate's degree and the prerequisites for admission to the professional program. It is sometimes referred to as the paraprofessional program.

Professional phase of the model program. A segment of the sustained operation model of the instructional program which follows the preprofessional phase and provides the student with competency for professional service as a general elementary teacher, with a teaching area of competency and the bachelor's degree. Satisfaction of the requirements of this phase usually provides the individual student with the opportunity to be admitted to the specialist phase of the model program.

Specialist's phase of the model program. A segment of the sustained operation model of the program which provides the teacher with competency for professional service as a specialist in elementary education, and the specialist's degree. The speciality may be in the teaching of any subject commonly taught in the elementary school sequence or in elementary education services such as pupil personnel, curriculum, school community relations, evaluation, human development and learning, educational media, and professional development.

General education. Sometimes called liberal education. A composite of those learnings which prepare the student as an adult to better understand and adjust to his social and physical environment, and to meet his obligations as a member of society. It is assumed that this composite of learnings is also basic to effective instruction in the elementary school.

Professional education. A composite of subject matter, thought processes, skills, and attitudes which are directly and primarily concerned with pedagogy and the teaching profession.

System. A network of interrelated and interdependent objects or activities united by a common function or purpose. It is characterized by inputs which are affected or changed by the dynamics of the environment. The products of a system are the outputs. The parameters of any system require definition in relation to the function or purpose of the system.

Subsystem. An identifiable network of interrelated and/or interdependent objects or activities within a system which has function and purpose both in itself and in the system of which it is a functioning part.

Component. An identifiable network of interrelated and interdependent objects or activities within a subsystem which has function and purpose both in itself and in the system of which it is a functioning part.

Some Theoretical Observations

The request for proposal and other guidelines which were furnished to direct this study avoided providing concise definitions of the terms feasibility and feasibility study. Although there is no explanation for this omission it is very likely that, since this was a first large scale venture with feasibility in an educational setting, those who drafted the request for proposals felt confident that those who earned contracts would provide definitions with sufficient variancies among them so as to make contributions to knowledge of the applications of feasibility analysis to education.

Feasibility may be regarded as a quality of an occurrence or condition that is capable of being effected. Taking into account the objectives to be achieved and available resources a phenomenon is regarded by experts as feasible if it is attainable and there is a practical course of action for its attainment. It would seem to follow then that a feasibility study would be an examination of the extent to which something is capable of being produced or effected, and the extent to which it is practical. When the tasks required of this project are examined, however, it becomes obvious that the nature of feasibility varies according to the complexity of the system being examined.

To fully comply with the contract there are two distinct tasks at hand. The first and most obvious is to clear doubt regarding the practicalness or feasibility of the model in sustained operation as originally described. That is, to answer such questions as: Assuming that the model could be engineered into sustained operation, would it work satisfactorily? Would its subsystems and components coordinate? Would the students learn better than they would in a more traditional program? Would there be sufficient talent to maintain the program? Would the program be reasonable in its demands on finances?

The other task is to design a practical strategy which can be used to develop the model into sustained operation. This second task is an engineering function and is treated as such.

The feasibility study began with a conceptual model of a system (the model program) in operation which by reason of the acceptance of the proposal could be declared satisfactory and judged theoretically sound. This model is a blueprint of a system in operation, but at the time of its creation little attention had been given to how that system could be engineered into existence. This has been a frequent occurrence throughout the history of education -- contributions of ideas for the improvement of educational programs have been numerous and it is likely that many of them would have been effective if there had been a way to put them into operation. That educators have been poor engineers of change should not be too sharply criticized. Engineering a large scale curriculum change is a tremendous undertaking which involves the manipulation of as many or more variables than the designing of systems for the equipment which carries man into space. We have not had the technology and the tools to accomplish such change in the past. Today, however, by borrowing from the applications of systems analysis in industry, military, and space operations we have the available technology and tools we need to do the job. We may anticipate that, as a result of studies such as this one, within a few years education will have its engineers of social change who will be able to successfully put approved exemplary educational program systems into operation.

Five major broad operations of a systems approach to curriculum engineering in sequence may be listed as follows: (a) designing a model which will satisfy existing needs (creating a blueprint of an intricate system of specifications), (b) validating the feasibility of the model in operation keeping projected available resources in mind, (c) designing an engineering strategy to move the desired system from a blueprint into a secure operation, (d) validating the feasibility of the engineering strategy, and (e) implementing the strategy allowing provisions for previously unforeseen problems and difficulties which will require modification of the strategy.

Organization of the Report

There are three volumes to this report. Volume I contains eight chapters. Chapter II outlines the procedures which were used in conducting the feasibility study. It first presents the theoretical considerations essential to this investigation and then, by means of PERT charts and timelines, outlines the procedures which were carried out between May 1, and December 31, 1969. Chapter III summarizes the engineering strategy proposed for the five year development program. After describing the essential characteristics of the program in relation to selected theoretical considerations the proposed strategy is presented through a series of PERT charts, flow charts, and timelines.

Chapters IV, V, and VI present evidence of the feasibility of the model teacher education program subsystems without consideration to costs (economic feasibility). In each chapter the components of the subsystem being dealt with are briefly summarized followed by the results of investigations designed to establish their feasibility. Next, the strategy proposed for the development of the subsystem is presented.

Chapter VII deals with economic feasibility. It explains how economic feasibility was determined, and summarizes the cost for development and sustained operation, and explores the feasibility of both development cost and operation cost for the model teacher education program. It also looks at the economic feasibility of alternates with consideration to limited available funds. For example, it explores what the cost for the development and operation of the teacher education model would be if the number of alternate paths for learning activities was reduced, and investigates the cost for the development and operation of each phase of the model program separate from the others.

Finally, there is a presentation of conclusions followed by an appendix containing data and information which is related but not essential to the content of the chapters.

Volumes II and III present detailed information relative to areas of concern without which other institutions wishing to use the same or a similar strategy for development and operation would be seriously handicapped. Volume II presents lists of all activities contained in the various components, subsystems and systems of the total development and operation programs. Accompanying each is a detailed list of the costs attached to activities with reference to specific items such as personnel, facilities, and materials. In addition, a time schedule showing the precise dates upon which various activities are scheduled to begin and end over a five year period is provided. Volume III contains detailed job descriptions of all essential personnel involved in the comprehensive development and operation program. These job descriptions become necessary items of reference in understanding the kinds of activities to be undertaken, and for purposes of revising or adjusting personnel cost for particular localities.

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Chapter II

Feasibility Study Procedures

C. E. Johnson

This chapter summarizes the rationale underlying the procedures used in the feasibility study and describes the procedures as they were carried out.

Procedural Assumptions

There were certain seemingly obvious assumptions underlying the procedures used in carrying out the feasibility study. These included: (a) that the instructional program in sustained operation represented by the Georgia educational model is theoretically sound, (b) that the implementation of the model into sustained operation is essential if a meaningful base for the educational needs of our society is to be provided, (c) that through the application of modern technology the Georgia educational model can be developed and engineered into operation within a period of five years, and (d) that, since a comprehensive feasibility study of this magnitude has never before been undertaken in professional education, the development of innovative systems designs for this project is essential to its successful completion.

Essential Operational Principles

The proposal which led to the undertaking of this project (Johnson, 1969) described the theoretical foundation upon which this investigation was to proceed. This theoretical base was maintained through the use of operational principles or rules for making decisions regarding procedural action. The following is a summary list of these principles which, when regarded in an interactive system of investigation, provide the rationale for procedures:

1. Dynamic ordering of the network of events for the feasibility study as the project progresses is essential in order to provide a flexible working control that can be maintained to supply information as to where effort must be applied or components shifted in order to accomplish the

objectives within the budgeted money, time and resources.

2. The necessity for designing an innovative and dynamic control subsystem does not preclude the use of standard management technology where applicable.

3. Any available scientific approach to establishing feasibility may be used so long as provision is made for its compatibility in its interaction with other approaches.

4. Operations research methods which deliberately seek different points of view in their deliberations are effective in resolving problems and developing strategies.

5. Throughout the development of any model, whether it be for operation or development, each major and minor subsystem component and module of the system should be subject to separation, identification, articulation, and evaluation (analysis).

6. After analysis of the individual subsystems, components, and modules of the system has proven them to be operative, the system should then be synthesized and again evaluated (synthesis).

7. To avoid specious varieties of the systems approach, operations should be sufficiently flexible to incorporate the highest level thinking from the philosophical, theoretical, structural, conceptual, and pragmatic aspects of the emerging systems methodology.

8. Characterizations of a model which may be challenged because of their uniqueness or deviation from demonstrated practice should be validated for feasibility.

9. Investigators undertaking a feasibility study who are convinced that the model they are testing is theoretically sound and worthwhile are justified in proving their assertions.

10. Wherever alternative paths are available for accomplishing a particular objective of a model, the alternate paths should be explored and the one which will furnish the most effective design with consideration to available resources should be selected.

11. Before investigating the technical or socio-psychological feasibility of any component of a dynamic model in sustained operation steps should be taken to be certain that all essential parts of the component have been reviewed and that the component appears to be theoretically operative.

12. If a component of the instructional program on first investigation is not found to be feasible for some particular reason, it should then be so redesigned as to become feasible. After the redesigning of any component it should be retested within the total system in order to determine the extent to which additional designing is necessary in order that all components are compatible.

Some General Criteria for Determining Feasibility

Feasibility has been defined simply as the extent to which an occurrence or specific condition is possible or likely to take place. This definition although objectively correct fails to take into account the functional quality of feasibility. That is, if something is feasible it has to be feasible in relation to a criterion. If model *M* is feasible in that it effectively fulfills criteria *X* and *Y*, but will not fulfill criterion *Z*, then model *M* is feasible if either *X* or *Y* is the criterion. For this reason the investigators clarified their procedures by establishing criteria for the operation of the components with which they were dealing before attempting to validate them.

More will be said concerning the use of specific criteria for validating feasibility at a later point. However, in order for the reader to grasp the rationale for procedures, he must be aware of the general criteria used in this study for validating feasibility. The two first order general criteria were: (a) the model program should produce better teachers than traditional programs; (b) the strategy for developing and engineering the model program into sustained operation should be effective in accomplishing its goals.

Illustrations of second order general criteria are: (a) the instructional program should be reasonable in its demands of time on all personnel (students, teachers, administrators, etc.), (b) the cost of the instructional program should be within reasonable limits of costs for traditional education, (c) the instructional program should be adaptable to man's environment or be such that man can adapt to it, (d) the materials and equipment required for the operation should be obtainable and capable of serving the program as intended by the model, and (e) the instructional program or components thereof should be capable of being transported to colleges and universities other than the one at which it was developed.

A Limiting Assumption

Feasibility is also affected by the specific policies and established practices which are peculiar to a selected environment. What may be feasible in one setting may not be in another. The present study has validated the feasibility of the model instructional program in what is assumed to be a typical university community located in a state educational system which is not unlike those in which colleges and universities seeking to develop a model program might be located. It is to the extent that this environment may be duplicated by other institutions that the various components of the model instructional program declared feasible herein may be regarded as feasible elsewhere.

Procedures for Investigating the Feasibility of the Model in Sustained Operation

Graphic representations of the technology and systems used in carrying out a project are sometimes too detailed to provide the reader who is not concerned with detailed analysis with an overall understanding of the general nature and structure of the research and development effort. Thus, risking criticism for oversimplification, the following list of events involved in determining the feasibility of the sustained operation model is presented for readers seeking a broad rather than detailed understanding:

1. Selection, orientation and training of new staff members for their feasibility work assignments.

2. Critical examination of the original model of the instructional program in sustained operation in order to complete all details of design and to identify characteristics likely to be challenged.

3. Investigation of the technical and socio-psychological feasibility of each component of the instructional model in sustained operation, and verification of feasibility where necessary.

4. Modification and/or redesignation of the specifications for the sustained operation model of the instructional program on the basis of the feasibility investigation findings where deemed necessary in order to establish the quality of feasibility.

5. Examination of the system representative of the model instructional program in sustained operation (including each module and component) to determine the extent to which all systems are compatible and consistent with the basic intent of the operation.

6. Revision of the design of the sustained operation model where necessary to validate feasibility requirements. That is, to establish that all systems are compatible and consistent with the basic objectives of the project.

7. Chart the systems network of the instructional program in sustained operation, attach detailed time and cost requirements (personnel, facilities, materials, etc.) for each identifiable activity and store in computer memory for later retrieval.

8. Investigate, determine and store projected costs for the standard or traditional teacher education program were it to continue into 1976.

9. Establish criteria for determining cost or economic feasibility for the operation of the model instructional program in sustained operation through 1976.

10. Retrieve costs for both the standard and the model instructional programs in sustained operation and compare.

11. Present cost feasibility findings based on cost differential in relation to established criteria (see 9 above).

12. Explore the cost for various possible modifications (reductions) of the instructional program sustained operation model in relation to limited available funds and report findings.

Procedures for Developing a Strategy to Effect the Model into Operation

To investigate and establish that the model program in sustained operation is feasible was an essential first undertaking. But no model of an operating system, no matter how perfectly feasible it appears, can be regarded as truly feasible unless there is a means of developing and engineering it into operation.

In 1950 a prominent group of educators concerned with curriculum change wrote, "What is needed at the present time, however, is . . . a rationale of educational engineering by which to attack the problems of curriculum change more systematically and in terms of which to select and to contrive additional procedures and techniques." (Smith, Stanley & Shores, 1950). It was not until the development of systems technology and the computer that we had a means to accomplish curriculum change effectively. Details of the strategy designed to develop and engineer or implement the model into sustained operation are contained in Chapter III where specific development activities are delineated in PERT charts. However, again risking criticism for oversimplification, the following list of activities involved in developing and refining the strategy for effecting the model educational program into operation is presented for the reader who is concerned with the broad structure of the operation rather than a detailed analysis:

1. Design a detailed and efficient strategy which is theoretically sound and will engineer the model instructional program into sustained operation. (This activity requires the involvement of consultants and other specialists with expertise in designing strategies and engineering designs in such fields as industry, military operations, space technology and sociology.)

2. Prepare a comprehensive PERT model of the strategy which identifies each activity essential to the design.

3. Investigate the technical and socio-psychological feasibility of the strategy and modify where necessary.

4. Assign time estimates to each activity and prepare a PERT time chart for the various components of the comprehensive strategy.

5. Review the time relationships of the activities of the strategy and determine time feasibility. (A five year limit was established.) If necessary, modify strategy until the limiting criterion is satisfied.

6. Attach cost estimates (personnel, facilities, equipment, technology, materials, etc.) to each activity or component in the strategy and computer store for later retrieval.

7. Retrieve and report costs for the five year period of developing the model of the instructional program and engineering it into sustained operation.

8. Explore cost of the development and engineering into operation of various possible modifications (reductions) of the model giving consideration to limited available funds.

Techniques for Determining Technical and Socio-Psychological Feasibility

Since this project is one of the first extensive applications of feasibility investigation to program development in education, it was necessary to locate and/or develop the tools to accomplish the objectives. Thus, an attempt was made to identify, construct where necessary, and classify the numerous methods and techniques which were regarded as possible approaches to establishing different kinds of feasibility. This was accomplished and made available to the investigators. However, in using the techniques contained in this classification, investigators noted that while these tools often appeared to be discrete it was seldom if ever that one could be used in isolation from the others.

It must be recognized that in the selection and use of these techniques there were definite time restrictions on the investigators, and that frequently an investigator's preference to apply a particular technique in place of another was made impossible by time limitations.

The investigation seeking techniques for determining feasibility revealed that there are at least four basic activities which in different combinations yield effective methods. These are: (a) consultation with experts, (b) assessment based on selected criteria, (c) simulated demonstration, and (d) operational demonstration. This discussion provides only a general overview. Later chapters demonstrate specific applications.

Consultation With Experts

There are a variety of ways to validate feasibility by use of consultation. For example, an investigator might simply ask a specialist to judge an activity or component in relation to a particular objective on the basis of his experience. This might be done by direct interview or by questionnaire. In some instances this method is extended to involve a group of specialists in order to obtain their collective judgment concerning the activity or component. This group inquiry method may require a judgmental statement from each of the participants. In some instances multiple choice questionnaires designed to obtain forced judgments of specialists are used. An extension of the aforementioned ways of obtaining expert advice is the Delphi technique (Helmer, 1966) which begins by having specialists consider the features of a target operation and make their judgments independently. They are then presented with the responses of other specialists who are in opposition to their judgment. Finally they are asked to reconsider and make another judgment.

Assessment Based on Selected Criteria

In using the criteria approach the initial step is to develop a list of characteristics which when combined will yield feasibility for an object or operation. These are regarded as criteria to assess particular activities, components, objects or operations. The extent to which the operation or object reflects the ideal condition contained in the original list of characteristics (criteria) is the extent to which it is feasible. For example, if the task were one of judging the feasibility of a design for management of instruction, and one of the essential characteristics for the design were that it provide adequately for the scheduling of student learning activities, then insofar as this characteristic is concerned, other factors being equal, only those management systems which provide adequately for this kind of scheduling would be regarded as feasible.

Simulated Demonstration

Simulation has a breadth of meaning. It may be regarded simply as a process of observing the performance of a system or its model (Mize & Cox, 1968). For example, at an unsophisticated level it might include role playing of a process in order to judge its effectiveness. The use of flow diagrams, program evaluation and review technique (PERT) charts, and similar graphic representations of processes are other illustrations of the tools and techniques of simulation. At a high level of complexity are computerized multi-dimensional programs which assign time and cost values to each activity and provide opportunities for the investigators to trace the paths of inputs with reasonable qualities through a simulated operation and judge the quality of the outputs comparatively.

Operational Demonstration

The most common use of operational demonstration is piloting. In this case, piloting refers to performing the target operation with a sample population in order to observe its effectiveness. However, it might also refer to the observation of an "outside" operation which is very similar in nature to the target operation. By judgmentally evaluating similarities and differences between the "outside" operation and the target operation an estimate of the effectiveness of the target operation may provide evidence to validate its feasibility. The ultimate level of operational demonstration of feasibility is to initiate the operation on full scale and judge its effectiveness.

Computer Program

The search for an appropriate computer program for the feasibility study included a review of available programs and consultation with computer specialists who had dealt with program development and management systems. After the characteristics of the available programs were matched with the needs of the investigation, Project Management System/360 (360A-CP-04X) Version 2 (PMS/360) was selected. Detailed information regarding its application to the tasks of this project will be found in later chapters. The following brief general description is quoted here to justify to the reader its appropriateness for this investigation:

> PMS/360 is a highly modular set of computer program routines, each performing one function common to many management applications. It is open-ended -- that is, the number of functions under PMS/360 can be expanded and added to. It is versatile -- that is, the user can control program logic without resorting to reprogramming. Output reports can be defined with a single set of procedural statements and can be revised with every computer run if required. The computer code

itself is written in a way that simplifies modification, if this ever becomes necessary. At present, PMS/360 contains the following three modules: a Network Processor, a Cost Processor, and a versatile Report Processor. In suitable combinations these processors will accomplish the data processing required in critical path analysis, PERT, and PERT Cost. (IBM PMS/360, 1968, p. 1)

Project Management

To carry out the various project activities a PERT chart with a timeline was designed to guide the operation. Although a tentative PERT chart was provided by the proposal (Johnson, 1969, p. II-3) it was not until after the initial period of filling staff vacancies, staff orientation, providing facilities, and assigning tasks, that the first operational PERT chart was constructed.

Construction of this chart began when team concerns were defined. Each team leader was asked to review initial plans with his team and to list each essential activity in the network of the subsystem with which he was working. He was also asked to relate (a) how long it would take to complete the activity (maximum, minimum and normal time), (b) the kinds of information which would have to be obtained in order to complete it, and (c) the activity sequence relationship or its place in relation to the order in which all activities would have to be undertaken.

After these reports were completed, they were reviewed by the project director in conference with the associate directors and systems technicians. Following this review the systems technicians prepared the PERT chart. After it was reviewed by the directors and corrections and adjustments were made, operation of the system was begun.

Tracking was an essential feature of the procedure. Once operations utilizing PERT charts were begun the team leaders (project directors) were required to submit weekly reports of the achievements of their teams. These reports (see Figure 2) required the team leader to describe the extent to which his team had accomplished that which it had intended to accomplish during that week, to report on

WEEKLY INFORMATION SHEET

Name: ______________________________ Date: ____________________

In the following week I can be reached on the following dates at the telephone numbers (besides the usual telephone number)

Date: _______________________ Telephone Number: _____________

_______________________ _____________

Activities progress (% complete) and hours spent on each activity:

Do you think that the time estimations for the present and future activities still hold?

Fig. 2. Weekly information sheet.

any previously unanticipated activities that would have to be carried out, and to indicate the extent to which the team as a whole was on schedule. These reports were carefully reviewed and, whenever a critical situation arose, changes in plans were executed. For example, if a team leader found that for some reason (such an unanticipated prerequisite activities, delay of materials, unavailability of consultants, or illness of a team member) his team was falling behind schedule to the extent that it was likely to seriously affect the timing of the project, immediate steps were taken to remedy the situation. Sometimes this meant reallocation of project staff; other times the hiring of supplementary personnel; still other times substituting. Substituting refers to such occurrences as an extensive phone call in lieu of a consultant visit, utilizing available materials with some modification instead of more suitable ones which were unavailable, and borrowing equipment.

As the project progressed it became evident that although the initial planning had been detailed and thorough a sufficient number of problems arose so that it was advisable to make periodic revisions of PERT charts and timelines a part of the project routine.

Figure 3 presents a summary network of events for the activities which took place between May 1, 1969 when the project was initiated and December 31, 1969 which was the date for completion. The network is composed of events and activities. An event represents the initiation or completion of an activity and is shown in a circle. An arrow with a solid line indicates an activity in progress. An arrow with a with a broken line represents a "dummy" activity which is not an activity at all but an indication of the flow of events where an activity is not required. A detailed list of the activities by predecessor and successor events accompanies the network on the pages immediately following it. The initial numeral for each event indicates the working team or group which undertook that activity. The following key is provided to guide the reader in relating working groups to activities:

Group 1: Project management subsystem
Group 2: Evaluation subsystem
Group 3: Instructional subsystem
Group 4: Feasibility study management

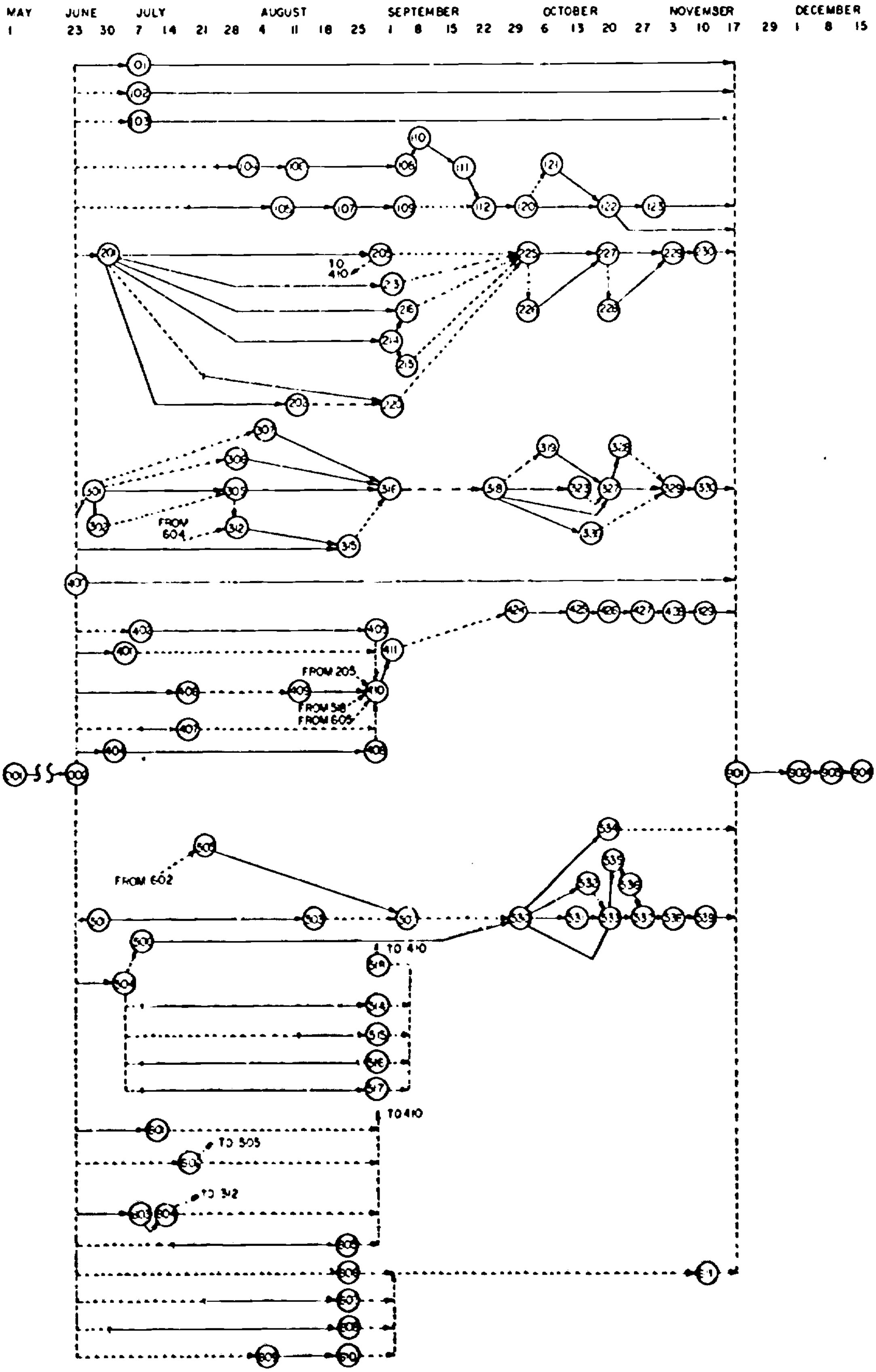

Fig. 3. PERT network for feasibility project.

Group 5: Program management subsystem
Group 6: Implementation management
Group 9: Combined groups
Group 0: Combined groups

List of Events and Activities

Predecessor	Successor	Description of Activity
001	002	Staff Orientation and Management Organization
002	101	Activity List & Design of PERT Chart for Feasibility Study
002	102	Dummy
002	103	Dummy
002	104	Study of Available COST/PERT Programs
002	105	Activity List & PERT Chart for 5-year Program
002	201	Annual Leave of Director of Evaluation Subsystem
002	301	Orient Staff of Instruction Subsystem
002	315	Select PMs, Orient Team & Determine Cost Thru Operation
002	400	Dummy
002	401	Edit Article for Systems Development Corporation
002	402	Dummy
002	404	Orient Research Assistant
002	406	Prepare Article for Journal of Research & Development
002	407	Prepare Outline for Preliminary Cost Estimate Report
002	501	Collect Data on Cost and Enrollment at the University of Georgia
002	504	Investigate Commitments of Institutions to GEM Program
002	601	Decision on Faculty Orientation and Training
002	602	Design of Laboratory Experience
002	603	Building PMs
002	605	Design for Student Advisement
002	606	Decision on Certification
002	607	Decision on Selection of Students
002	608	Decision on Administrative Arrangements within College of Education
002	609	Dummy

101	901	Update PERT Chart for Feasibility Study
102	901	Cost Control
103	901	Design Simulation Model
104	106	Familiarization with COST/TIME Program PMS/360 from IBM
105	107	Organize Time & Resource Estimates
106	108	Preparation for Run of Time Module
107	109	Rough Versions of Resource Estimations
108	110	First Runs of Time Module
109	112	Dummy
110	111	Preparation for Run of Time & Cost Module
111	112	First Runs of Time & Cost Module
112	120	Orientation of New Staff
120	121	Dummy
120	122	Development of Cost Program
121	122	Refinement of Time Program
122	123	Pullout of Subsystems from Chart
122	901	Refinement of Cost Program
123	901	Development of Materials for Final Report
201	202	Orient Staff of Evaluation Subsystem
201	205	Design & Determine Feasibility of Candidate Selection Evaluation System
201	213	Design & Determine Feasibility of Candidate Performance Evaluation System
201	214	Design & Determine Feasibility of Project Evaluation System
201	216	Determine PM Evaluation Structure
201	220	Design & Determine Feasibility of Program Evaluation System
202	220	Dummy
205	225	Dummy
205	410	Dummy
213	225	Dummy
214	215	Project Evaluation: Establishment of Selection Criteria & Review
214	216	Plan Activities - Sept. 8 to Nov. 17
215	225	Dummy
216	225	Dummy
220	225	Dummy
225	226	Dummy
225	227	Writeup of Components of Assessment Subsystem in Operation
226	227	Revision of All Cost Estimates
227	228	Dummy

227	229	Writeup of Feasibility of Assessment Subsystem in Operation
228	229	Develop Criteria for Evaluation Procedures
229	230	Writeup of Systems Design for Development of components of Assessment Subsystem
230	901	Writeup of Conclusions Regarding Feasibility of Operation of Assessment Subsystem
301	302	Time Estimations for Feasibility Study PERT Chart
301	305	Refine Specifications & Start Draft of PMs
301	306	Dummy
301	307	Dummy
302	305	Dummy
305	312	Dummy
305	316	Complete Draft, Sequence for Retrieval & Revise PMs
306	316	Write Description of Phases & Operations
307	316	Write Description of Development, Implementation & Operation
312	315	Pilot Test of Target PM
315	316	Dummy
316	318	Dummy
318	319	Dummy
318	323	Edit Target PM's
318	326	Determine Time
318	327	Writeup of Components of the Instruction Subsystem
319	327	Revise and Refine Cost Estimate on PM
323	327	Dummy
326	329	Dummy
327	328	Plan and Coordinate for Testing of Target PMs
327	329	Writeup of Feasibility of the Instruction Subsystem in Operation
328	329	Dummy
329	330	Writeup of Systems Design for Development of Components of Instruction
330	901	Writeup of Conclusions Regarding Feasibility of Operation
400	901	General Planning & Coordinating Activities
401	410	Dummy
402	405	Write First Draft of Part I of Final Report
404	408	Survey 8 Feasibility Proposals & Prepare Report
405	410	Dummy
406	409	Dummy
407	410	Dummy
408	410	Dummy

409	410	Write Preliminary Cost Estimate Report
410	411	Print Preliminary Cost Estimate Report
411	424	Dummy
424	425	Write Preface to Final Report
425	426	Writeup of Purposes & Background of the GEM Study
426	427	Writeup of Procedures for the Feasibility Study
427	428	Writeup of Comprehensive Strategy for a 5-yr. Development Plan
428	429	Writeup of Economic Feasibility of Model Program Alternates
429	901	Writeup of Conclusions
501	503	Calculate Cost of Educating Elementary Teachers at University of Georgia & Project Next 5 Years
503	507	Dummy
504	506	Dummy
504	514	Reciprocal Agreements with School Systems & Other Agencies
504	515	Investigate Use of Non-professional Personnel in Management
504	516	Investigate Implementation of 12-month School Year
504	517	Investigate Problem of Continuous Schedule Revision
505	507	Work out Specifications for Laboratory Facilities & Experiences
506	530	Miscellaneous Management Components of System
507	530	Dummy
514	518	Dummy
515	518	Dummy
516	518	Dummy
517	518	Dummy
518	410	Dummy
530	531	Writeup of Components of Management System in Operation
530	532	Review Reciprocal Commitments & Agreements
530	533	Revise Cost Estimate
530	534	Compile Job Descriptions
531	533	Writeup of Feasibility of Management System in Operation
532	533	Dummy
533	535	12-month School Year
533	537	Writeup of System Design for Development of Components of Management
534	901	Dummy
535	536	Revise Laboratory Specifications

536	537	Dummy
537	538	Writeup of Conclusions Regarding Feasibility of Operation
538	539	Start Writeup of Feasibility of Development & Operation of the Comprehensive Model Program
539	901	Finish Writeups
601	410	Dummy
602	410	Dummy
602	505	Dummy
603	604	Decisions on Testing Pilot PMs in Summer & Fall of 1969
604	312	Dummy
604	410	Dummy
605	410	Dummy
606	611	Dummy
607	611	Dummy
608	611	Dummy
609	610	Decision on Reciprocal Commitments
610	611	Dummy
611	901	Write Final Report
901	902	Edit Parts I-IV of Final Report
902	903	Confer on Conclusions and Write Part V
903	904	Print Final Report

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Chapter III

Strategy for a Five Year Development Program Leading to Sustained Operation

C. E. Johnson

This chapter summarizes the findings of the investigation as regards the strategy which is recommended for the implementation of the model instructional program in sustained operation. Although some attention is given in this chapter to maintaining the program in sustained operation it is the following chapters that provide the details for that final stage.

Proposed Project Management Techniques

The management of program development efforts differs from that appropriate for maintaining the program in operation. Once the model with its specifications is firmly defined and efforts are undertaken to implement a strategy which will make the model a realization, the various complex interrelated activities which were undertaken in developing that model are no longer needed. Thereafter, different management techniques must be used. For example, during the development stages considerable effort must be directed toward planning and designing instructional materials. Once these are planned and designed they must be written, piloted, tested, revised and duplicated. They will reach initial operation and finally after a final testing be put into the program in sustained operation. These activities are much different than those which will be occurring during sustained operation. Then materials will already have been developed and will be in use by the students in learning laboratories. The focus of attention then will turn to maintaining them through correction, modification, extension and substitution.

Initial development will require considerable effort, but little or none of this is directed toward actual instruction of students. On the other hand, during sustained operation the system's major focus of attention is upon instruction. Similarly each of the various components to be dealt with reveals a contrast between those activities which will happen during development and those which will happen during sustained operation.

During development activities related to candidate selection will include the preparation of manuals, the selection of appropriate tests from among those which are available, the designing of devices for recording information about candidates, and the setting down in detail of the entire recruitment program. Also, new devices such as check lists, observation sheets, tests not currently available, and the devices to be used for data storage such as computer cards and selected computer programs must be invented or selected so that ultimately sustained operation is realized.

The nature of activities concerned with institutional orientation, dissemination, and staff training will also be different during development than in sustained operation. For example, the training of staff members during the development period will mean preparing teams to design and produce the initial PMs. These persons will have to learn how modules are constructed, organized, written, and published. They will have to learn about format, editing, language usage and program sequences. Later, during sustained operation when these materials are available, the staff training objectives will be concerned with preparing professors and instructors to manage the use of these study guides with students. During development, educational media specialists will serve as consultants in helping to design materials, whereas during sustained operation their attention will be turned to helping students utilize these media for learning purposes. They will also assist those in the process of continually updating PMs to utilize new equipment appearing on the market that shows promise of improving the educational program.

As regards the continual monitoring of progress in implementing the strategy for development considerably more flexibility is essential to a program development operation than is necessary in maintaining a program in sustained operation. For example, although this proposal presents a strategy which at the present time appears to be a neat and progressive system which will ultimately realize a sustained operation of the model instructional program, it is not only likely but expected that there will be numerous problems arising during the period of educational engineering. There will be unavoidable delays in accomplishing certain activities on the one hand and unexpected slack time on the other. Thus, it is essential to a development operation that periodic redesigning of the operational network of activities pattern is undertaken. This updating procedure was described in Chapter II in a discussion of the procedures used in the feasibility study where it was necessary to frequently redesign the PERT network, reallocate time, adjust expenditures, and bring in new forces where efforts were delayed.

As contrasted with program development procedures those in sustained operation are relatively well regulated. When the point of sustained operation is reached the objective becomes one of production rather than creative invention. During sustained operation the focus is on producing exemplary elementary school teachers through the continual updating, improvement, and increased efficiency of the network of events associated with the production process.

Complexities of Program Management

The complexities of the management of the development strategy or system become seriously evident when one considers that there are not only numerous components of the model instructional program but that each of these components must pass through various operations. In addition there are three sequential phases to the instructional program.

Figure 4 shows a three dimensional representation of the relationships among operations, components and instructional phases. For the most part, the terms are self-explanatory and the sequence is evident. For example, the first instructional phase is the preprofessional program. That is to say, when the student enters the program for his first university or college level experience he will enter the preprofessional program which upon completion of particular requirements will prepare him for entrance into the professional program. From there he will progress to the specialist.

Each of these three instructional phases is by definition separated into components. The components are

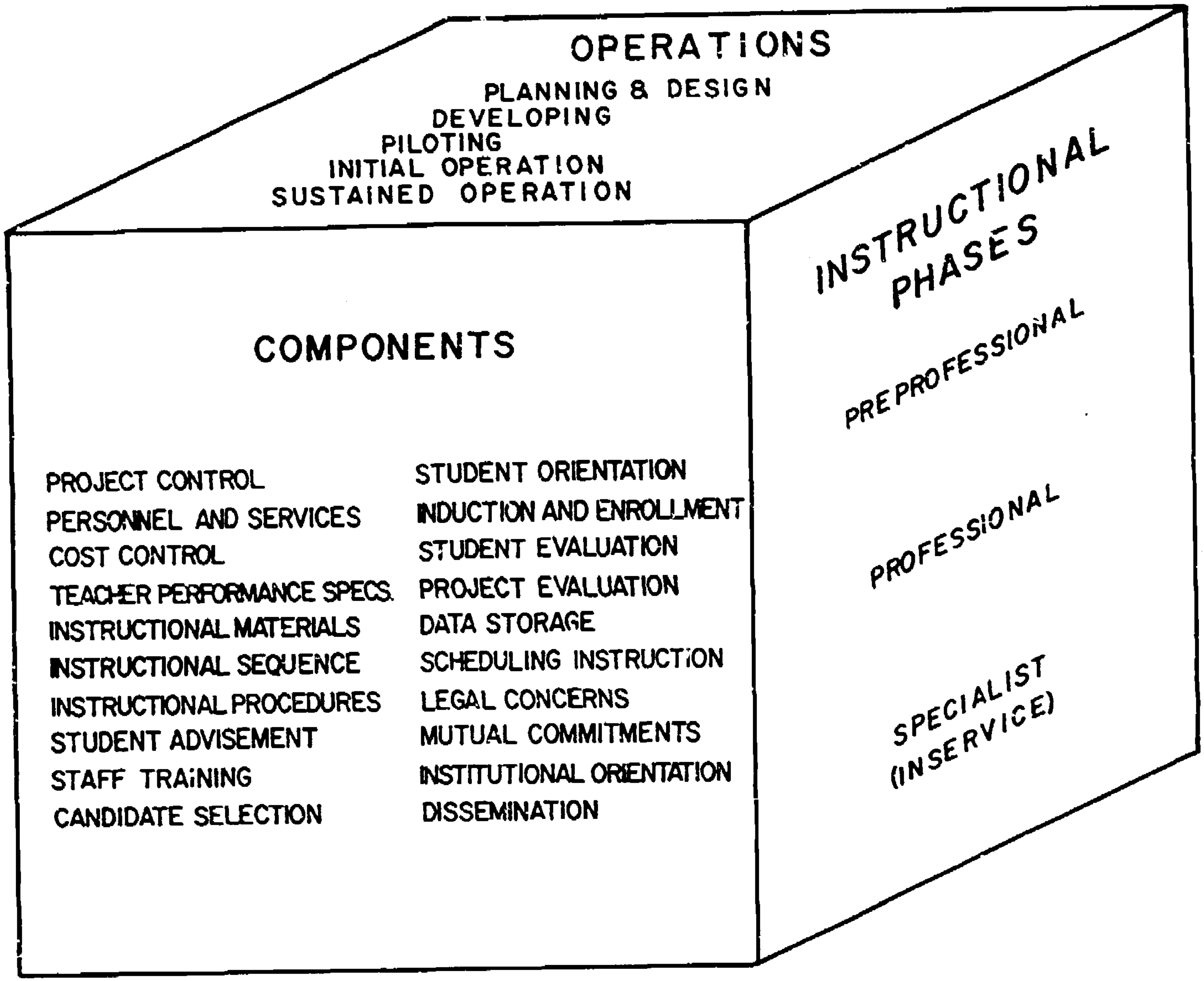


Fig. 4. Three dimensional relationships among operational components and instructional phases.

listed on the face of the three dimensional figure. For example, it will be necessary to have a project control system for each of the three phases of the program, and each will need personnel and services; the available money to carry out each phase of the program must be subjected to control; there will be particular teacher performance specifications assigned to the preprofessional phase, and so on through to concern for mutual commitments, institutional orientation, and dessemination.

These various instructional phases each with twenty or more separate components must pass through a process of operation from the earliest stage of planning through design, development, piloting, and initial operation. Planning requires considerable time in conferring to develop a strategy for accomplishing the desired end. Designing differs from planning in that planning refers to the development of strategies while designing is concerned with suggested features of a product. Developing means putting the plan into operation or actually creating the product suggested by the design. Such would be the case in producing a study guide, a set of examinations, an evaluation check list, or a computer program. Developing usually includes testing in order to provide a sound product. For example, an evaluation check list which has been planned, designed and produced must also be tested and revised before the process of developing is completed. Next in the sequence of operations is piloting. Piloting means trying out a procedure or a product in a life situation on a limited scale. Piloting requires a preliminary strategy, its application, and the process of evaluation to determine the extent to which the object or system function in its intended manner. The fourth and final step in development is initial operation. Up to this point, components may have been treated only in isolation or in small related groups of components. However, in initial operation the purpose is to see the extent to which all components are interacting effectively within an instructional phase. This is a caution against the situation in which one might note separate and isolated components all working in efficient timing but when combined are found to be incompatible. This is related to the principle of queueing.

The principle of queueing is concerned with the extent to which all components are functioning efficiently in relation with one another. Thus, it is concerned with regulating the scheduling of inputs in relation to outputs. For example, it may be reasonable to assume that if the component of student evaluation is viewed in isolation from the other components within one of the instructional phases it may be regarded as a properly functioning component. However, the magnitude of the provisions within that component may be insufficient to provide for the development of more than a relatively small number of tests when it is intended that the component in operation should provide a sufficient number to accommodate the needs of the PMs being developed concurrently. Unnecessary delay could result if provision in the evaluation component was insufficient to provide for the number of instructional materials being produced.

It was noted that Figure 4 listed twenty components. Actually, there are many more. In this figure they were reduced to twenty by combining some related components. The figure shows five operational steps, from planning and design through sustained operation. Also, the three instructional phases are indicated. Each of the listings under the three dimensions is interrelated within the dimension as well as with the items listed in the other dimensions. Thus, literally thousands of possible relationships must be considered in detail. Also, it should be observed that if adjustments are made in any one combination of concerns it is likely that there will be an effect on numerous other related concerns within the three dimensions.

Sequential Induction of Phases

The concept of sequential induction as a fundamental principle for the strategy of the development of the model program was arrived at after considerable examination of alternatives. This concept requires that the program be built and implemented from the point of initial entry and that development activities continue sequentially through to the highest level of proficiency required by the specifications for teacher performance. This means that attention is first given to the development of the preprofessional phase, next to the professional phase and finally to the specialist phase. Furthermore, it means that when sustained operation occurs it will occur first with the preprofessional phase, followed next with the professional phase and finally with the specialist phase. Thus, the attainment of the condition where all phases of the instructional program are in sustained operation is not complete until the specialist phase leaves its final stage of development. Illustrative of a considered alternative is a situation in which development of all phases of the instructional program is undertaken concurrently. Such would be the case if three teams set about concurrently to develop the entire instructional program, each concerned with a separate phase. Exploration of this alternative revealed that the final product would lack continuity and the desired sequential and integrated characteristics. In addition, the cost for the preparation of the staff and their demands upon facilities and materials would be uneconomical. In other words, if the core staff charged with the development of the preprofessional phase participates on the basis of their experience in developing the professional phase and next the specialist phase, there is much saving in cost as related to the training and preparation of the staff.

Strategic Stages of Development

The results of the investigation designed to provide a strategy for a development system designed to implement the model program into sustained operation are briefly outlined in the graphic representation in Figure 5. Six stages are shown leading from preliminary planning to sustained operation. In examining this figure, the reader is cautioned that although each stage is represented by an equal allotment of space not all stages represent equal allotments of time. The total amount of time represented in Figure 5 is approximately six years. Time allotments and critical dates will be shown in other representations.

Planning and Designing

Planning and designing are the concerns in the first three stages. In stage 1, the planning and designing of the overall program begins, and concurrently attention is given to planning and designing the development of the preprofessional phase. In stage 2, while continuous attention is given to planning and designing the overall program special attention is given to the development of the professional

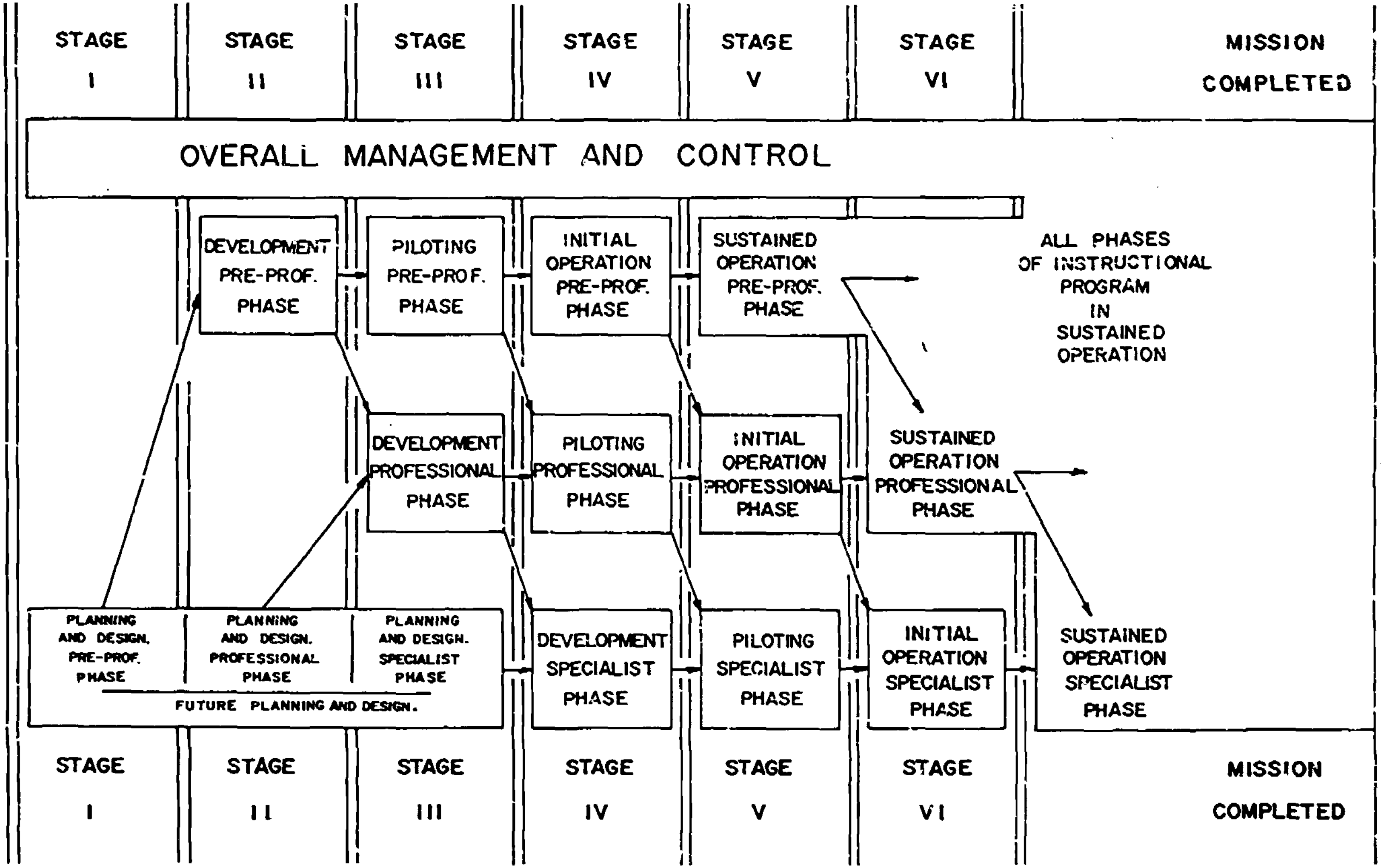


Fig. 5. Stages of the development strategy.

phase of the instructional program. Stage 3 continues activities concerned with planning and designing the overall program while it focuses attention upon planning and designing the specialist phase.

There is a wide range of activities involved in planning and designing. All such activities recommended for the development strategy are listed in detail in Volume II of this report. These include: the selection of professional and non-professional staff; organizing and orienting the staff; planning facilities, equipment and materials; designing a simulation model of the operational phase; testing and revising that model, and many others.

Development of Instructional Program Phases

Stage 1 which involves the staff in planning and designing the overall program and in preparing activities for stage 2 leads directly into stage 2 where the first development activities take place. Here, the preprofessional phase of the instructional program is developed and made ready for piloting. Concurrent with the development of the preprofessional phase is the planning and designing of the professional phase of the program which moves into development in stage 3. Similarly the planning and designing of the specialist phase which occurs in stage 3 and information and data collected during the development of the professional phase of the instructional program in stage 3 leads in the direction of assisting in the development of the specialist phase of the instructional program which occurs in stage 4.

As was the case in the networks associated with the planning and designing of the overall program and each phase of the instructional program the network for development activities is a complex interrelationship of hundreds of activities, all of which are listed and coded in Volume II of this report. In examining such a list the reader will note a great variety of activities which have been classed as development activities. These activities include planning PM development teams, selecting staff for these teams, organizing these teams and orienting them to their purpose and objectives. It provides for the planning of each PM and the activities that will be undertaken as they are designed, for the coordination of design of numerous PM groupings, and for the revision of personnel groups as well as the testing of PMs. Also included here are activities associated with planning facilities, equipment, and materials for instruction as well for testing these materials. In addition is the provision for the writing of rough drafts, their editing, their revision and finally their publication.

This brief presentation of activities is only illustrative. Inasmuch as there are numerous additional components for which revision is made on the basis of the illustration, the reader can duplicate the same operations as regards development of the evaluative materials for the various blocks and program sequence and provisions for selecting and obtaining staff and facilities to carry out these activities.

Piloting Phases of the Instructional Program

The term piloting, as was the case with the terms development and planning and design, is a term inclusive of many varieties of activities. Piloting does not refer to the first testing of the materials. Materials and procedures have been evaluated, tested and revised many times before they reach the piloting stage. However, it is during piloting that a sample group of students is carried through the model instructional program in a fashion fairly representative of that which will occur during the sustained operation.

Considerable attention in carrying out piloting operations must be given to planning facilities and equipment and materials for the testing of PMs. However, even before these facilities, materials and equipment can be selected, attention must be given to the selection of students for testing, organizing and orienting them to the program. In addition to the selection of students, additional specially trained staff must be made ready for carrying out the instructional aspects of the piloting program. This means that special attention must be given to the selection of persons to guide student learning, and to consult with students on the problems which they experience as they pursue the activities suggested by the PMs. For the first time elaborate provisions must be made for computer storage of data and the testing of the programs designed to accomplish that end. Here again numerous activities are involved, all of which are listed in Volume II of this report.

Piloting begins in stage 3 for the preprofessional phase. The activities of planning and designing, and development have led to the piloting activities. Piloting of the preprofessional phase of the program lays the foundation for the piloting of the professional phase in stage 4 and ultimately the specialist phase in stage 5. Much will be learned in the initial undertaking of piloting operations which will become useful as the investigators move from one stage to another, and it may be assumed that the results of experience will gradually shorten preparation activities.

Initial Operation

The initial operation period is the first time that the model program is in operation under what may be regarded as projected normal conditions for sustained operation. Initial operation of the preprofessional program begins in stage 4. Preparation for this network of activities was the result of planning and designing, developing and piloting which occurred in stages 1, 2, and 3. Here again is a matrix of interrelated activities arranged in a logical and sequential network of events, all of which are presented in detail in Volume II of this report. These activities begin again with planning personnel and selecting and organizing them as well as orienting them to the tasks which they are to perform. Next is the selection and organization of students. This is followed by planning for facilities, equipment and materials and the procurement of these concerns in order to provide the setting in which the piloting will be undertaken. Next begins the actual operation of the piloting of the PMs with their evaluation activities and finally the evaluation of the entire program as it appeared during the initial operation. This of course will be accompanied by continual evaluation and revision of the various materials and procedures involved in the preprofessional phase of the instructional program. Similarly the initial operation of the professional phase which takes place in stage 5 and the initial operation of the specialist phase which takes place in stage 6 will have appropriate activities.

Sustained Operation

After any phase of the program has passed through the stringent tests, evaluation and revisions which are representative of the initial operation phase of the program, it passes on to the condition of sustained operation. This begins with stage 5 when the preprofessional phase of the program having been planned and designed, developed, piloted, and fully tested is ready to be regarded as fully implemented and ready for consumer usage.

Experiences in carrying out the initial operation of the preprofessional phase of the instructional program are used in performing similar experiences in stage 5 with the professional phase and in stage 6 with the specialist phase. At the end of stage 5 the professional phase of the instructional program will pass into sustained operation and at the close of stage 6 the specialist phase of the instructional program will pass into sustained operation. Thus at the close of stage 6 all phases of the instruction program will be in sustained operation and the mission of the development strategy will have been completed.

Time Relationships

The specifications for the development strategy which require the application of research and development procedural principles provide for flexibility in the management of time. However, this flexibility is within a framework of defined limits. For example, the starting date for the project is assumed to be July 1, 1970. The period of funding by the contractor is limited to five years. Because of these limitations the strategy is designed so that all components of all phases of the instructional program will have been developed and piloted by July 1, 1975. It should also be noted that the endorsement of the principle of sequential induction, combined with the fact that the instructional program employs individualized instruction, creates particular scheduling concerns. For example, it is estimated that while the average qualified student will require 18 months to complete the preprofessional phase of the program, a highly qualified student may complete it within 12 months. Since the student who completes the first phase of the program six months earlier than the norm will be ready to move immediately into the second or professional phase of the program, the latest allowable date for initiating the professional phase is 12, rather than 18 months after initiating the preprofessional program. A similar overlapping must also occur between the professional and the specialist phases.

With reference to the duration of activities associated with initial operation of these phases of the instructional program, the terminal dates are subject to variation. For example, it is assumed that the initial operation phase of the preprofessional program will transform itself into the sustained operation phase after 90 students have satisfied its requirements. Since the students will be inducted into the program at a rate of no more than 40 in any one month, it is estimated that total transformation from initial operation to sustained operation will not be completed in less than 24 months.

Volume II of this report provides a detailed time analysis for the five year development strategy. For each of the hundreds of activities involved, it sets forth estimates of the maximum, expected and minimum time durations for activities, and the expected and latest dates for their occurrences. For readers who are not interested in studying the highly technical data provided in Volume II, Figure 6 was designed to depict graphically on a broad conceptual base the time relationship among the various systems associated with the development and operation of the model instructional program over a six year period.

Illustrative PERT Chart Diagrams

PERT chart diagrams for the entire system of program development and sustained operation were designed during the feasibility study. These charts, all of which appear in Volume II, show the entire flow of events from the point of initial operations to the point where all phases of the instructional program are in sustained operation. Illustrations of these detailed charts are those shown in Figure 7. At the top of Figure 7 is a

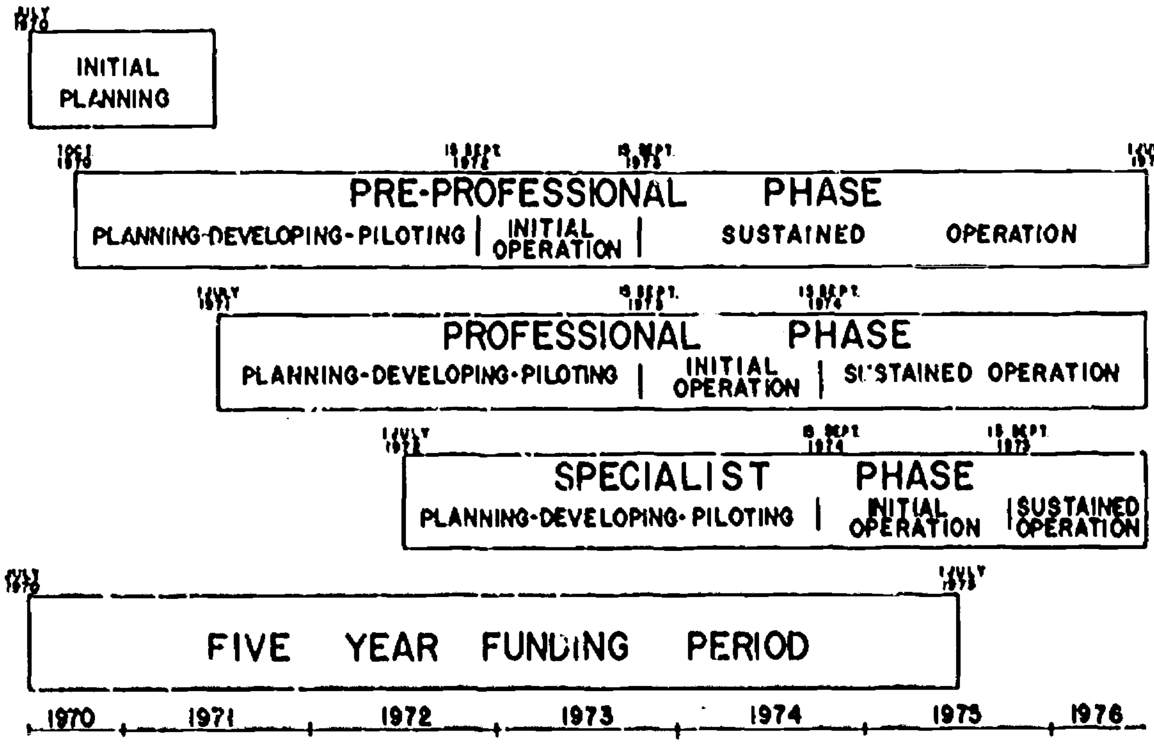
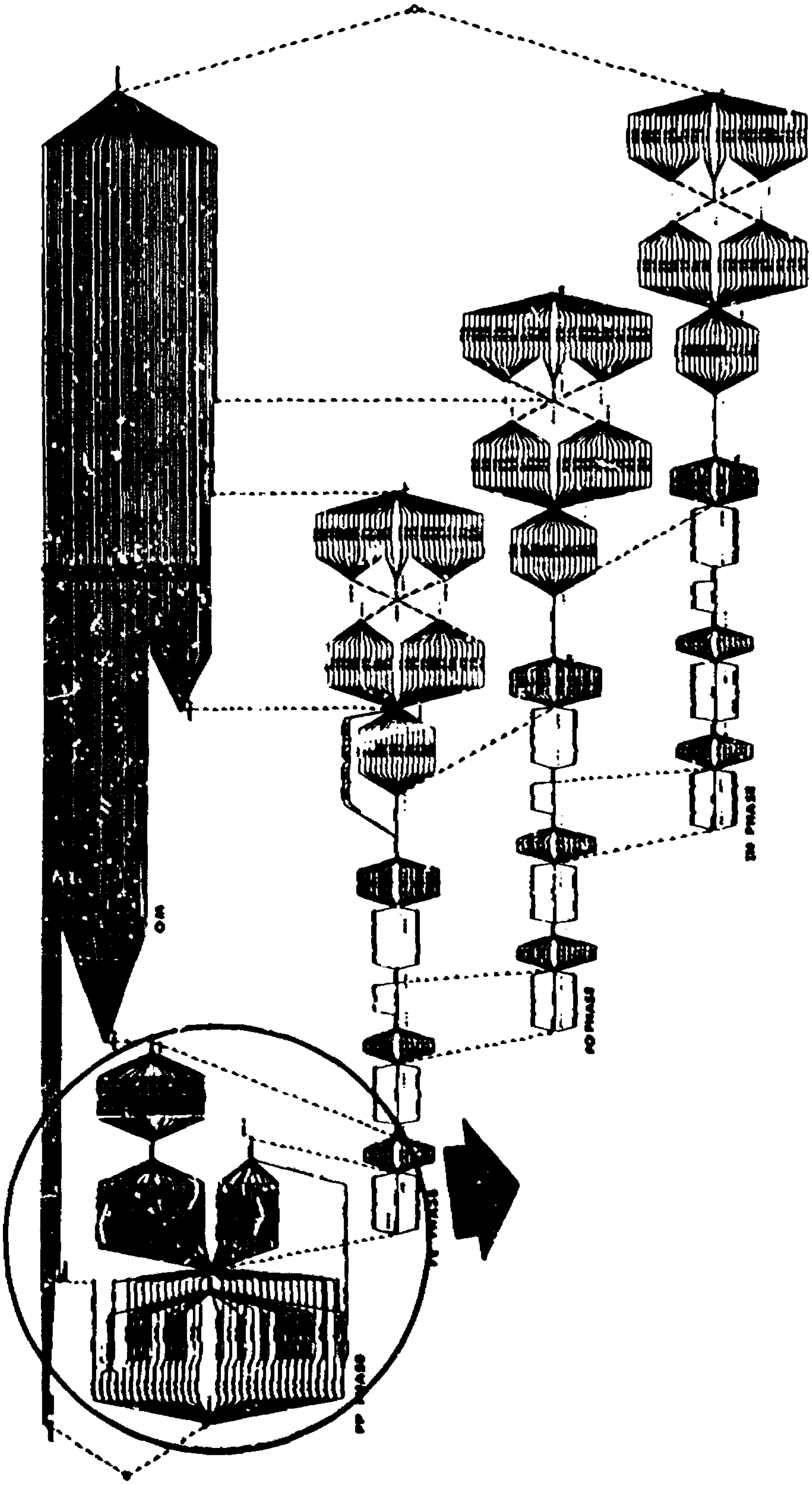


Fig. 6. Time sequence for the development strategy.

representation of the total network which has been photographically reduced to the point where it has lost much of its legibility. It is included only to assist the reader in noting its relationship with the network at the bottom of the figure. That is to say the circled portion of the network at the top of Figure 7 is magnified to legible proportions in the network which appears at the bottom of the page. The enlarged network depicts the flow of events for just the initial planning or preparation phase. There is a cost, time and date assigned to each activity. Should the reader care to know what a particular activity calls for in terms of persons involved, materials needed, equipment required, or the date on which the activity is likely to be taking place, he can find this information in the technical tables in Volume II which follow the complete set of PERT chart diagrams.

Figure 8 illustrates the network of events for the development of the preprofessional phase, and Figure 9 the network of events for the piloting of the professional phase.

In studying Figures 7, 8, and 9 the reader will note that the style of the PERT charts differs from that which appeared in Chapter II. This is due to the differences in the application of perting techniques. The purpose of Figure 7 is to show component and activity relationships with less concern for the time scale. The diagram for the feasibility study had as its purpose the time oriented description of activities for the various teams of the feasibility study. One advantage of PERT techniques is this flexibility of charting styles.



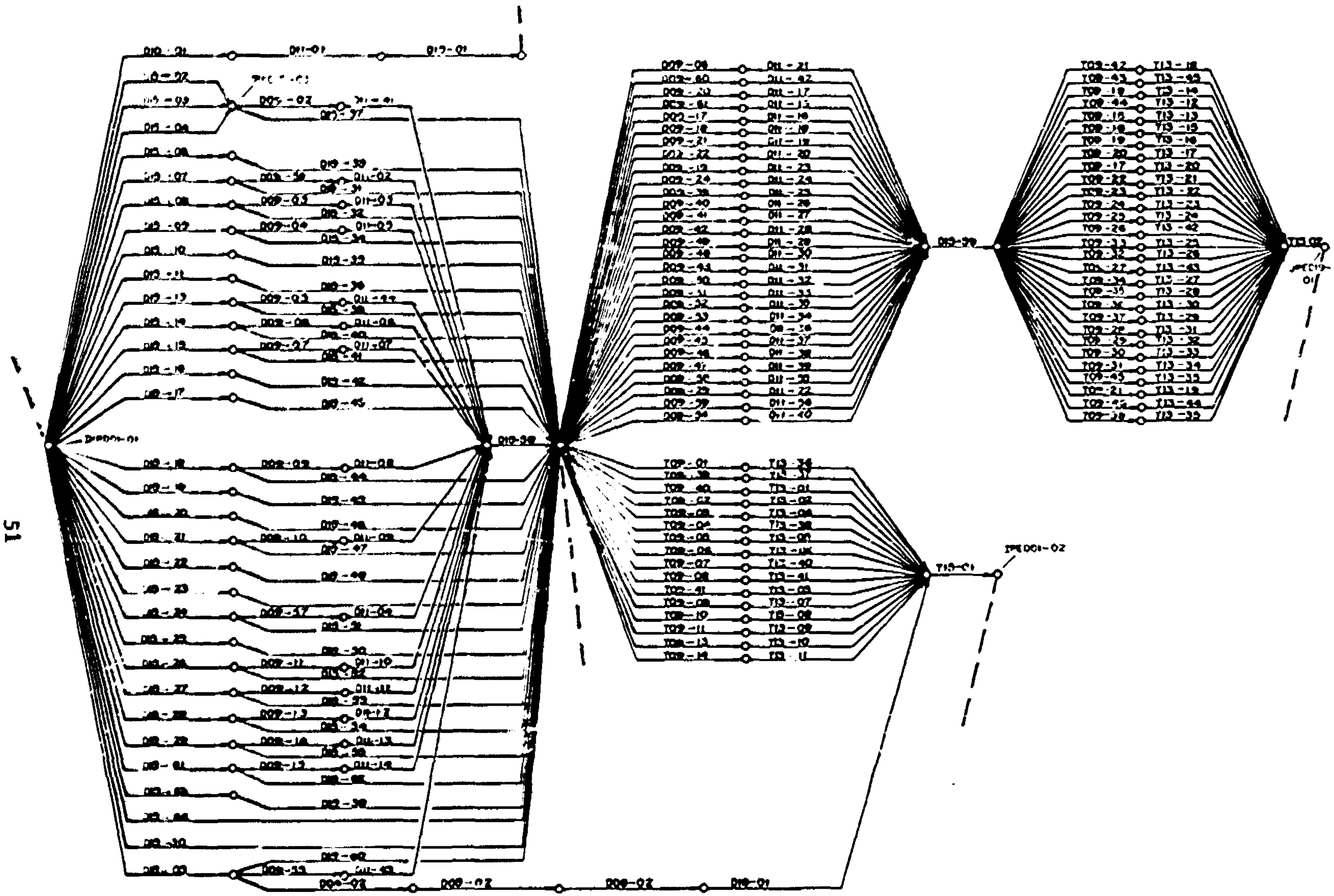
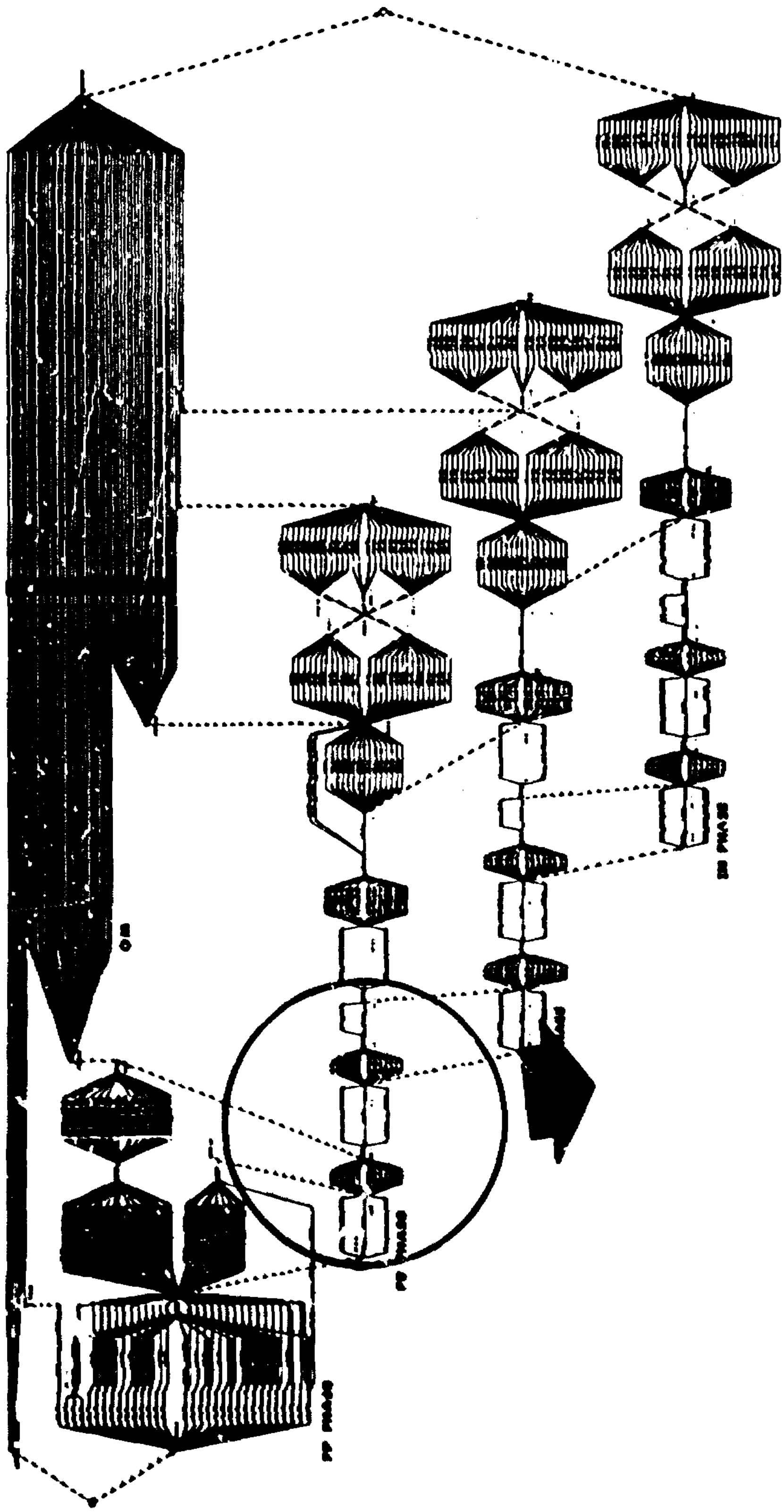


Fig. 7. PERT network for the preparation phase (initial planning).



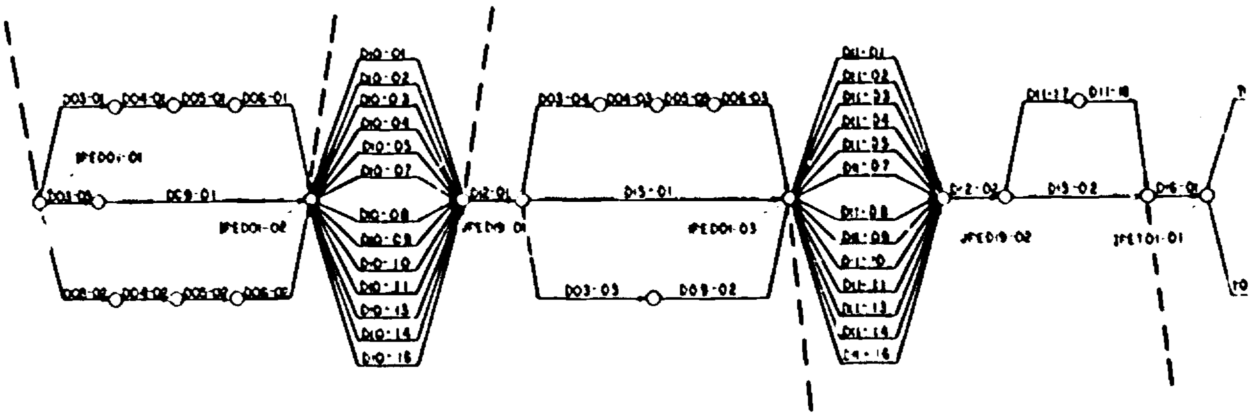
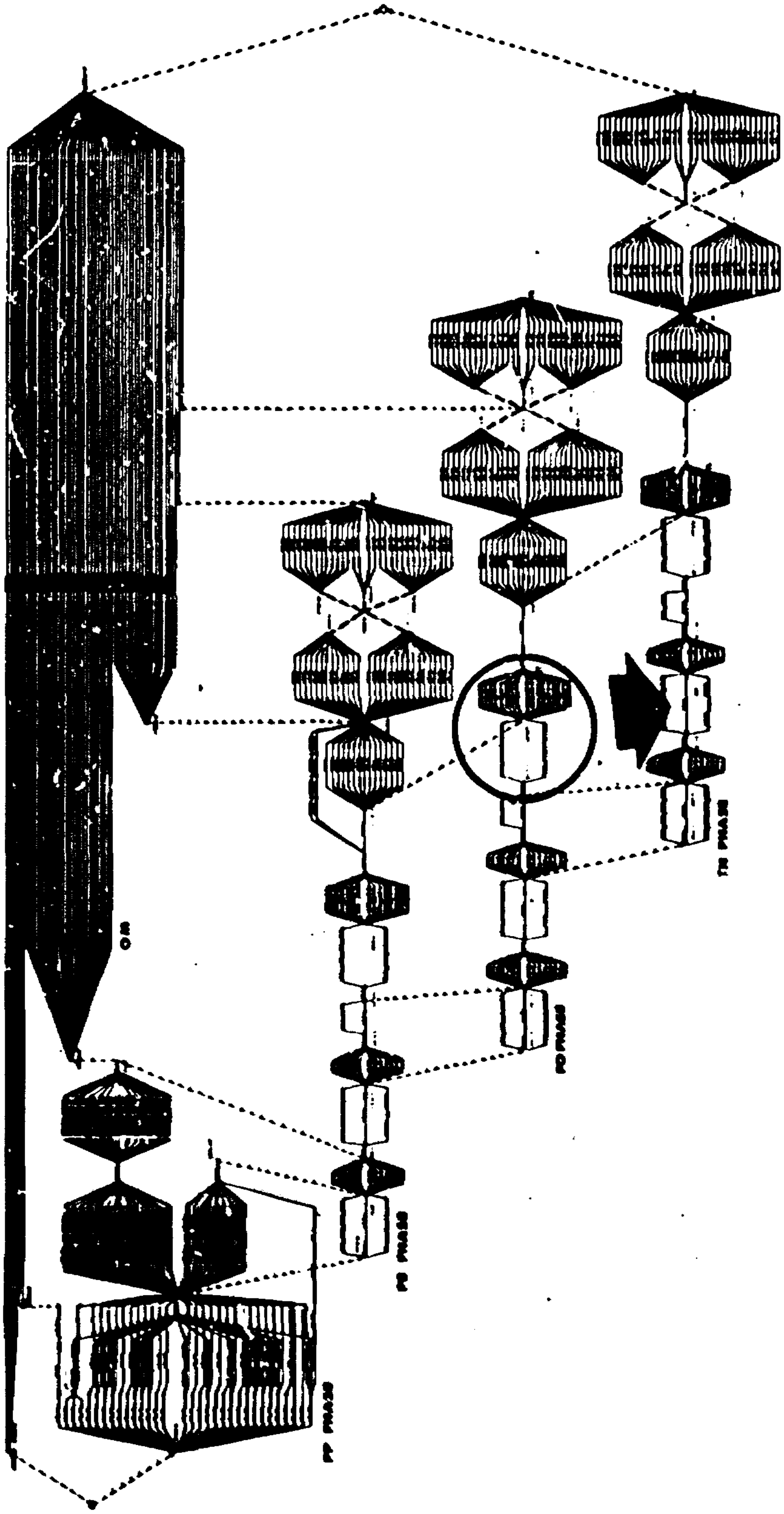


Fig. 8. PERT network for the development of the preprofessional phase of the instructional program.



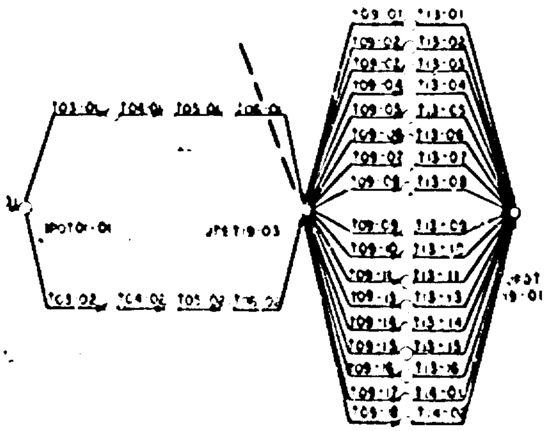


Fig. 9. PERT network for the piloting (testing) of the professional phase of the instructional program.

Chapter IV

Feasibility of the Instructional Subsystem

M. L. Hawkins and G. F. Shearron

This chapter is concerned with the feasibility of the instructional components of the model program as they will operate when the model is in sustained operation and with the strategy designed to implement them into sustained operation. A detailed description of all operations can be found in Volume II of this report. The components of the program described here are those that bring student, professor and program content together in a process of individualized interaction that produces an elementary teacher prepared to function with optimum effectiveness in the public elementary schools.

The teacher performance behaviors form the core of the instructional program. The components described in the paragraphs that follow are parts of the schema that make it possible to translate the teacher performance specifications into a program to prepare elementary teachers. Therefore, the teacher performance specifications provide the base of content for the program. The learning procedures and materials components provide the methodology. The instructional sequence component insures logical and psychological routing through the program. The evaluation of student achievement component insures the mastery of the content, skills, and attitudes specified in the teacher performance specifications. The faculty orientation component provides inservice education and communication training for the professors, while the student advisement section makes certain that the student has a base to return to in an individualized teacher education program.

The Instructional Subsystem in Sustained Operation

The instruction component is concerned with the teaching-learning aspects of the model program. The instructional program is divided into seven components in this report. Each is regarded as an important part of the instructional component and the interaction of these components will determine to a great extent the success of the model program.

The components of instruction are: learning activities and materials, instructional procedures, instructional program sequence, evaluation of student achievement, teacher performance specifications, student advisement and faculty orientation.

The feasibility of the instructional program in sustained operation has been established in several different ways. Perhaps the most significant of these has been the development and piloting of selected learning experiences. This has provided an opportunity to observe faculty and students in real situations under conditions prescribed in the original specifications. In addition, the various college committees that deal with instruction have approved the proposed procedures. These committees include: Committee on Undergraduate Teacher Education Programs, Elementary Education Advisory Committee, and Faculty Executive Committee.

Perhaps the most difficult area in which to establish feasibility is what has been referred to earlier as "psychological feasibility." The strategy has been to involve large numbers of faculty members in both the designing of the model and in this present study of its feasibility. This provides a base on which to build. Although the model has been well received by other faculty members it remains to be seen how they will react when they are asked to become involved. It is anticipated that most of those individuals to be involved in the sustained operation of the program will have participated in the development stages.

Teacher Performance Specifications

Teacher performance specifications (also referred to as teacher behaviors) are statements which describe competencies which a teacher should possess in order to operate at optimum effectiveness. These specifications incorporate characteristics for the development of cognitive learnings, attitudes, and skills.

Performance specifications are classified into three areas: teaching assistant, general elementary teacher, and specialist. The job description contained in the final report (Johnson, Shearron, and Stauffer, 1968) reveals four general categories into which the teaching function is ordered in the model. Performance specifications for the fourth category, the teacher aide, have not been developed in the Georgia model. The reason for this is that the designers of the model take the position that the job as defined can be performed without university training and should not lead to the bachelors degree. Tasks for aides are listed, however, in the report which provides specifications for the model.

Operational definitions determined by the Georgia Educational Model's staff are:

> A teacher's aide is a person whose function is to perform routine and other paraprofessional activities in the classroom.
>
> A teaching assistant is a person who has the competencies of a teacher aide and in addition has completed the equivalent of an associate of arts degree, has a basic knowledge of human development, and has met requirements for admission to the professional program for general elementary teachers.
>
> A general elementary teacher is a professionally prepared person regarded as competent to assume the responsibilities for the general instruction of children primarily within the age range of 3 years through 15 years, or any defined age group within this total chronological age range. General means that the person possesses paraprofessional knowledge and skills for working with children within the defined age range plus professional competency to guide children in acquiring new learnings in all areas of content normally presented within the elementary school range.
>
> A specialist elementary teacher is a professional worker who possesses all of the qualifications of a general elementary teacher but is also prepared with additional professional and supervisory competencies in a particular subject area of professional service such as curriculum, educational media, human development and learning, evaluation, pupil personnel (guidance), professional development and school community

relations. (Johnson et al., 1968, pp. 15-19).

These definitions were used in determining the specifications and criteria for what will be included in each type of module in each area. Teacher performance specifications (Johnson et al., 1968, pp. 42-155) were written by experts in each content area. On the basis of the operational definitions, the specifications were grouped into practical sequences for development of each PM in each content area.

In order for the model program to meet and to continue to meet the needs of public school districts for competent teachers, constant program revision will be necessary. This revision will take place in a planned sequential fashion with regular examinations of projected societal and educational trends identified by experts then translated by specialists in subject matter and professional educational fields into revised job descriptions of the elementary teachers. Then, as the description of the teachers' work changes, the staff and faculty of the project drawn from the many cooperating institutions review the present teacher performance specifications and revise the specifications and the proficiency modules in their areas of academic specialty (Hawkins, 1969a).

Feasibility of the Teacher Performance Specifications

The report which provided the specifications for the model also presented the projected needs of American society and described the characteristics of the kind of elementary school which might fulfill these needs. From these needs and characteristics criteria were drawn which have been applied to the teacher performance specifications. To be feasible in terms of the Georgia model, the teacher performance specifications must continue to provide for:

1. Teachers who have liberal education sufficient to allow them to assume their responsibilities as leaders in our society.

2. Teachers who have both the will and the ability to assume responsible leadership in our society.

3. Teachers who have the subject matter, skill, processes and attitudes needed to guide children from

three through fifteen years of age and to guide children of all races, creeds, and socioeconomic status toward acquiring the behaviors reflected in the projected needs of our society.

4. Behaviors that are arranged or classified into various levels which represent stages in a career sequence, such as teacher aide, assistant teacher, certified general elementary teacher, and specialist.

Since the teacher performance specifications form the core of the model program, considerable care has been devoted to examining the specifications in light of their applicability to the job description of the elementary teacher of the 1970's. The specifications were drawn by experts in academic and professional education on the basis of the projected job description of the elementary teacher. A recent report (Hawkins, 1969b) contains an example of the social science and social science education specifications grouped into levels of the career sequence for PM development. However, prior to the PM development phase, the specifications will be re-examined by specialists in elementary education and by academic professors, then reclassified, if necessary, by levels in the teacher career sequence.

Further evidence of feasibility is found in the fact that as presently drawn the teacher performance specifications as a component of the model program have been approved by the College of Education's faculty Committees on instruction, the University administration, the University System Chancellor and Board of Regents.

Learning Activities and Materials

Performance specifications will be acquired through tasks contained in proficiency modules (PMs). Instruction will be individualized; thus each student will proceed at his own most efficient rate through series of PMs. Each subject area will provide an instructional unit where students will find the materials and equipment needed for completing the module in that subject area. Staff members will be available to assist the students and arrange both group and individual sessions.

A proficiency module is defined as a published guide which is designed to direct individual student learning behavior in studying particular subjects or topics or in undertaking particular activities in laboratory situations. The PMs are a means of organizing content for instruction in such a manner that it is assured that the student either has acquired the content, skills, and attitudes of that module, or that he will do so by carrying out the learning tasks contained in it.

The content for any PM is a selected cluster of related teacher performance behaviors, including not only definitions, facts and concepts, but, where appropriate, thought processes, motor skills and attitudes. The core of the PM, insofar as the student is concerned, is a series of learning tasks prepared by specialists. These tasks are carefully designed and arranged in such a manner that they are regarded as an effective means of guiding students toward the acquisition of the performance behaviors. These tasks provide alternate tracks for the attainment of the desired ends in such a manner as to make them adaptable to the students' individual differences in characteristics such as rate of learning, sensory sensitivity, and cognitive styles.

When properly constructed, PMs avoid duplication of content among offerings and permit the student to move through the program at a pace which is challenging to him. In meeting the specific requirements a qualified student may move as rapidly as he is capable of moving or as slowly as is necessary (Johnson et al., 1968, p. 190).

Four assumptions were basic to all proficiency modules:

1. The model program is designed to prepare teachers of children ages three through fifteen, plus various subgroups of American society.

2. There are alternate paths to mastery of content, skills, and attitudes.

3. Student time spent acquiring behaviors is determined by his performance rather than by arbitrary time or course units.

4. All learning activities are directly related to one or more teacher performance specifications (Hawkins, 1969b).

Each PM follows the same format, including:

Classification: A brief indication of the specific subject or behavioral area of concern and the sequence block to which it belongs.

General Directions: A general explanation to the student as to how to proceed in undertaking the PM.

Prerequisites: A list of the essential subject matter, thought processes, skills, and attitudes which the student must possess in order to undertake the PM.

Pre-evaluation: A diagnostic evaluation unit developed on the basis of the content which contains appropriate devices (paper-pencil tests, checklists, performance scales, etc.) designed to determine the student's initial status in relation to the content to be learned. It is not contained in the student's edition of the PM.

Objectives: The teacher performance specifications applicable to the particular PM. A matrix depicting the objectives and the supporting behaviors and activities is included.

Supporting Behaviors and Activities (Learning Tasks): A multiple series of learning activities adjusted to individual differences designed to be completed by the students. They are prepared by specialists as the most efficient known means for guiding students toward the acquisition of the performance behaviors. Learning tasks are grouped by alternate paths, such as reading and/or viewing and listening. The student, with the advice of his advisor, may choose the path that he considers most appropriate for his own learning style.

Postevaluation: A diagnostic evaluation unit based on the content which contains appropriate devices (paper-pencil tests, checklists, performance scales, etc.) designed to determine the student's status in relation to the content after he has completed particularly assigned learning tasks. It is not contained in the students' edition of the PM, but directions for arranging for the posttest are included.

Each PM will be developed in the same way. Teams composed of content specialists, learning specialists, subject matter education specialists, and an editor will have prepared the PMs during the developmental stages. These would have been reproduced, made ready for student use, and distributed through the instructional units of each subject area.

During sustained operation the staff will be concerned with reviewing, revising, and re-testing the specifications, contents, and procedures in each PM. The five major operations involved are: (a) assignment of teacher performance specifications, (b) review and revision of the specifications, (c) review and revision of learning procedures by content area, (d) testing of learning procedures by content areas, and (e) planning for the revision of learning procedures (Hawkins, 1969a).

It should be noted that all PMs will not be developed by faculty of the University of Georgia. When thought appropriate by the model staff, PMs will be contracted for with other units of the University System of the state or by cooperating institutions outside the state. For example, preliminary arrangements are being made to subcontract the PMs in black history and teaching disadvantaged children to institutions with particular strengths in these areas.

There are eight types of PMs. The term types refers to classes of PMs which group themselves around common functional relationships. These types are:

Type A A sequence of basic PMs required for all students in the preprofessional program (includes orientation PMs which acquaint the students with the nature of the program).

Type B A sequence of basic PMs required for all students in the professional program.

Type C A sequence of special PMs required for students electing the PM grouping as a teaching area of competency.

Type D A sequence of basic PMs required of all students in the inservice program.

Type E A continuing sequence of PMs in one area of specialization for all students enrolled in the specialist programs.

Type F A group of exploratory PMs in subject areas not selected as a teaching area of emphasis during the preservice program.

Type G A group of special purpose PMs designed to meet local conditions or needs.

Type H PMs which are developed by a learner (or group of learners) rather than by specialists which the student(s) proposes to his (their) advisors for acceptance either as special enrichment or as a reasonable substitute for a required PM.

Proficiency modules have been developed in sixteen areas. Table 1 shows the number of PMs by type and area. These 582 PMs include both laboratory and non-laboratory instruction.

Table 1

PMs by Type and Area

PM Area Group	Types of PMs								Total
	Preservice			Inservice					
	A	B	C	D	E	F	G	H	
Language Arts	34	34	14	0	31	7	6	1	127
Social Science	17	26	19	0	30	11	10	1	114
Science	12	20	6	0	12	4	5	1	60
Mathematics	4	10	5	0	9	2	1	1	32
Fine Arts	3	4	8	0	10	4	2	1	32
Foreign Languages	0	0	30	0	15	6	3	1	55
Health Education	4	5	12	0	17	4	2	1	45
Human Growth	2	7	4	4	4	2	0	1	24
Pupil Personnel Services	2	3	0	1	5	2	2	1	16
Media	1	2	0	1	3	1	1	1	10
Professional Development	6	8	0	5	4	2	1	1	27
School Community Coordination	0	0	0	0	5	2	1	1	9
Evaluation	1	1	0	2	3	1	1	1	10
Social Foundations	2	3	0	1	5	2	1	1	15
Internship	0	1	0	0	0	0	0	0	1
Laboratory Experiences	2	3	0	0	0	0	0	0	5
Total	90	127	98	14	153	50	36	14	582

Feasibility of Learning Activities and Materials

The feasibility of this component has been established through the development and testing of PMs. Eight target PMs were developed. They represent different types and program phases. Those that were developed are listed below.

Type A - "Linguistics in Language Arts"
"Elementary Economics - The Market System"
"Basic Physical Geography"
"Physical Fitness for Elementary Teacher Assistants"

Type B - "Graphic Representation in Social Studies Instruction"
"Magnetism, Electricity, Heat, and Microscopic Viewing in Science Instruction"

Type E - "Skill Development in Reading Instruction"
"Physical Fitness for Elementary Education Specialists"

Three of these have been tested during the summer and fall sessions of 1969. The faculty involved in testing these modules are enthusiastic about the success of these endeavors. Student reactions are reported on one of these learning experiences (Ricker & Hawkins, 1969a). This module was entitled "Magnetism, Electricity, Heat and Microscopic Viewing in Science Instruction."

Since determining psychological feasibility was the purpose of the testing of the PM, subjective rather than objective evaluations were requested from the students. Three questions were asked each of the seventeen participants.

1. How many of the lab activities described in the handbook did you carry out?

   Fifteen of the seventeen students completed all of the activities in the PM. The two remaining students found it unnecessary to complete all the activities because they had previously acquired the competencies, but they did complete some or most of the activities. This provided a base for establishing feasibility as far as the time factor is concerned.

2. How much reading did you do?

   About seventy per cent of the students found it necessary to read material other than the lab handbook. Three students read extensively; nine students read some; and five students found it unnecessary to utilize this learning activity.

3. How many small group instructional sessions did you attend?

   Students were not required to attend the sessions, which were provided for those who may have felt that they needed them. Every student attended at least one session. Ten students attended all three sessions, while seven students attended only one session.

It was possible for students to combine learning activities in various ways. Table 2 lists the combinations that were used.

Table 2

The Combination of Learning Activities Utilized and the Number of Students that Utilized Each Combination

Combinations of Learning Activities			
Lab Activities Completed	Reading Done	Small Group Sessions Attended	Numbers of Students That Used the Combination
All	Some	Three	5
All	Some	One	3
All	None	One	3
All	None	Three	2
All	Much	Three	1
All	Much	One	1
Most	Some	Three	1
Some	Much	Three	1

Almost fifty per cent of the students selected a combination of learning activities that consisted of doing all the lab activities, some reading, and attending either one or three of the small group instructional sessions. About another thirty per cent of the students used a combination that consisted of doing all the lab activities, no reading, and attending either one or three of the small group sessions.

Students were asked to respond to three questions in reference to the organization of the instructional program.

1. What do you think of this means of organizing an instructional program? What are some of its advantages and disadvantages?

   Sixteen students responded favorably to the program and one was neutral. Most of the students made favorable comments about the individualized instruction and the participatory learning situations. Individual differences were met in this learning experience. Students worked at their own rate according to their abilities and/or desires.

2. What do you think should be the size of a learning station? Why?

   Two students felt that a learning station should be designed to enable more than two students to work together; fourteen students suggested two student learning stations would be best; and one student expressed the desire for individual learning stations. Working together was regarded as beneficial and pleasant.

3. What is your reaction to the organization of the lab handbook?

   Favorable responses were given by all seventeen students. Most students expressed an appreciation for having to think through the answers and having gained a better understanding by doing so. Responses also indicate more empathy for students encountering learning situations in elementary classrooms as a result of their experiences in the experimental program.

The total results of the testing were considered satisfactory. Reactions of students to a social science PM were approximately the same (Akenson & Hawkins, 1969). The testing of these modules also provided a base for revising and making recommendations for sustained operations.

Original materials can be developed by the Learning Resource Center, Center for Continuing Education, or the College of Education Media Department when commercially developed materials are inadequate for the learning tasks. Available materials have been carefully selected to provide students with opportunities to become familiar with all types, ranging from printed to realia. The materials will be contained in the instructional unit in the College of Education Building now under construction. Each area facility will be staffed by specialists, most of whom are presently employed by the University of Georgia.

Frequent evaluations and the resulting revisions will provide current materials and insure that learning activities are theoretically and practically feasible.

During the feasibility investigation attention was given to the preparation of criteria which would establish the feasibility of this component. In evaluating and revising the activities for this element of the model in sustained operation special attention was given to these standards.

1. The activities and materials must be organized in accordance with what is known regarding how the content is most effectively learned (rather than necessarily in accordance with the scholarly system of classification of subjects within separate disciplines).

2. Program operation must be sustained by interdisciplinary teams of specialists who have a sound understanding of the performance behaviors to be acquired, and who utilize these behaviors to provide an adequately balanced system of learning activities and materials.

3. Development of learning activities and materials must be so structured that practical applications and basic theoretical concepts are introduced concurrently, with stress being given to their

interrelationships. (More complex theoretical consideration should be undertaken only after basic practice and theory have been assimilated.)

4. Learning activities and materials must take into account significant subgroups of the elementary school population such as the culturally disadvantaged, the poor, and the non-English-speaking, with a view toward ultimately helping these children achieve a positive self-image and high motivation to deal with social problems.

5. Learning activities and materials must be designed to prepare the student or trainee to teach particular target age groups of elementary school children within the age range of from 3 through 15.

6. Students or trainees must be involved in the development of learning activities and the selection of materials.

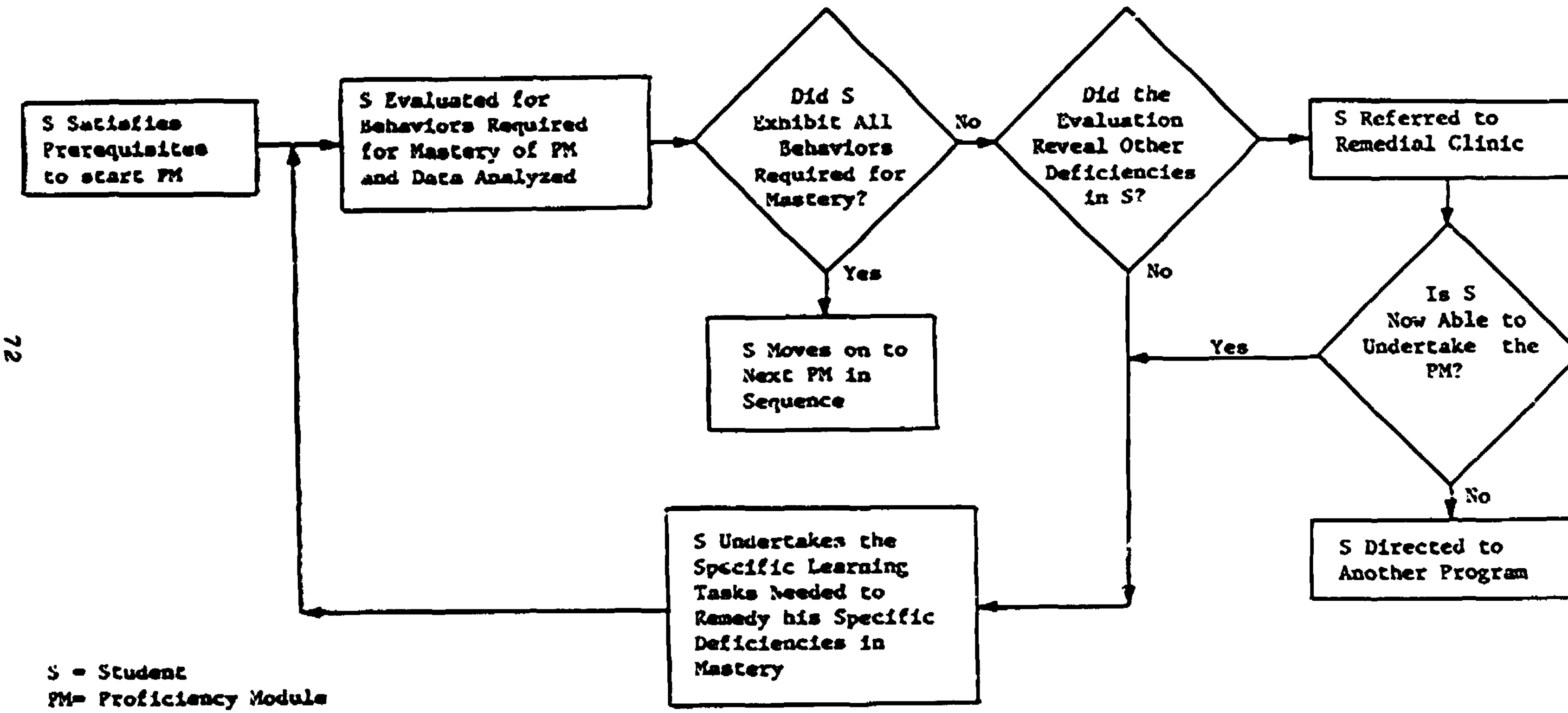
7. Learning activities and materials must provide for individualized instruction.

8. The program must have as an integral element a system of continuous follow-up evaluation so as to provide for its continuous revision.

It is the opinion of the investigators that insofar as continued provision is made for the above criteria during implementation that the feasibility of the component will be assured.

Instructional Procedures

The preceding section described how learning experiences are to be organized into PMs. Instructional procedures are the next concern. These might be referred to as the interactions between the student and his learning activities. The model program is both clinical and individualized. Figure 10 is a graphic representation sketching a student's movement through any module.



S = Student
PM= Proficiency Module

Fig. 10. Flow chart of procedures for use of a PM.

Before undertaking a PM the student must provide his instructor with evidence that he has satisfactorily met the PM prerequisites. The student is then evaluated on a pretest which consists of a sampling of the behaviors which the PM is designed to help him acquire. In conference with the subject area specialist, the PM pretest is analyzed and a mutually agreed upon plan of action is prepared. It may be decided that the student's performance on the pretest indicated that there was no need for him to undertake the learning tasks contained in the particular PM, or to undertake only specific parts.

Pretests will be devised for each PM. If the results of the test warrant exemption from the tasks of the PM, the student moves on to the next PM. If not, the student proceeds through the PM.

PM pretests for those PMs designed to guide students in practical laboratory experiences are administered after the student is judged to have had sufficient time in the laboratory setting to exhibit those qualities reflected in the content of the PMs. However, were he to have met the prerequisites for beginning a PM in practical laboratory experience, he would not receive the pretest until he had had a short period of on-the-job activities in the laboratory setting.

It is also possible for a student to propose his own objectives and learning activities, if they are found to be in keeping with the goals of the program and are approved by his advisor.

The clinic (see Figure 10), is a separate component of each instructional unit and has as its responsibility the development and implementation of programs to provide remedial and/or background experiences necessary for satisfying the requirements of the PMs. Clinic experiences are independent of PM requirements and are administered on an individual basis. Students referred to the clinic are assigned to professional personnel who can give the assistance they require.

The final major part of instructional procedures are laboratory facilities designed to help students through the instructional procedures. These are:

General Resources Laboratories include facilities which are used by students and staff of universities, colleges, and schools for learning activities.

Instructional Unit Central Resources Laboratories are a part of the facilities of each instructional unit in the program. They house and provide all learning materials and equipment essential for the undertaking of PMs of that instructional unit which are not readily and conveniently available in General Resources Laboratories.

Instructional Unit Field Laboratory Facilities are provided by each Instructional Unit through the manager in charge of laboratory services who employs a coordinator whose primary job is to obtain the needed field facilities and arrange schedules as required by students engaging in learning tasks contained in PMs.

Each Instructional Unit provides laboratory experiences in group interaction learning. The unit manager of these services schedules such activities as lectures, seminars, workshops, debates, recitals, art shows, and panel discussions as they are required by the PM learning tasks or especially requested by instructors or students.

Two practical laboratory experiences are required during the preprofessional program. The first focuses on paraprofessional classroom activities and is carried out with children in early childhood. The second focuses on paraprofessional activities and is carried out with children in later childhood. The laboratory experiences will last a minimum of 5 weeks or until the student can successfully perform the behaviors listed in the PM.

Three practical laboratory experiences are required during the professional program. The three practical laboratory experiences which occur in the professional program focus on professional activities and are carried out with children within the student's target age group. children younger than those within the student's target age group, and with children older than those within the student's target age group.

Placement in practical laboratory experiences is such that the students have the opportunity to work with children of various socioeconomic and ethnic characteristics.

The preservice internship, a ten week period, is carried out with children within the intern's target age group and the intern is given the opportunity to give special emphasis to providing instruction in his teaching area of competency.

Feasibility of the Instructional Procedures

The feasibility of the instructional procedures specified in the Georgia instructional model has been established through the piloting of target PMs. The results of this activity have been reported earlier in this chapter. The procedures used in this study included the following:

1. Each student was required to acquire each performance behavior specified in the module.

2. Each student selected the learning activities to help him acquire the specified competencies.

3. The instructor's role was one of guiding rather than telling.

4. Each student was given a mimeographed guide in which all procedures were outlined.

As has been indicated previously fifteen of the seventeen students achieved all of the desired behaviors (Ricker & Hawkins, 1969b).

Computer assisted instruction on a large scale is not feasible at this time. The programs available are limited in their scope and are not based on the performance specifications developed in the Georgia model. The development of specific programs for use in this model is not economically feasible at this time nor is it projected to be feasible during the first few years of sustained operation. These conclusions were reached by the GEM Feasibility Study staff after careful study of the existing programs and consultations with experts in the field (Shaw & Hawkins, 1969; Shaw, Darwin & Hawkins, 1969; Brann, 1969; and Lopez, 1969).

Literature reporting CAI programs and research relates some favorable findings but also some negative comments. Equipment and program costs are but one aspect. Most seem to stress the need for refinement of the total program before results can be reliably measured. It has also been recommended that CAI not be used when other methods are equally effective (Bitzer, 1968-69). The existing gaps in knowledge about CAI, time and skills involved in preparing the specific programs needed to meet the unique specifications, and the prohibitive costs make consideration of CAI impractical at this time as part of the Georgia model (Charp, 1969; Goodman, 1968; and Hickey, 1968). Much has yet to be learned; a continuing study will be made of the use of CAI and when it is considered to be economically feasible it will be incorporated as an instructional procedure.

The instructional procedures provide benefits not found in traditional programs. In addition to individualized instruction, more laboratory experiences, and more carefully selected materials, the procedures follow an organized and logical pattern that allows students to participate actively in the learning process and work in real situations. The procedures also include the techniques advocated for improved college teaching and teacher training as described by Cooper (1958) and Estrin and Goode (1964).

Since each PM has alternate paths for learning, differences in sensory sensitivity as well as rate of learning and cognitive styles are provided for. Including alternate paths recognizes that students learn differently. This has been recommended in the past but traditional programs have not put theory into practice. Having experienced the alternate paths themselves should sensitize the students to the need for providing alternate learning situations when they become teachers (Smith, 1964).

Clinical and individualized instruction can be provided. Clinics, patterned somewhat after the already existing University speech clinic, for each instructional unit will provide both remedial and/or background experiences. Each clinic will be staffed by trained personnel to insure maximum student benefits. Laboratories will also be available for each instructional unit in which a student may participate in various activities at a rate suited to his ability.

Operational activities associated with the instructional procedures component as they appear in sustained operation are described in detail in Volume II. All activities were designed to provide for the following criteria:

1. That the student's accumulation of experience and his capabilities provide the basis for determining the specific behaviors which he is to acquire and the methods, materials, and procedures by which he is to acquire them.

2. That a student's performance be evaluated by comparing his achievement with the behaviors he is to acquire, rather than with the achievements of others.

3. That the extensiveness of the student's time required to acquire a particular behavior be determined by his performance in relation to that behavior, rather than by standard units ot time.

4. That students be clearly aware of their objectives, have important roles in determining them, and be involved in selecting the means by which they are achieved.

5. That the learning activities and materials be so arranged as to provide alternate paths designed to guide the student toward the acquisition of particular behaviors and assist the student in selecting those most effective for him.

6. That students be encouraged to develop individual objectives beyond those established for the educational program, which are compatible with, and complementary to, the goals of the program.

7. That students evaluate their own progress toward the objectives and be assisted in doing so. (This does not mean that self-evaluation is the only evaluative procedure to be used with students in the program.)

8. That learning activities be designed so as to effectively lead the student toward behaviors which reflect positive skills and attitudes in

terms of human or interpersonal relations. (Some behaviors can only be acquired through activities which stress human interaction.)

9. That the extent to which the student has satisfied the prerequisistes for undertaking new learnings be systematically determined.

The feasibility of this component is regarded as assured by the investigators if continued provision for these criteria is maintained in sustained operation.

Instructional Program Sequence

The model program provides for three levels of professional competency. The design of the three levels provides a definite break in the student's preparation at which time he is prepared to accept a public school position or continue in his preparation program.

The first phase--preprofessional--is equivalent to the first two years of the undergraduate program and upon completion provides the student with the beginnings of a liberal education, preparation of paraprofessional service as a teaching assistant and the associate in education degree. Figure 11 is a graphic illustration of the distribution of emphasis among subject areas for students in the preprofessional program.

The student progresses through the performance behaviors specified in the structure of the PMs. All PMs are classified into types and blocks. The term types refers to a class of PMs that group themselves around common functional relationships, such as basic PMs required for all students enrolled in the preprofessional program or PMs required of all students enrolled for a particular teaching area of competency. The term blocks refers to clusters of PMs which are designed to be taken in sequence. In Figures 12 and 14 there are six PM blocks in the preprofessional program and ten PM blocks in the professional program. The student is normally expected to meet the level of proficiency required in all of the PMs of any one block before he moves on to the next. The PMs required in each general education and professional education area are identified within Figure 14.

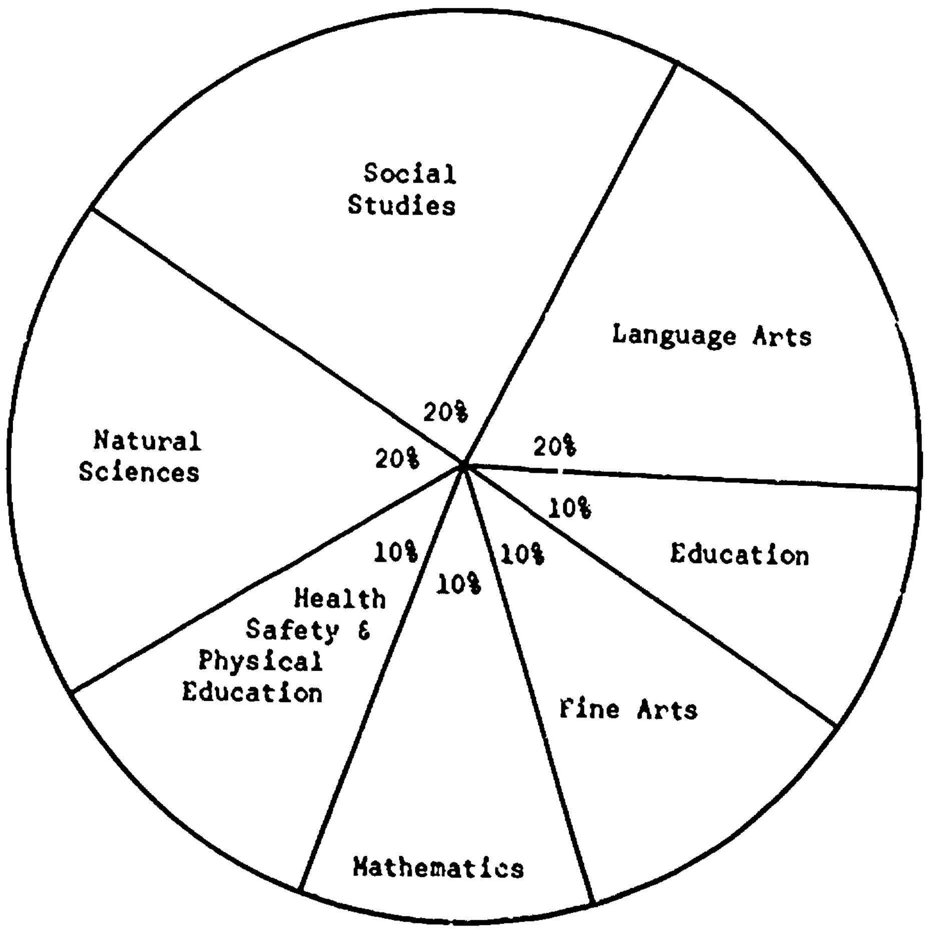


Fig. 11. Preprofessional program subject area emphasis.

Block 1	Block 2	Block 3
PMs 1-8 Language Arts	PM 1 Laboratory Experience Preprofessional Approximately 5 weeks	PMs 9-14 Language Arts
PMs 1-3 Social Science		PMs 4-6 Social Science
PMs 1-3 Natural Sciences		PMs 4-7 Natural Sciences
PMs 1-2 Music		PM 1 Art
PMs 1-2 Health Education		PM 3 Health Education
Para- and Professional Education and Advisor-Advisee Seminars PMs 1-14		

0 1 2 3 4 5 6 7 8 9

Months

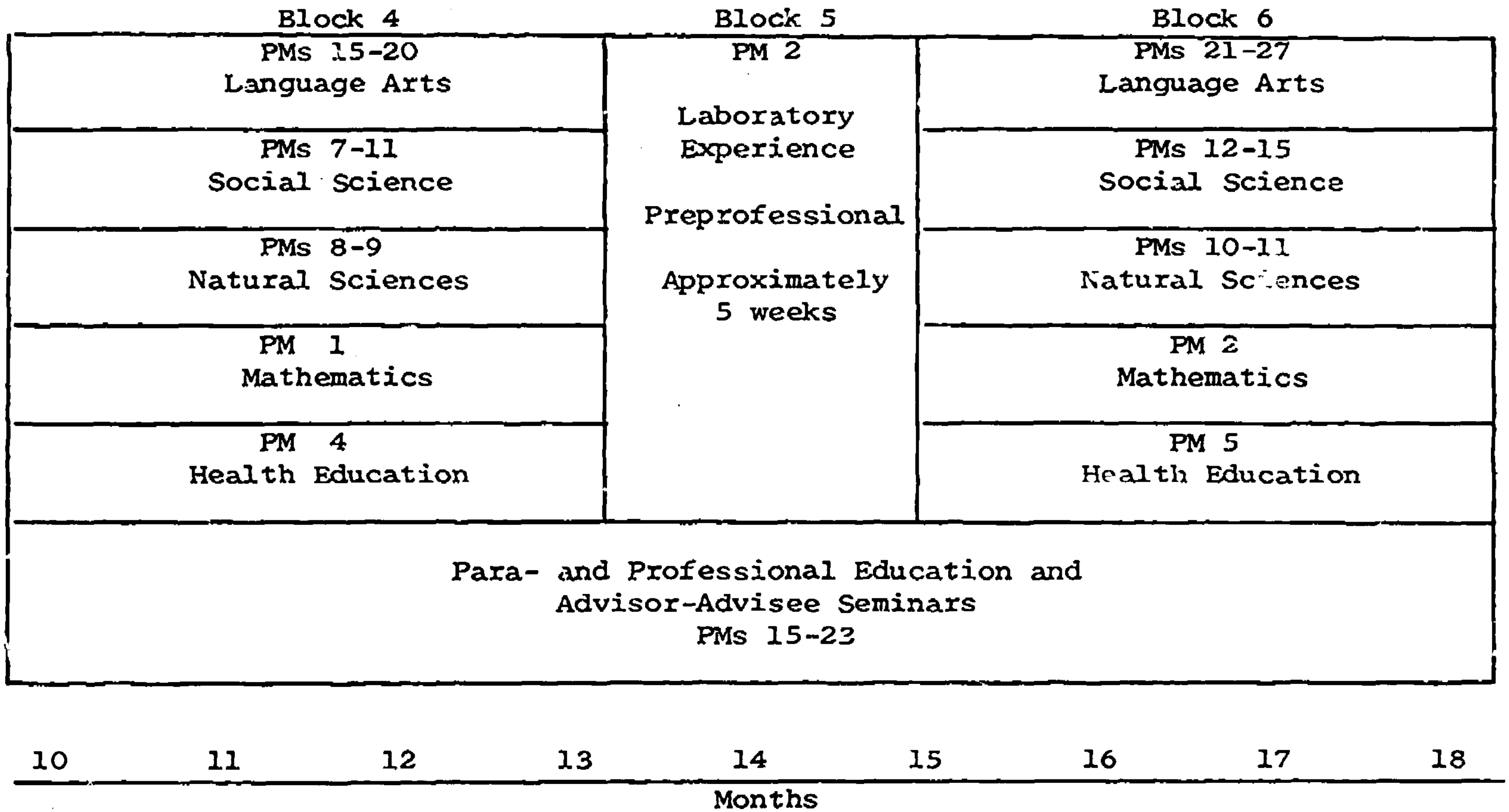


Fig. 12. Diagram of PM requirements for study sequence for the preprofessional program.

The second phase is the professional phase. This is equivalent to the last two years of college and prepares the student for a professional elementary certificate, the Bachelor of Science in Education degree and satisfies the prerequisites for admission to the graduate program. Figure 13 is a graphic illustration of the distribution of emphasis among subject areas for students in the professional program.

Figure 14 illustrates the proportion of work the student will complete in his third and fourth years in the program. This figure delineates the required PMs in each of the ten blocks.

The area of competency PMs are selected according to the student's major interest. Here he is at liberty to pursue the subject area that will be comparable to a minor or a "field of concentration."

The model program provides for considerably more laboratory experience than the traditional program. During the preprofessional phase two periods of approximately 5 weeks each are set aside for laboratory (on-the-job paraprofessional) experiences working with children. The professional program provides three laboratory (on-the-job preprofessional) experiences of approximately 5 weeks each, plus a 10 week internship. Specifications contained in the GEM Final Report (Johnson et al., 1968, pp 39-42) insure that the training has a variety of professional experience, i.e., working with children of differing chronological ages, races, and cultural backgrounds.

The specialist phase is approximately equivalent to two years of graduate study and provides the student with the Master of Science in Education and the Fifth Year Certificate at the end of the equivalent of the first year of the program and a Specialist in Education Diploma and the Sixth Year Certificate at the end of the program. Figure 15 is a graphic illustration of the distribution of emphasis among subject areas for students in the specialist program.

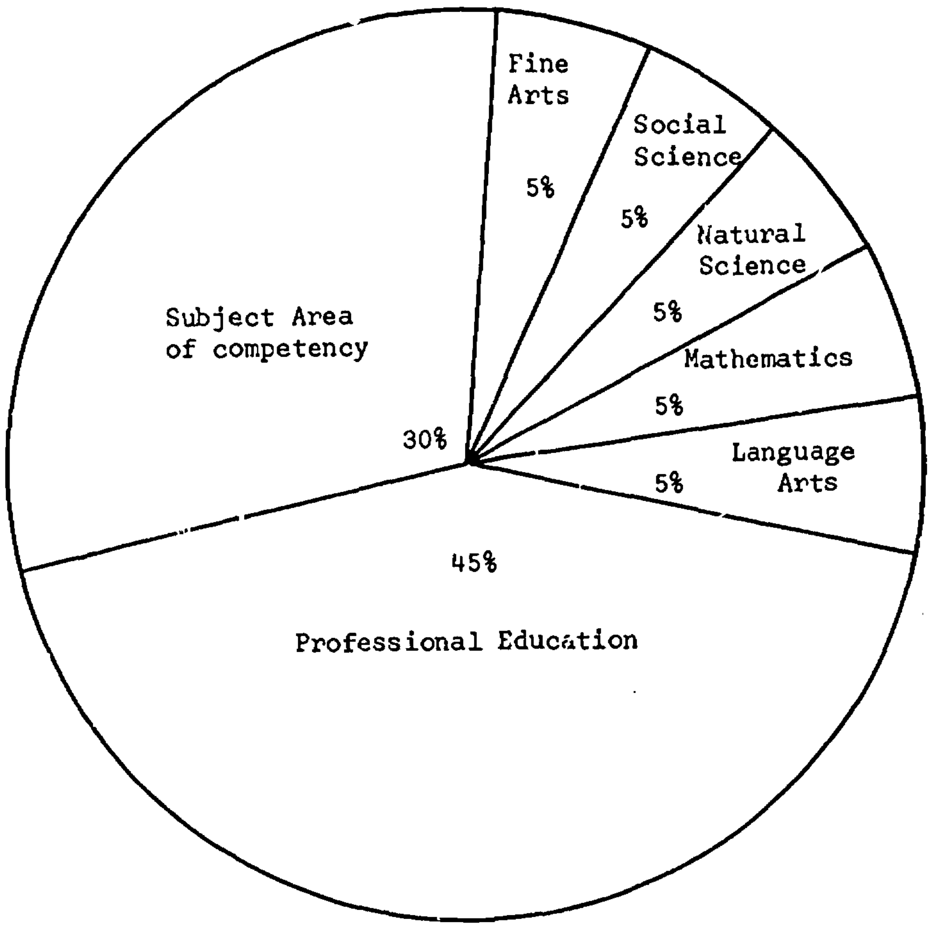


Fig. 13. Professional program subject area emphasis.

Block 1		Block 3		Block 5
PMs 1-23 General Education	PM 1 Laboratory Experiences Approximately 5 weeks	PMs 24-25 General Education	PM 2 Laboratory Experience Approximately 5 weeks	PMs 46-47 General Education
Area of Competency		Area of Competency		Area of Competency
Professional Education and Advisor-Advisee Seminars PMs 1-43				

0 1 2 3 4 5 6 7 8 9 10 11

RECESS	PMs 68-83 General Education	PM 3 Laboratory Experience Approximately 5 weeks	Area of Competency	PM 1 Internship Approximately 10 weeks	Area of Competency
	Area of Competency				
Professional Education and Advisor-Advisee Seminars PMs 44-62					

12 13 14 15 16 17 18 19 20 21 22

Fig. 14. Diagram of PM requirements for the professional sequence. The number of PMs in a student's area of competency will differ according to the requirements of the particular subject matter area chosen.

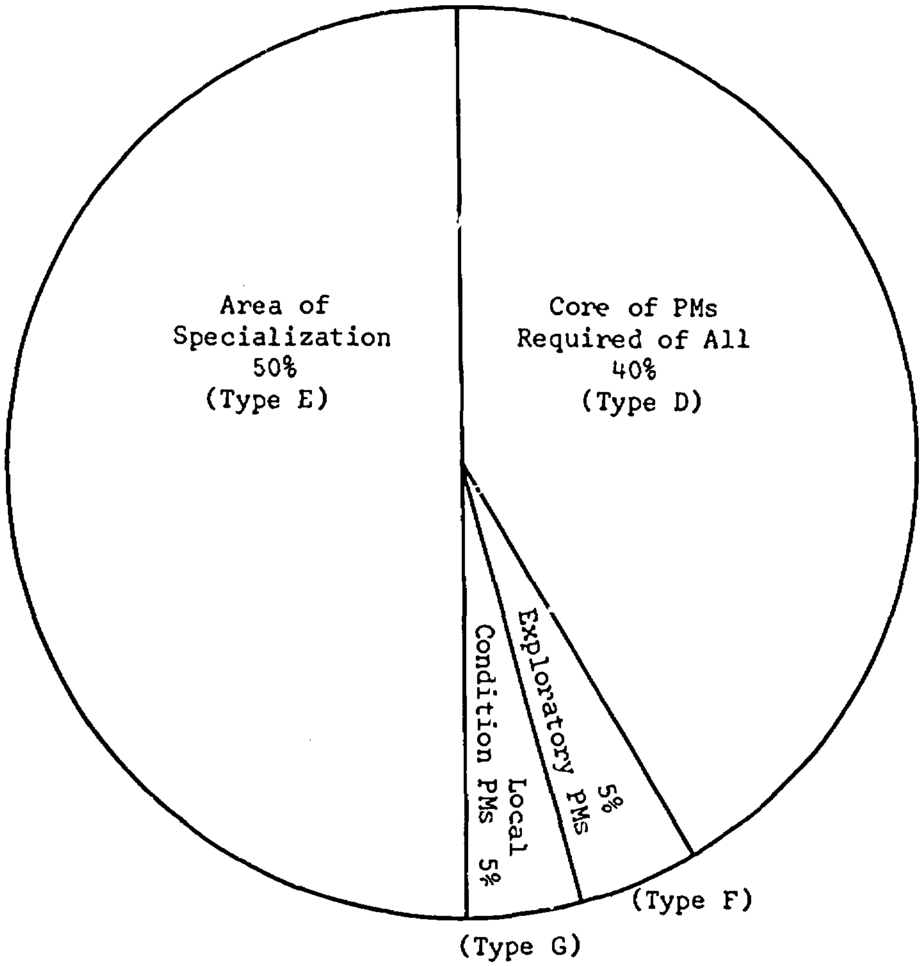


Fig. 15. The specialist program subject area emphasis.

Since the model program is predicated on a mastery principle and students are restricted by neither course unit credits nor arbitrary time units, it must be noted that the references to two years to complete each phase of the program is approximate based on an estimate of what the average qualified full-time student will accomplish. A student may progress through the model program at the rate appropriate to him. The program itself is constructed so that the student is bound by the least number of time restrictions as is possible to build into the program.

Figure 16 illustrates the approximate distribution of effort of the graduate student through his two years of study and delineates the required PMs--those that form the basic core of content.

Traditionally, the route to teaching has been directly from high school to college and into teaching. This path will be maintained and, hopefully, improved in this model. An alternative proposal allows the student to enter teaching directly from high school as an aide, attend college on a part-time basis, advance to teaching assistant, become a teacher, and finally move toward becoming a specialist. A third route allows non-education majors to enter as aides, or as teaching assistants, and complete their professional training.

The program prepares students to be economically secure at the end of each phase of the program. Each phase of the sequence is a building block to the specialist program. Thus, students may have a sense of security and economic well-being throughout the sequence of the program.

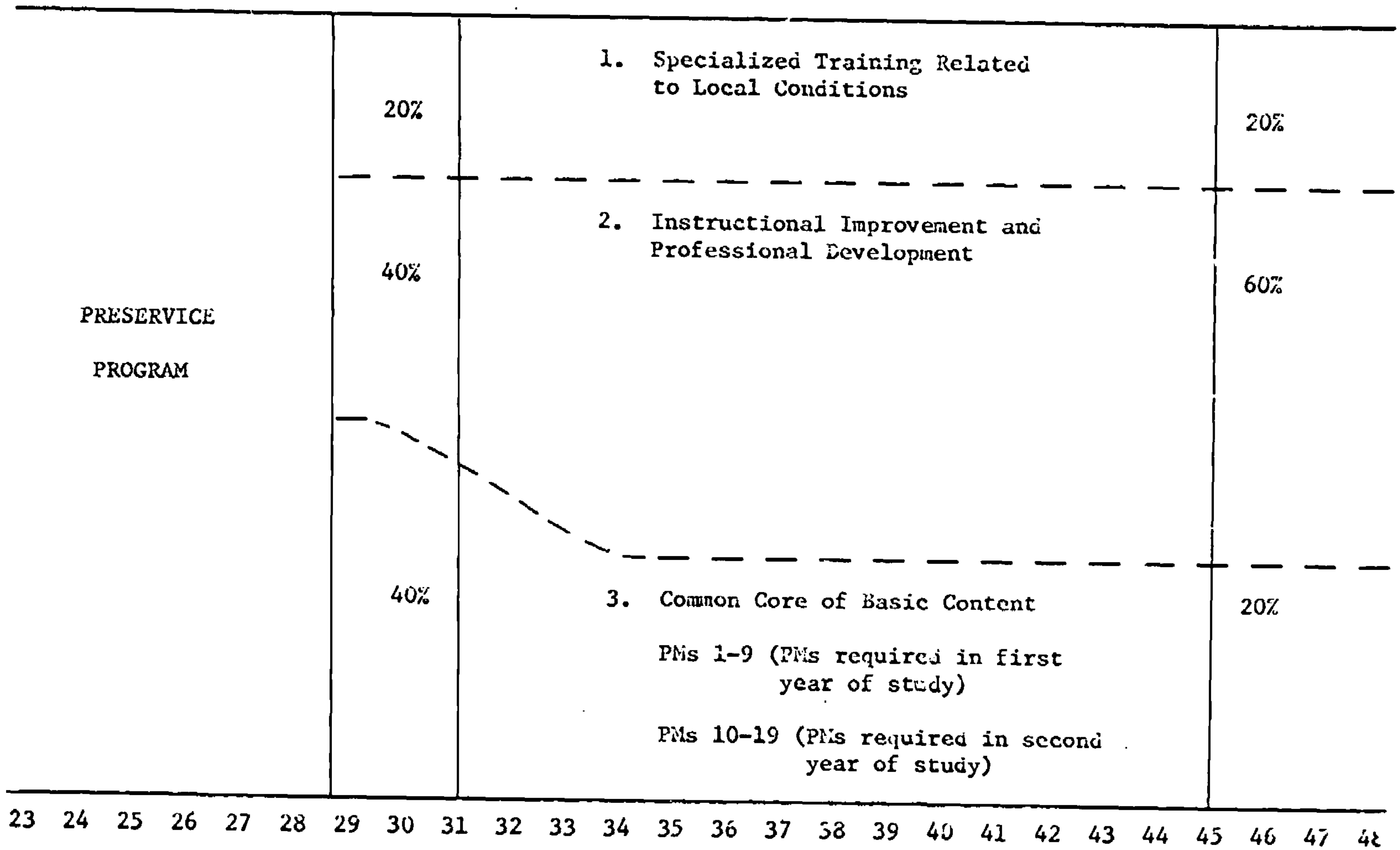


Fig. 16. Diagram of PM requirements for study sequence for the specialist program.

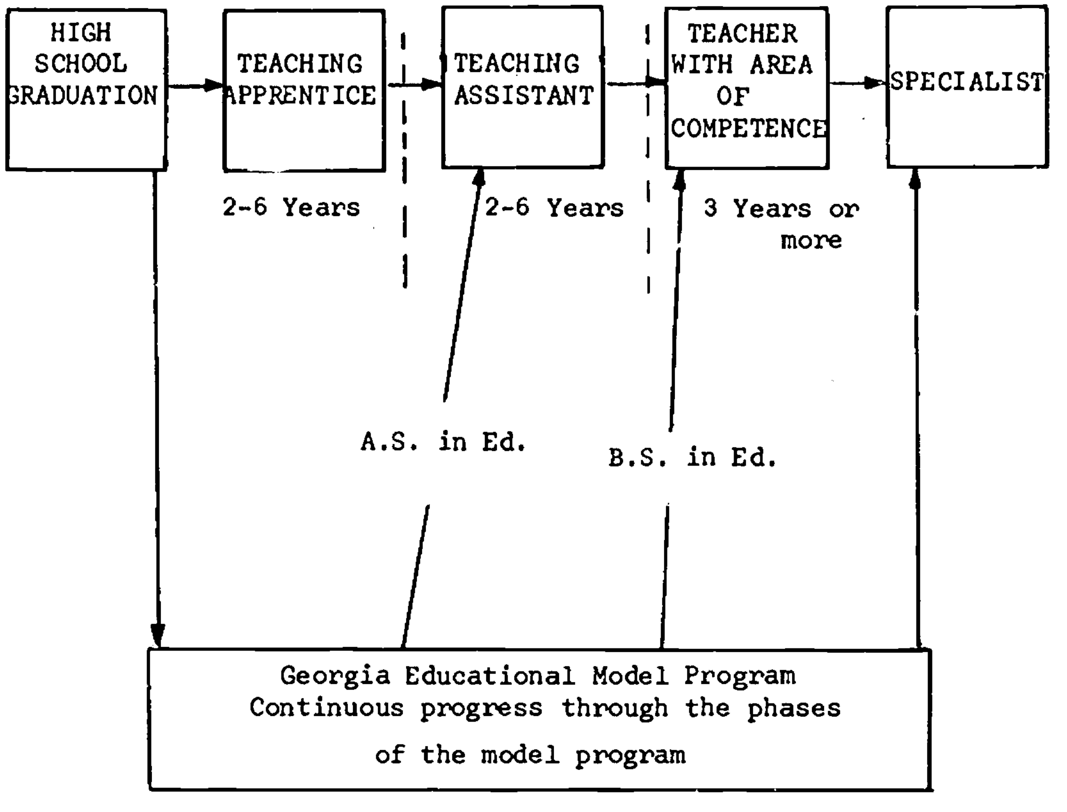


Fig. 17. Paths in the teacher career field.

Feasibility of the Instructional Program Sequence

The feasibility of the instructional sequence had to be established in several ways. Again it was necessary to gain approval of the various faculty committees. We have referred to these committees earlier in this chapter. Secondly it was necessary to have scholars from the various disciplines examine the proposed sequence. They were asked to respond to such questions as these: Does the proposed sequence follow some logical order within your discipline? If not, what sequential organization would you recommend? Learning specialists were asked to respond to questions such as: From your point of view does the proposed sequence offer problems? If so, what would you recommend? Comments made by this group of specialists gave the staff information that allowed decisions to be made concerning feasibility.

The feasibility of the laboratory experiences within the sequence was determined again by asking questions of knowledgeable people in the field of teacher education, public school personnel, and students in the current program at the University of Georgia. All three of these groups recommended early and more frequent laboratory experiences. It was also necessary to establish the physical feasibility of this component. A survey reported in Chapter VI shows that there are enough public school facilities to accommodate students in the proposed sequence (Ayers, 1969).

Criteria for insuring the feasibility of the instructional sequence in sustained operation are listed below.

1. That the learning activities be arranged on a continuum, extending from the student's lowest level of familiarity with the area of learning to the highest level of behavioral performance specified.

2. That at defined points along the continuum of learning, provision is made for the prospective teacher who does not finish the entire program, to begin his career. (Examples: teacher aide, assistant teacher, certified general teacher.)

3. That, insofar as the preparation of the prospective teacher for professional pursuits is concerned, clinical practical laboratory and on-the-job experiences begin with the first period of instruction and are continuous throughout the entire program.

The feasibility of instructional program sequence is regarded as assured by the investigators if continued provision for these criteria is maintained as the component is implemented into full-scale operation.

Student Advisement Procedures

Each student in the model program is under constant advisement and counseling from his entrance as a beginning student to completion of the requirements for the specialist diploma. The student program advisement service directs the longitudinal sequence of advisee-advisor relations in the program. Within each phase of the program, this service maintains records necessary for student accounting, serves as a communication link with other units, and assigns advisees to faculty members.

Attention is drawn to the proportion of time allocated to the Advisor-Advisee seminars in Figures 12 and 14. The proportion of time devoted to group advising reflects the concern of the program staff for assuring that each student has not only a peer group with whom he can identify but a faculty advisor that he knows well.

The seminar is a heterogeneous group of approximately twenty education students. Some will have been in the seminar for almost two years and are near completion of their paraprofessional work while others are just beginning. Before entering the seminar the student will have been prepared by having been introduced informally to the seminar participants in a social setting and by having conferred with his seminar leader who is also his faculty advisor. During this conference the advisor explains to the student that initially he is not expected to participate actively in the seminar; as time passes, he will find himself comfortably joining in and making his contributions to the productiveness of these sessions. Thus, when he enters the seminar the student is somewhat prepared for it and begins the process of identifying himself with a group of individuals with common concern for professional education.

The student will stay in this seminar until he acquires the behaviors and knowledges he must have to function as an assistant teacher. It may take some less than a year, and others in excess of two. The content for discussion in the seminar has great range. Some days are devoted to open "complaint sessions," others to special professional problems which are of timely importance and not likely to be contained in the prepared learning materials. There will be occasional field trips to places of professional interest. Whenever necessary program changes and scheduling problems will consume a portion of the session. From time to time, as students "graduate" from this preprofessional phase of the program, there will be social events to celebrate the occasion.

There will be times when the group attendance will be reduced considerably from the normal maximum of twenty. These will be times when members of the seminar are engaged in five week field experiences working in elementary school classrooms off campus. However, on returning from their field experiences, these students will prepare reports on what has happened, present them to the seminar, and discuss issues and problems which were encountered. These seminars will be managed, not lead, by the advisors. Leadership in carrying out seminar activities will most often be assumed by students as an interested group of individuals seeking self-improvement in their profession. Further, all advisors provide schedules of office hours when students may consult with them concerning matters which are not of general concern during the regularly scheduled meetings.

As illustrated in Figures 12 and 14, when the student enters the preprofessional program he is assigned an advisor who is a staff member in elementary education. This person remains his advisor as long as the student remains in the preprofessional program. When the student enters the professional program he is advised by a professor in elementary education whose specialty is related to the student's selected teaching area of competency. At the specialist level the student is assigned to an advisor who is a professor with a specialty in the area which the student has chosen for specialization.

This advisement program is designed with a major concern for the program's investment in the probable academic and personal success of each student.

In a teacher preparation program that is designed to care for individual differences in students, a major concern of the model program staff is that the student is not working in isolation but has many opportunities for contact with both his peer group and the academic and professional education profes ors from whom he receives instruction. The program of advisement described in the previous paragraphs provides for each student a home base populated with peers who have common successes and frustrations and professors who function as integrative elements for the dimensions of the students' academic and professional education preparation.

Feasibility of Student Advisement Procedures

Feasibility of the student advisement component is based on three factors: acceptance of this procedure by the various faculty committees and the administration of the College of Education; the cost factor, and the development of criteria that will provide a program beneficial to students.

The cost factor was examined and found to be feasible. Cost figures can be found in Volume II of this report.

The criteria which would establish investigation identified the feasibility of the student advisement component in sustained operation. They are:

1. All advisors will have participated in the faculty orientation sessions to establish familiarity with the philosophy of the model program, role expectations of the advisor, and the operations of the program.

2. During the student orientation phase, students will be appraised of the advisor-advisee program and begin to participate in the weekly sessions.

3. Advisors will be appointed for each student in the three levels of the model program on the basis of familiarity with the program and specialization. The advisor's familiarity with each level will insure completion of all requirements and assist in solving individual student problems. Subject matter specialization for the professional and specialist levels will be of assistance in advising

students in selecting elective proficiency modules in addition to the required ones.

4. Individual and group sessions will be an integral part of the student advisement program. Regular seminars will be conducted and individual sessions may be scheduled as needed or desired.

5. Delegation of staff duties will include provision for advising. This will make it possible for staff members to schedule regular hours for advising sessions and provide hours for individual sessions.

It is the opinion of the investigators that insofar as continued provision is made for the above criteria during implementation that the feasibility of the component will be assured.

Evaluation of Student Achievement

In the instructional component the evaluation of student achievement is carried out with the pretests and posttests which are integral parts of all PMs and by performance during field experiences. The procedures by which pre- and posttests will be constructed begin with categorized subsets of behaviors. The nature of the evaluation instruments is dependent upon the behaviors to be evaluated. For this reason a variety of evaluation devices are required. Acquisition of subject matter will be evaluated with such instruments as objective and performance tests. Evaluation of the cognitive processes will employ means such as written essays and problem solving situations.

Skills evaluation will be accomplished through observations and through appraisal of the products of effort and values will require self-evaluation scales and observational techniques. In general, wherever deemed effective, technology will be used as a tool to obtain, store, assimilate, and retrieve data related to student achievement.

While the evaluation of student achievement is an integral part of the instructional process, it is of such importance to the student's success that its feasibility is given separate attention in Chapter V of this report.

Faculty Orientation

Implementation of the model program involves a different conception of the traditional faculty role. In the model program faculty activities will not conform to the pattern of classroom teaching of specific groups of students over a stated period of time. Rather, faculty will teach small groups of students and individual students, create and revise teaching materials and teaching procedures, and advise students. It should be understood that these are activities which faculty have traditionally carried on; however, the manner in which they will be accomplished in the model program will require a redistribution of faculty time away from the larger proportion of time spent in teaching students in traditional patterns to the larger proportion of time being devoted to advising students and preparing teaching-learning materials.

Enthusiastic endorsement and willingness to participate in the study of those features of the model program with which they may be unfamiliar is a prime requisite for faculty participation and the success of the operation of the model program. The implications under which this component operates are: that the operation of the GBM requires modifications in the professional behaviors of the faculty, and faculty orientation is a continuing process. In order to insure faculty endorsement and cooperation the model specifies a comprehensive orientation and inservice training program for all faculty selected to work in the model program.

In view of the above, faculty orientation will take place in three separate operations (Hawkins, 1969a). The first is orientation to the model program. This phase will be accomplished through the mechanism of a proficiency module so that the faculty will not only receive information relating to the substance of the model program and their possible functions within the program but will, during the process, become acquainted with the same mode of learning as the students in the program.

Since the model program requires distinct changes in faculty behavior before the program can enter sustained operation, the faculty will receive training in human relations skills. Each faculty and staff member who comes in direct contact with or has opportunity to influence the progress of the pre- and inservice teachers will have this training. Part of the faculty orientation period will be devoted to facilitation skills training conducted by members of the Department of Counselor Education using the Gazda Model (Gazda, 1969).

Gazda has outlined a program based on a preventive philosophy and incorporating the concepts of developmental tasks and coping behaviors as guideposts for the teacher or group guidance leader to use for the assessment of potential problem areas. His system has emphasized the application of appropriate learning principles and the core dimensions of a helping relationship to group procedures in the elementary school. The program as outlined represents a means for assisting the prospective elementary school teacher to acquire and improve his human relations skills. The process proceeds through a series of modular exercises in which module one consists of systematic training in human relations or facilitation skills. Module two is a systematic study and development of a group guidance model; and module three presents reinforcers through two series of planned training groups.

The third phase of faculty orientation will be inservice training through PMs that are designed to provide or sharpen the teaching skills of individual professors in the methodology particularly appropriate to operation within the context of the model. Further, during the time the faculty is being exposed to methodology, they will be exposed to the media capabilities that can be used to support their teaching and will be, insofar as possible, immersed in the collections of the most current teaching-learning materials available in the professor's academic area. Lastly, this instruction will be conducted utilizing a multimedia approach in an attempt to acquaint the professors with the most effective ways of working with college-age students.

As new faculty is acquired each will receive orientation at such a time as enough can be gathered together to make such instruction feasible.

Feasibility of the Faculty Orientation

Establishing feasibility for faculty orientation began with a committee structure in the present College of

Education administrative operation. The Committee on Improving Instruction rea/ily endorsed the faculty orientation component as did the Faculty Executive Committee. There is underway at this time a training program based on the Gazda Model (Gazda, 1969). Thirty faculty members are involved in this. The available trainers for this model are on campus at present.

Part of the overall strategy used in developing the original specifications for the model and in conducting the feasibility study has been the involvement of faculty members. A total of approximately 40 faculty members were involved. The development phase will provide another opportunity for faculty orientation.

Faculty members who are to be employed in the future will be advised in advance of the orientation.

During the course of the feasibility study, a series of PMs were drawn up for cost purposes and testing. So that the PM developers could fit their method of operation into the model specifications, each was given a short orientation to the model program prior to beginning work on their specific PMs. Of the ten individuals who contracted to develop target PMs for cost estimation purposes, eight enthusiastically supported the idea of the model program, one rejected the program out-of-hand, and one supported the idea in a half-hearted manner.

The feasibility of this component is assured if the following criteria are applied.

1. That there be an initial intensive inservice program for the orientation of the staff to the goals, objectives, and procedures of the model program.

2. That there be a continuous inservice orientation program through the phases of development, implementation, and on into sustained operation, for the purpose of continuous orientation and updating as the program matures and develops through its sequential evolution and reworking in the light of evaluative data.

3. That as new members of the model program staff are

added, they are provided with special orientation sessions.

4. That only those staff members who enthusiastically endorse the model program's goals and objectives be retained as core staff.

5. That the core staff which develops and implements the model program be retained to administer the program during sustained operation.

The investigators believe that the feasibility of this component in sustained operation can be assured if provisions are made to maintain these criteria.

Illustrative Operational Activities

The major elements of the operation phase of the model program are PM operation and PM revision. In order to determine the cost feasibility target PMs were selected, developed and tested. On the basis of their development the estimations for the revision requirements were made; on the basis of the developed and tested PMs the estimations for operation requirements were made. The two sections that follow outline basic requirements for operation and revision of PMs; for complete details see the resource estimation sheet printouts in Volume II of this report.

Operation of PMs. The activity numbered PO O 18-02 is titled Operate (teach) Social Science type B and C PMs. On the basis of the developed non-laboratory PMs requirements were estimated for personnel, support personnel, and space needed to operate type B and C PMs. For this specific PM group (forty eight social science) of the above types, it was estimated that a student would need approximately three 8 hour days to work through the PM and achieve mastery of the teacher performance specifications that form the core of the PM. Twenty-five preparation and instructional hours would be required for the professor in alternate path one, 26 hours in path two and 39 hours in path three. Support personnel, in this instance a graduate assistant, would be needed for 6 hours in path one, 7 hours in path two, and 11 hours in path three. Space requirements, that is, carrel time of 25 hours would be required in path one, 26 hours in path two, and 16 hours in path three. Classroom-type space for each of the alternate paths is 9, 9, and 12 for paths one, two and three respectively.

It should be noted that the requirements for carrel space are related to the number of students in the PM at any one time. However, the classroom-type space, the support personnel, and the basic professor could handle more than one student per path at any one time.

Revision of PMs. The activity numbered PE O 15-02 is titled Revise Social Science Type A PMs. On the basis of the time requirements for developing the target PMs, estimates were made for the requirements to revise the PMs after testing. These estimates were in terms of personnel, space, and time. For this specific PM group, seventeen social science of type A, it was estimated that 50 percent, 40 percent, and 30 percent would need to be revised in the time from initial testing until the PM is put into final operation. Under the above activity number it was estimated that four PMs would need revision. Personnel requirements for this activity parallel the requirements for PM development, that is, a design person will be needed for one-half day, the basic professor will be needed 3 days, the elementary and media specialist will be needed one-half day each, the learning specialist for one-fourth day, the editor for 1 day, and a secretary for 1 day. The requirements for space include the basic professor's office and secretarial station and a small conference room for the 1 day in which the basic professor and the rest of the development team confer.

It should be noted that complete requirements for these two activities explained above are included in Volume II of this report.

Strategy for the Development of the Instructional Subsystem

The preceding parts of this chapter have dealt primarily with validating the feasibility of the components of the instruction subsystem. It has been shown that insofar as the feasibility study staff making the investigation is concerned it is feasible to maintain the model instructional program in sustained operation. The next point of concern is a plan or strategy that can effect the conceptual model into operation. This five year strategy is presented in Chapter III of this report as it pertains to all subsystems, components and activities in interaction. Volume II of this report presents in detail the hundreds of specific activities required over a five year period to engineer the instruction subsystem into full-scale operation. Specifications for time, personnel, facilities, materials and sequence are given for each activity. Here, special attention is given to a conceptual understanding of the activities as they relate to the stages of development of the instruction subsystem.

Diagrams will assist the reader in understanding the narrative. The relationship of the individual activity to the whole can be seen in the diagrams preceding the description. Selection of representative samples of the total network facilitates understanding of each phase since each activity will proceed in the same way for each level of the program. The reader will note that the subordinate topics in this section do not appear in the same order as in the preceding section. The topics are arranged in order of development in this section so that they appear from Personnel Orientation to Materials Development through Revision of Materials.

Selected Elements in the Design of the Strategy

In the following pages are narrative and figures of selected activities showing their relationship to the total network.

Faculty orientation. The ultimate purpose of faculty orientation is to provide students participating in the model program with professors who are sensitive to the needs of the students, capable of communicating with them, competent in the skills needed, and knowledgeable about the philosophy of the model program. Complete details for the faculty orientation phase are described in Components of the Instructional Subsystem. (Hawkins, 1969a)

The initial orientation sessions are designed to acquaint the participating staff members with the philosophy, procedures, and materials of the model program. Activity PODO6-01 (see Figure 18) will be concerned with human relations training. Two types of training will be involved.

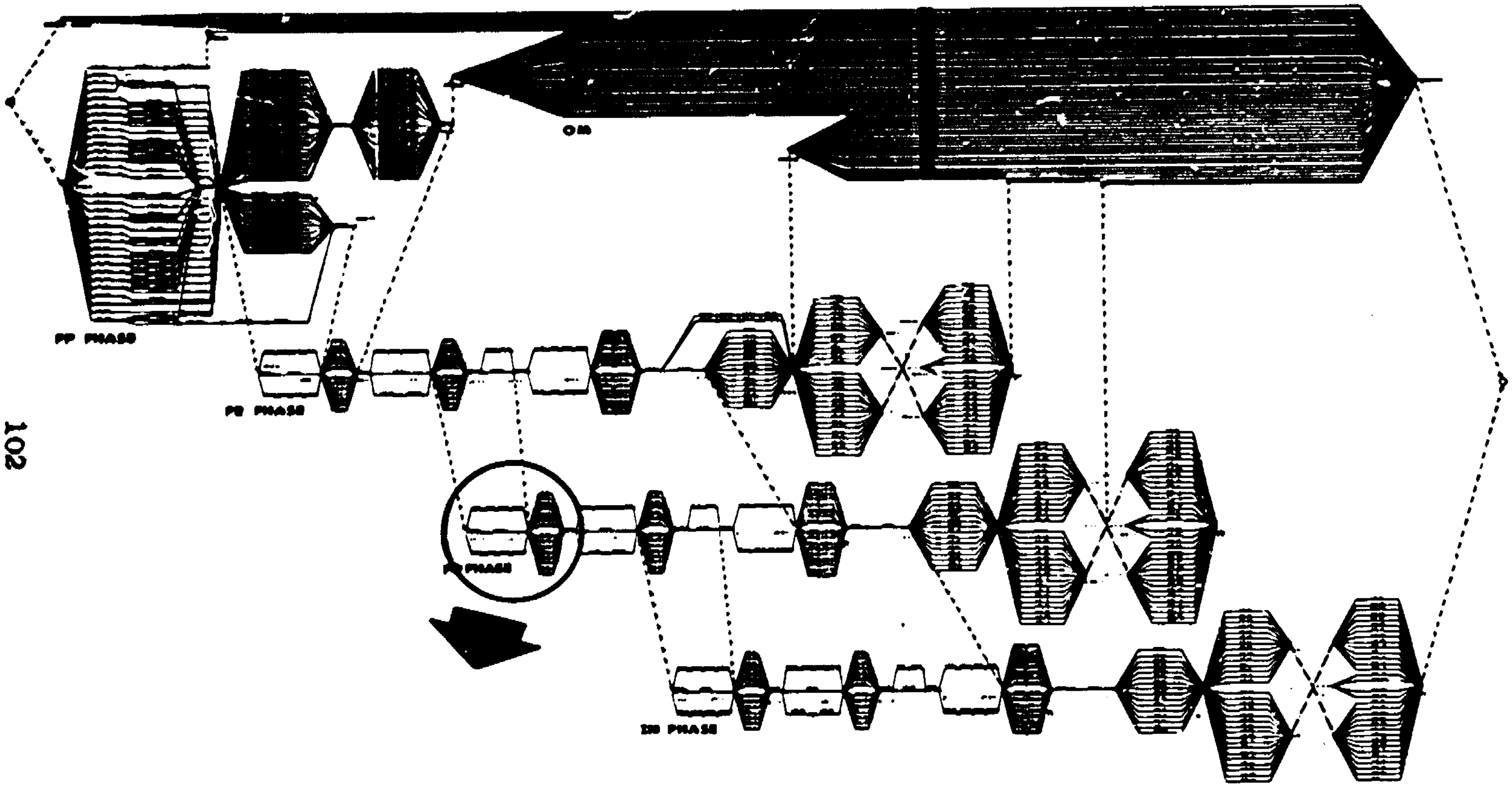
The Gazda model is designed to improve communication skills, and the sensitivity training follows the recommendations of the National Training Laboratory. The professor will be provided a choice of two types.

All faculty members assigned to the model program will participate in the orientation sessions. Of those approached for advice or contributions during the feasibility study approximately 80 percent of the faculty members responded favorably to the program, an indication of the attitudes toward the program. Only staff members who are interested in the program will be selected. Orientation will include sessions for acquainting the staff with the philosophy, procedures, and materials of the model program, plus two types of human relations training. During activity POD06-01 communications and sensitivity training will be conducted for about 54 hours initially and an additional 50 hours in successive quarters.

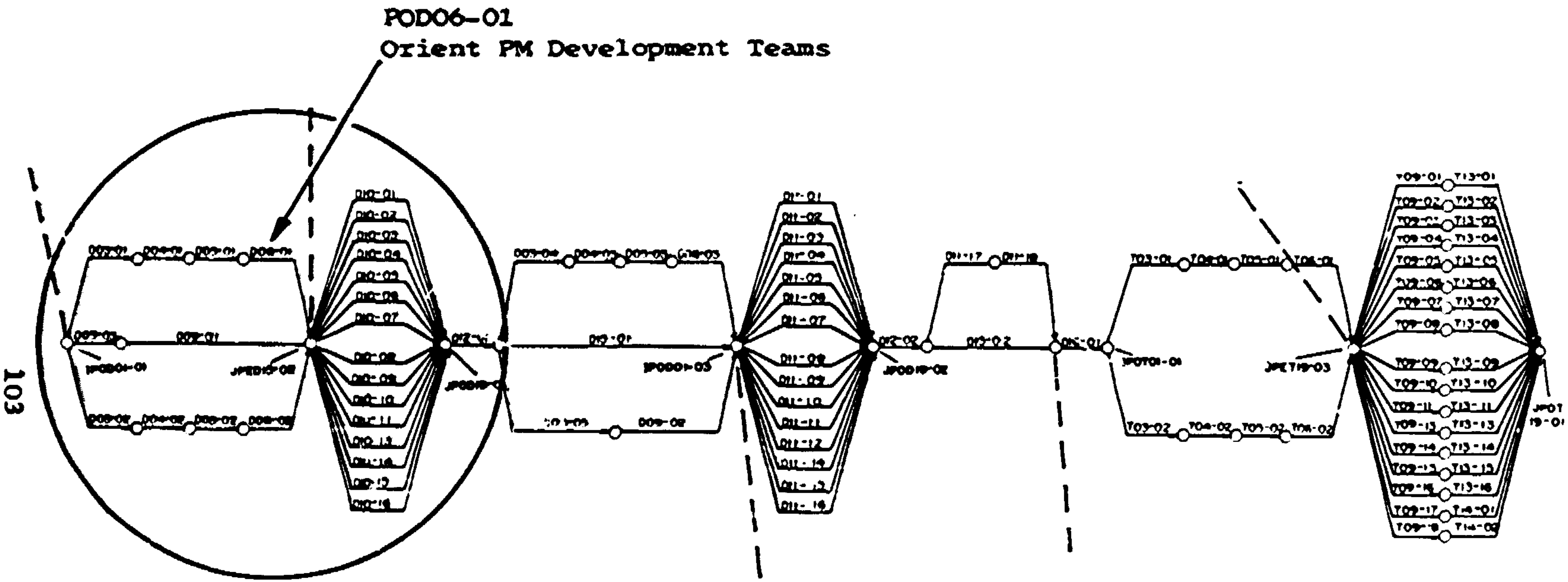
Teacher performance specifications. All teacher performance specifications developed during Phase I of the Georgia Educational Models will be re-examined prior to the development of proficiency modules. This will be accomplished in the design activity. The procedure will follow the same pattern for each set of specifications.

One day has been designated for reviewing teacher performance specifications for each module group. The adequacy of this time has been proved by the preliminary grouping of the social science professional specifications. One day for two people will be spent in carefully examining each specification for placement in a specific module. These will then be reviewed for practicality and sequence. Two people will be engaged in this process, involving 17 modules. During activity PED10-02 (see Figure 19) the specifications for each module will be given to the basic professor and an elementary specialist for review during the allotted time.

Designing PMs. Proficiency modules will be developed for each area and program phase in the same way. The only differences will be in the number of people involved, the content of the PMs, and the number of PMs produced. Teacher performance specifications have been divided by content and competency levels into groups from which a PM can be developed. (See Figure 19).

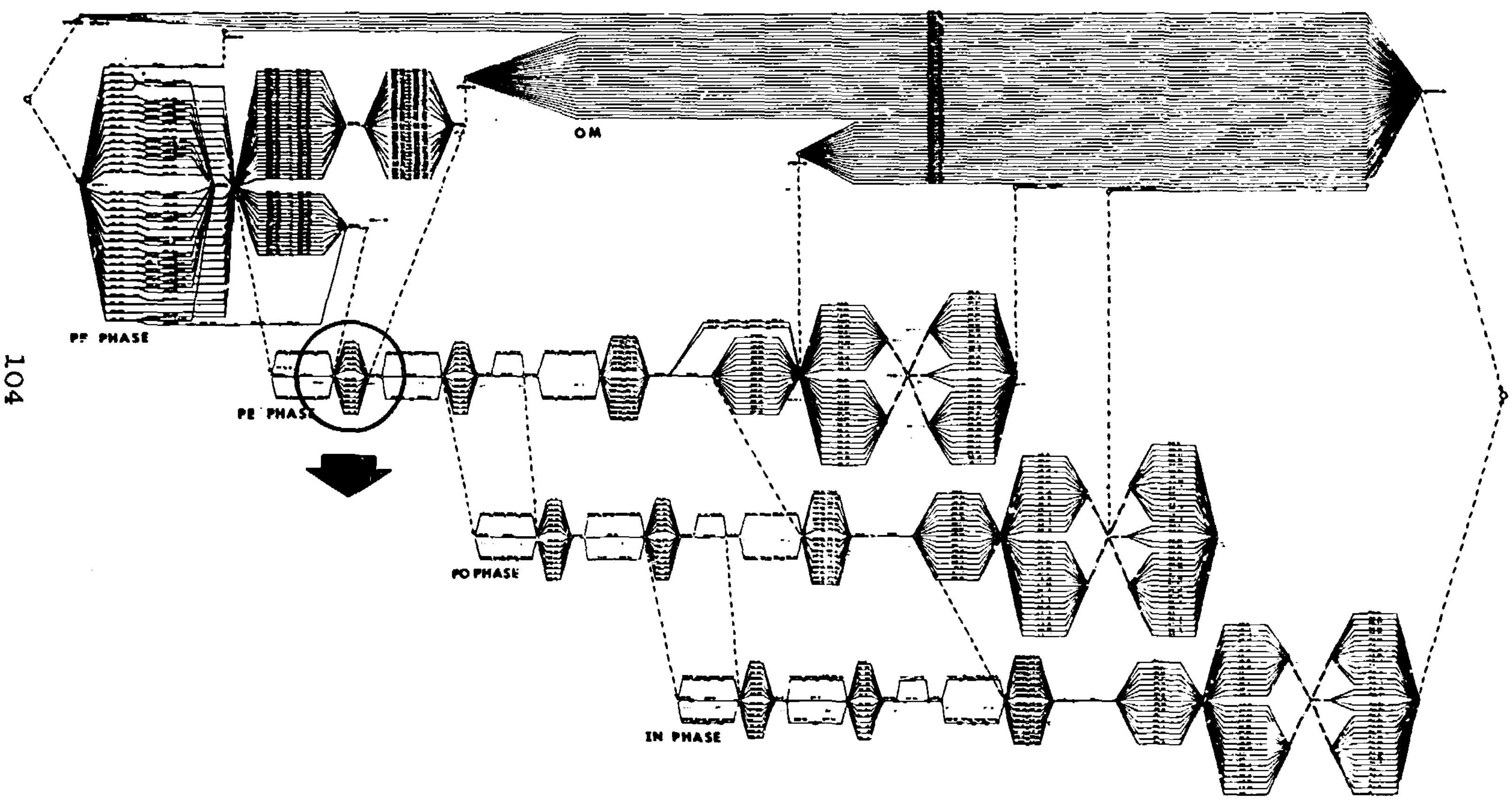


Model program--all phases.

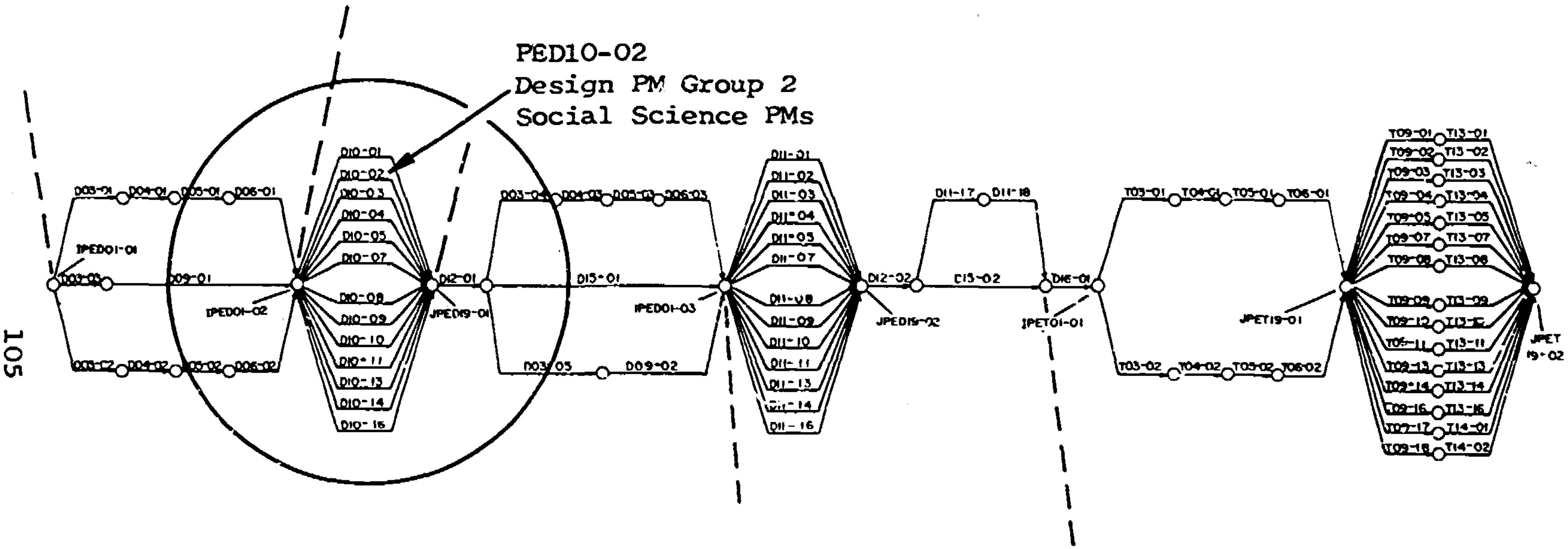


Professional phase (PO)--development and piloting (testing).

Fig. 18. Activity POD06-01 in relation to the professional phase (PE) and model program networks.



Model program--all phases.



Preprofessional phase--development and piloting (testing).

Fig. 19. Activity PED10-02 in relation to the preprofessional phase (PE) and model program PERT networks.

Complete details for the designing of proficiency modules are contained in Hawkins (1969a). This includes all operations from the initial communication from the GEM Director through the production of the proficiency module.

Three and one-half days have been allocated for designing and developing a PM. A conference room and/or office space will be needed. One day will be used by the basic professor for study, one-half day with the designer, and two half-days with the media, elementary, and learning specialists. Then the rough PM goes to the editor for drafting. Only materials for writing and typing will be needed during the design phase.

It is assumed that seven basic professors will be needed for the designing of the PMs in the PED10-02 phase. The numbers involved in the designing of other groups of PMs will vary, but the procedures followed will remain constant.

The production of target PMs has proved the feasibility of the projected plans for PM development. One person developed each PM, with the exception of social science education. An average of three days was spent on these. However, it must be considered that these were experimental in nature. More precise instructions, plus additional personnel, should result in carefully constructed materials. During the PED10-02 (See Figure 19) activity five or six faculty members will be participating in the development of each social science module. Modules in other areas will be developed in the same way.

As noted in the preceding section, certain PMs will be contracted for with other units of the University System and cooperating institutions in other states.

Drafting PMs. Drafting PMs will follow the design phase. This will be done by an editor from the rough drafts generated from the design phase. Proficiency modules for each of the three levels of the program will proceed in the same manner. (See Figure 20).

Rough drafts of each PM will be submitted to an editor for drating. The editor will be allotted 2 days to draft the PM from the material submitted by the development team.

A secretary will have 1 day for typing. Then the copy will be sent to the basic professor and the Associate Director for Instruction and Evaluation, to whom 1 day has been allowed for approval. After making any necessary changes, 1 and one-half days will be needed for typing, duplicating, and collating the PM.

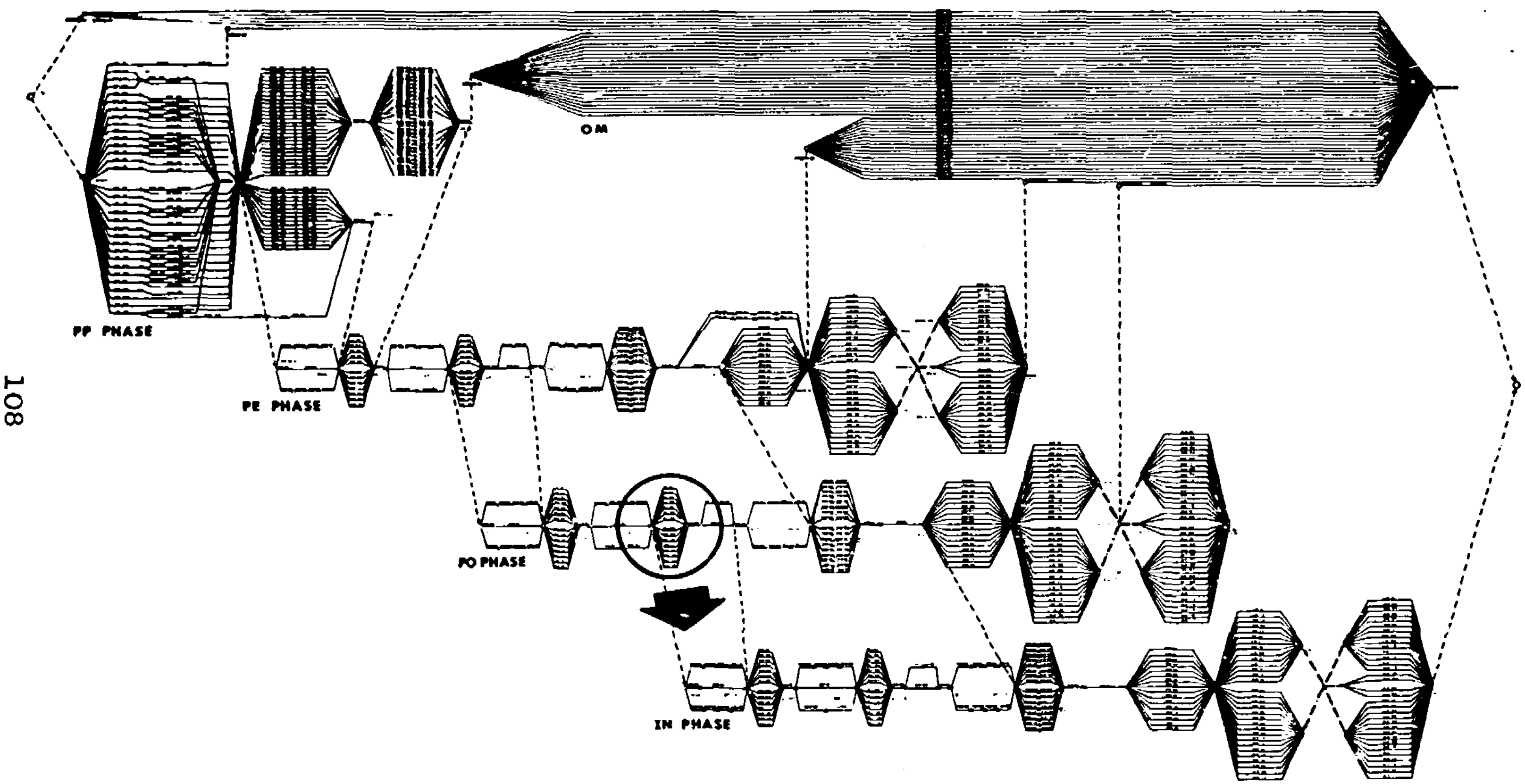
Five and one-half days will be needed for drafting each PM, with space to be provided in the following manner: editorial office, 2 days; secretarial station, 2 days; duplication and collation room, one-half day; and office space for the basic professor and the Associate Director for Instruction and Evaluation, one-half day each. Only materials used for writing, typing, and duplicating will be needed during the drafting phase.

Time for the drafting of each PM has been estimated on the basis of experience with the target PMs. Once the editor has the plans from the development teams no more than 2 days should be required for the editor and one day for a secretary to have copies ready for approval by the basic professor and the Associate Director for Instruction and Evaluation. Another aspect of the feasibility is that parts of each PM, the general instructions and transition paragraphs, have already been completed and will only need to be inserted in each new PM. Activity POD11-02 (see Figure 20), for example, will include the drafting of 45 social science PMs and each drafting phase will proceed in like manner with the exception of the number of PMs to be drafted.

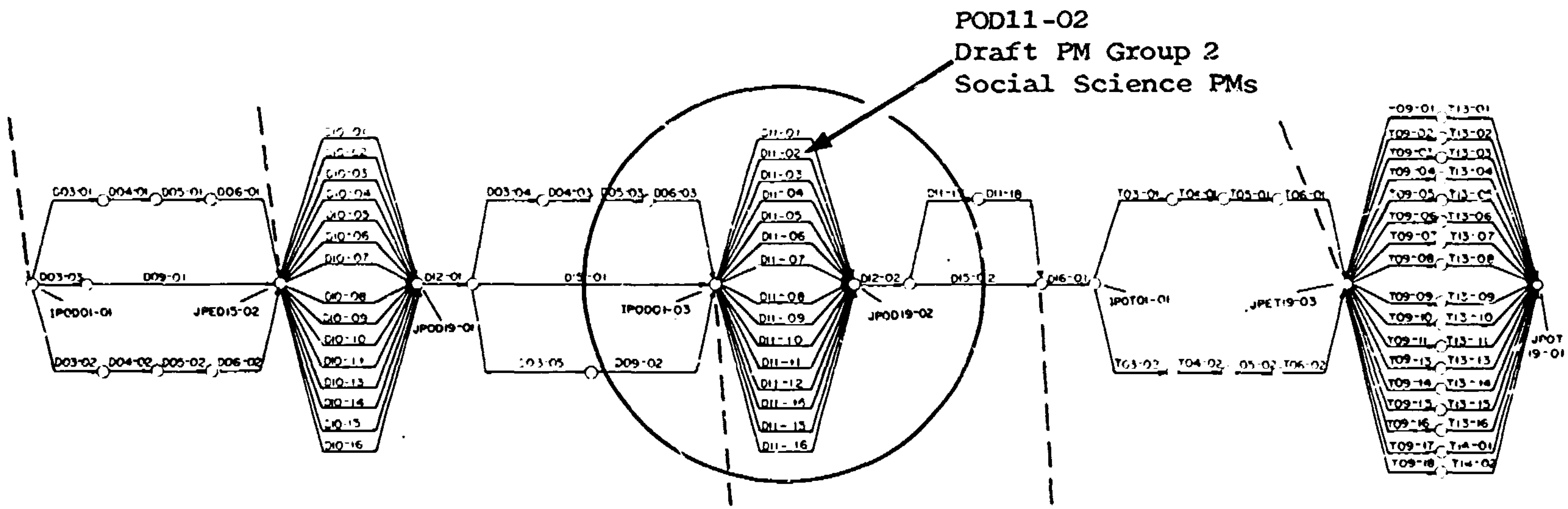
A total of 9 working days will be needed for the two operations of designing and drafting each PM, regardless of the level on which it will be used.

Testing PMs. Testing for each PM will be done with groups of students with the number of PMs tested at any one time being determined by available space, materials and facilities (see Figure 21).

Type A PMs will use 15 students per section with five students per track. It is assumed that a decreasing number of students will be participating in the professional and specialist levels, thus limiting the number of experimental sections and the number of students per path. Each PM will

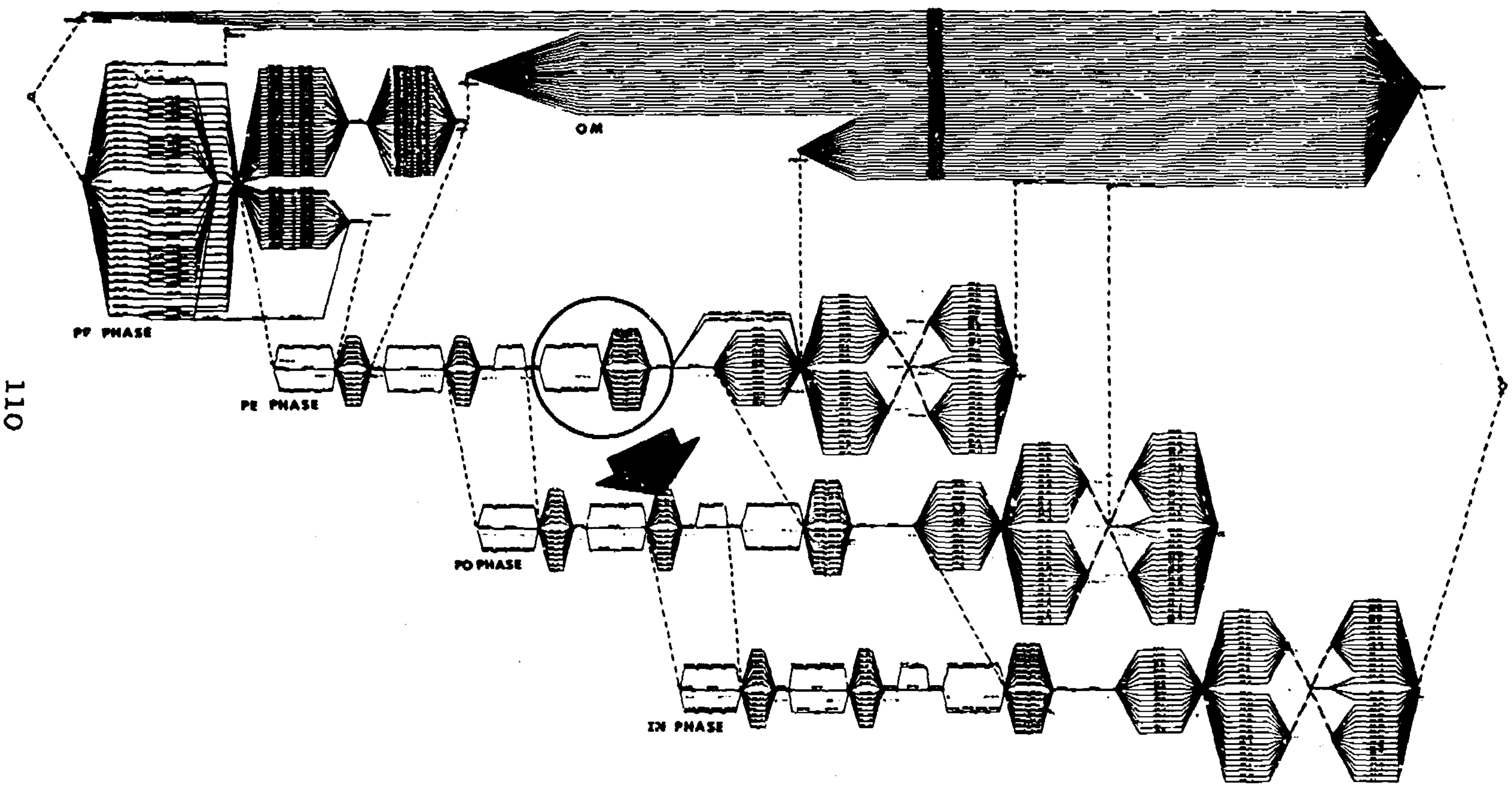


Model program--all phases.

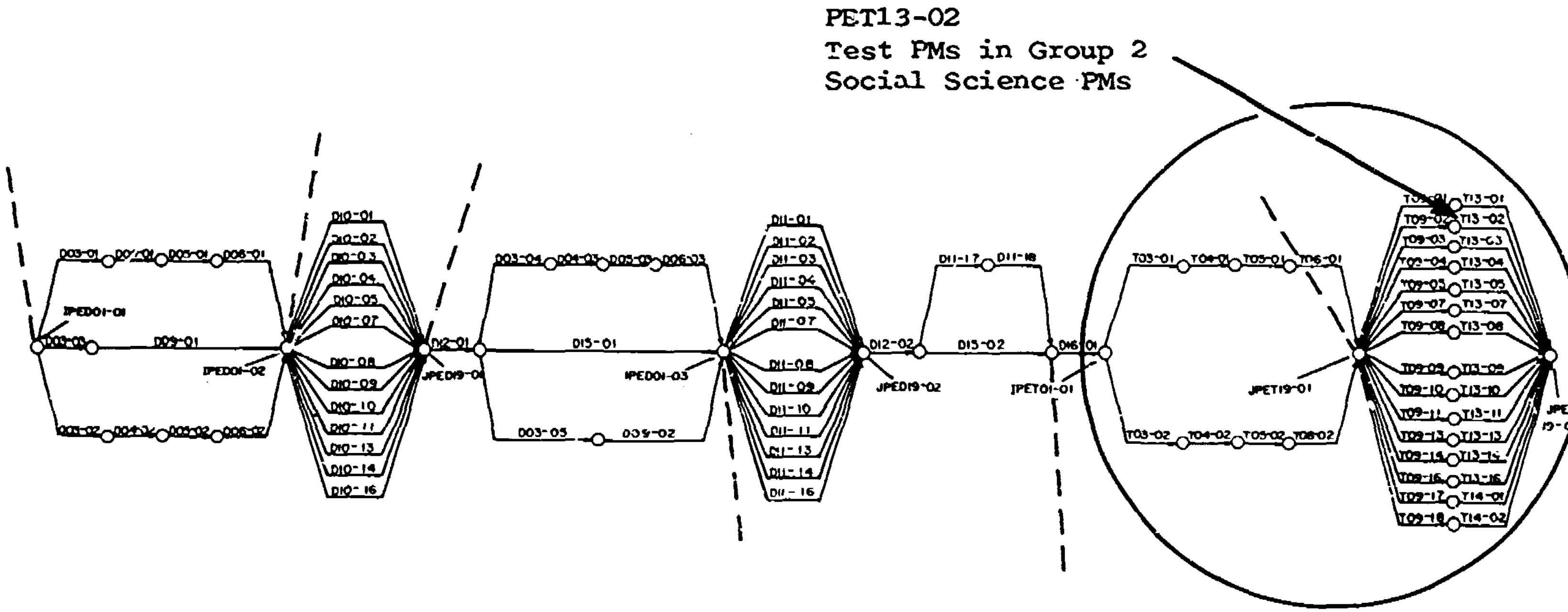


Professional phase--development and piloting (testing).

Fig. 20. Activity POD11-02 in relation to the professional phase (PO) and model program PERT networks.



Model program--all phases.



Preprofessional phase--development and piloting (testing).

Fig. 21. Activity PET13-02 in relation to the preprofessional phase (PE) and model program networks.

be tested before it is put into operation to assure that it is functioning properly.

Pretest and posttest results, student and staff reactions, and recommendations will be compiled by each experimenter, as well as information about time involved for completion. If two or more experimenters are testing the same PM, results will be compared and evaluated. If the PMs require no revisions, they will be put into operation as they are. If revision is necessary this process will proceed as described in the following section.

PM revision. The data collected during the testing phase will be used by the PM development teams for making any necessary revisions. It is assumed that about 50 percent of the modules will require some revision after the initial operation. Provisions have been made for the development teams to use the data for revising the modules. This is provided for in activity PO015-02 (see Figure 22) of the operation. All data collected during the testing phase will be made available to the PM development teams, including test results and recommendations. Three days have been included for the revisions, of which one-half day will be devoted to a combined meeting of the development team to evaluate the data and revise the PMs. Proficiency modules requiring no revision will be made available for use as they are, with test results available for review by the faculty if desired.

The revision phase will require conference rooms for the teams. A secretary will be required for producing the revised modules but no other special materials or space will be needed.

Revision for modules in each area and at each level will be conducted in the same way. The only differences will be in the number of PMs being revised and the personnel. Percentages are expected to remain constant. Later revision phases are expected to be required on the basis of 40 percent and 20 percent.

Revision time has also been estimated on the basis of the target PM testing. Only slight modifications have been needed in the tested PMs. It is estimated that during the PE015-02 activity approximately 50 percent of the modules will need revision. Other revision phases at later periods have been estimated in decreasing proportions of 40 percent and 20 percent in each area. Three days, of which one-half day will be spent in a joint conference, should be adequate for the development teams to incorporate any needed revisions into the PM.

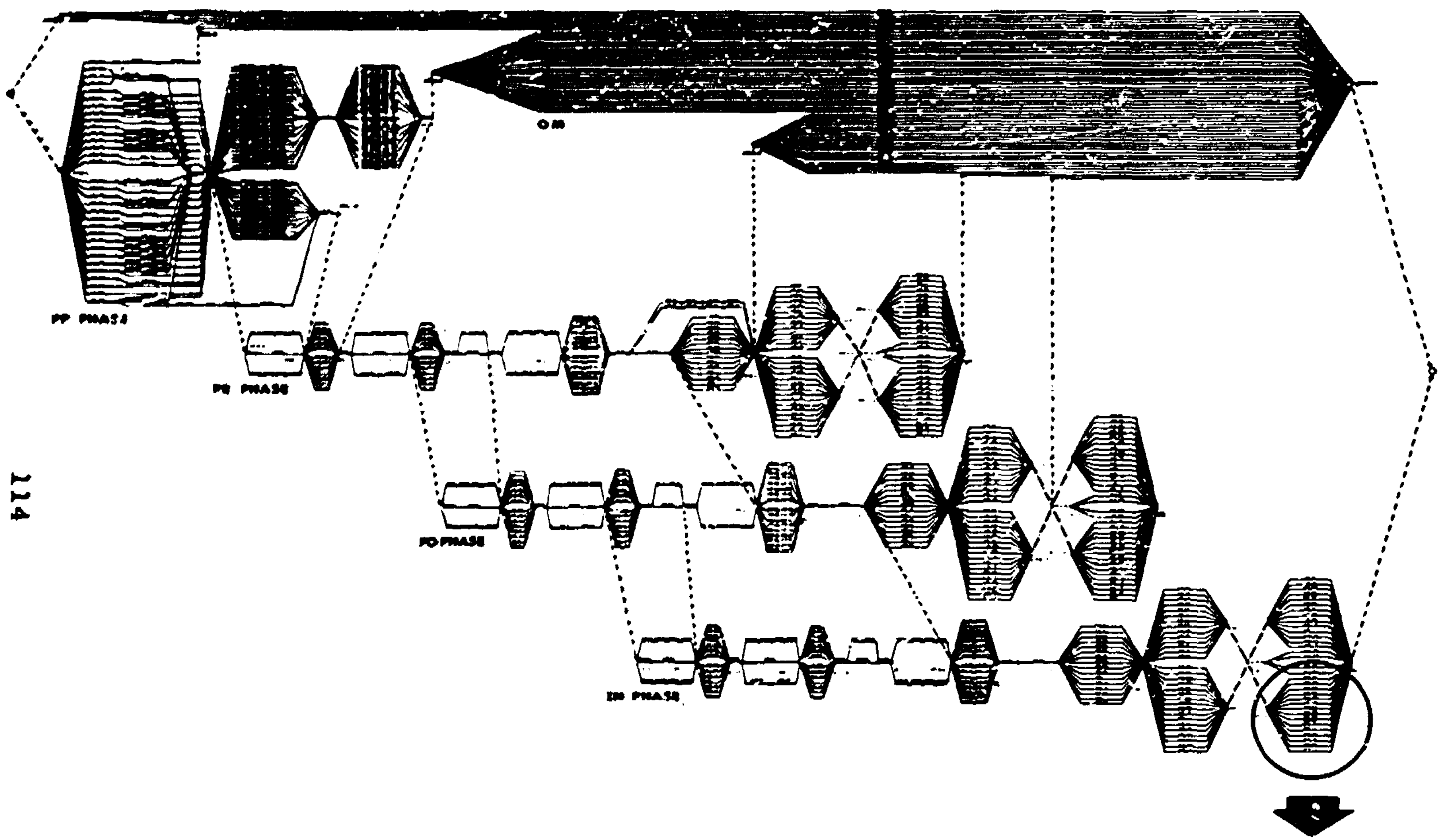
In summary the above diagrams and descriptions have included details about selected activities in the orientation, development, drafting, testing, and revision phases of operations of the model programs. The complete network of development is included in Volume II of this report. Selected operations have been extracted and enlarged from the total network to provide a more meaningful understanding of the activity and its relation to the whole program. These diagrams, in conjunction with the narrative descriptions, provide an explanation of each phase. When the total operations are reviewed in sequence, the results are a program that is feasible in that it can be attained within the specified time and is theoretically sound.

Illustrative Developmental Activities

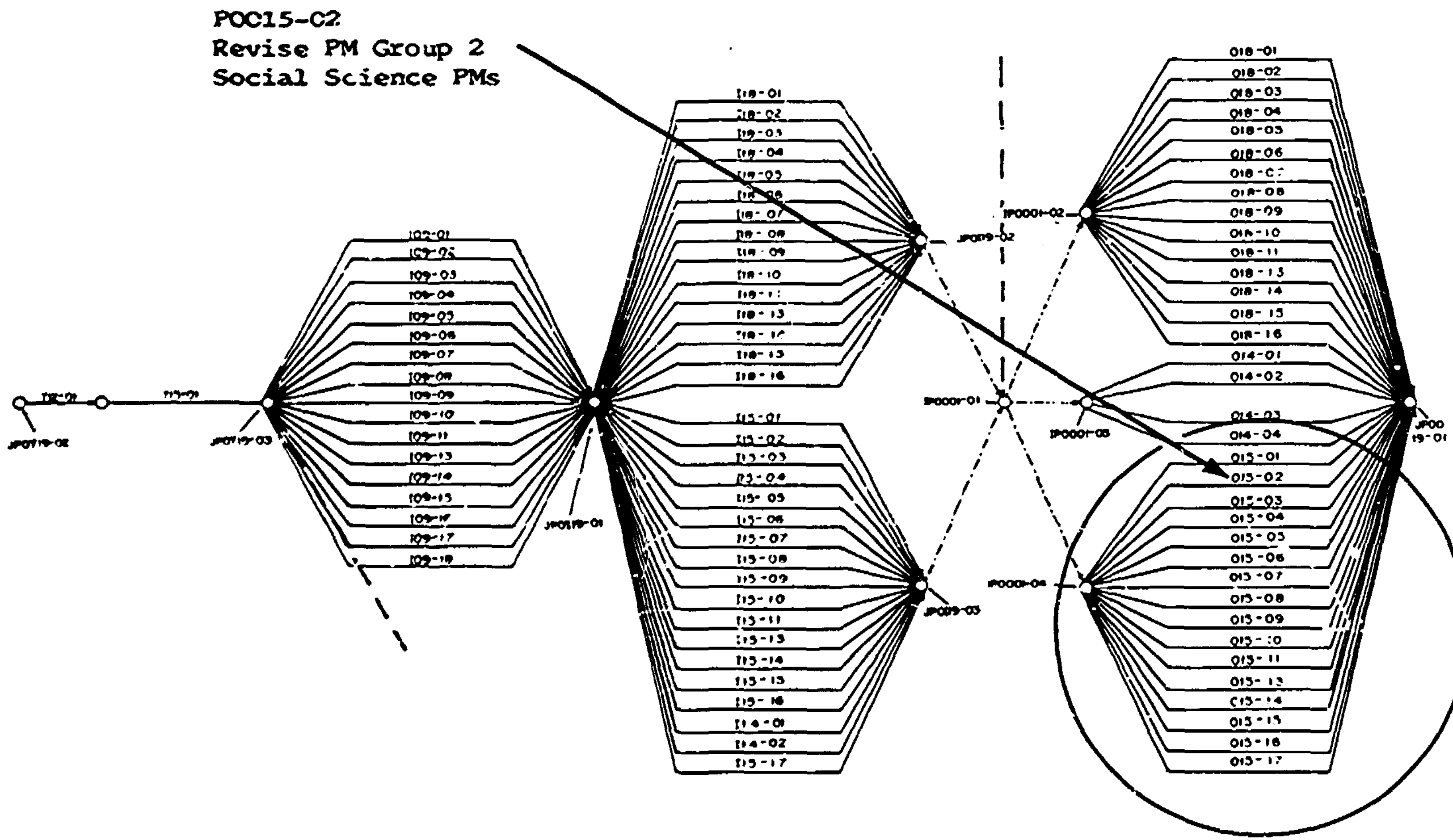
Faculty orientation. For illustrative purposes social science staff members will be used. They will be grouped into units of ten people each and proceed through the orientation sessions. The Gazda model requires 30 hours of initial training during two quarters, and two hours each successive quarter for reinforcement. Each session will require a professor (the trainee) and a graduate assistant. Sessions will be conducted in conference rooms accommodating about 15 people. The sensitivity training will require the same personnel and space, but the sessions will vary in time requirements. Twenty-four hours of training will be conducted during the first quarter, and three hours of reinforcements during each successive quarter.

Professors in each area will be oriented the same as social science staff members. The last phase of the orientation will occur during the development phase just prior to PM design and development and will be concerned primarily with materials and learning theory.

Teacher performance specifications. The PED10-02 activity encompasses the re-examination of the social science specifications at the professional level. At this time the



Model program--all phases.



Professional phase--initial and sustained operation.

Fig. 22. Activity PO015-02 in relation to the professional phase (PO) and model program PERT networks.

basic professor for each of the 17 modules and one elementary specialist will review the specifications carefully. Any changes deemed necessary will be made. For example, specifications for a history PM will be reviewed by the basic professor assigned to the PM development team and the elementary specialist. One day has been allotted for this review, and it can be done in an office and requires no special equipment or supplies. The approved specifications will then be distributed to the development teams for the next activity. The same procedure will be followed for each PM in this group, including all the social science disciplines and social science education.

Specifications at each level in all 16 areas will be reviewed in the manner described above for social science. This review will make it possible to assure the incorporation of the most recent knowledge about the discipline and the deletion of outdated or less important content.

Design and development of PMs. An example of the way modules will be developed can be seen by using social science as an example in the preprofessional phase, activity number PED10-02.

The time and personnel required to design and develop the social studies PMs are shown in Table 3.

Teacher performance specifications have been grouped (Hawkins, 1969b) for designing with two PMs in social science education, three in history, four in geography, two in political science, four in sociology, one in anthropology, and one in economics in the preprofessional phase. Each group of specifications will be given to a development team consisting of the designer, basic professor in the discipline, an elementary social science education specialist, media specialist, and learning specialist. These specifications will have been sent to the participants for study prior to a combined meeting in which plans are presented for the PM.

Drafting PMs. The social science Pms in the professional phase have been selected to illustrate the drafting operation, POD11-02. Designing will have been accomplished in the same manner as described for PBF10-02.

The PMs needed in this phase include eight in social

Table 3.

Pre-Professional Phase PM Development Teams by Time (days) Allocated Per PM

Discipline	Number of PMs	Basic Professor	Designer	Elementary Specialist	Media Specialist	Learning Specialist	Total Days for Task
Social Science Education	2	6	1	a	1	1	7[b]
History	3	9	1	½	1	1	10
Geography	4	12	2	2	2	2	14
Political Science	2	6	1	½	1	1	7
Sociology	4	12	2	2	2	2	14
Anthropology	1	3					3
Economics	1	3					3

[a]The basic professor is a specialist in elementary school social science education.
[b]The days are not additive; the specialists' one-half days are part of the basic professor's three days.

science education, six in history, two in geography, three in sociology, two in anthropology, two in political science, one in economics, one in philosophy, and one in religion. From the basic information furnished by the PM development team the editor will write the PMs in the form most appropriate for use.

Testing PMs. Activity number PET13-02 has been selected to illustrate the testing phase; each testing phase will proceed in the same manner as the social science testing. There are 17 type A social science modules and each will be tested in the same way. Copies of the PM drafts will be distributed to instructors with whom arrangements have been made. The content will be part of the content usually studied in the course taught by the instructor. Materials required for the PM will have been collected and made ready for use in one area.

A pretest will be administered to each student participating in the experimental situation. Test results will be analyzed for each student and recommendations will be made for individualized progression through the paths. Five students in each section will proceed through each path. After completing the module, each student will be given a posttest.

The student posttests for each of the three alternate paths will be compared with the mastery standard appropriate for that PM. This comparison will determine whether the procedures and materials used in that path accomplish what they are designed to accomplish and will indicate where revisions are necessary.

Revising PMs. After initial testing PMs will be revised if necessary. Activity number PBI15-02 revision of PM group two, social science, has been chosen to illustrate the revision phase; each PM needing revision after initial testing will be revised in the same manner as the social science PMs. The posttest data with their analyses of alternate paths will be returned to the PM development teams consisting of the basic professor, the media, elementary, and learning specialists. Using the test data this team will select alternate procedures and materials to include in the paths where revision is considered necessary. This process should take one to three days depending upon the number of paths to be revised. When the revision is completed by the development-revision team, the rough draft will go to the editor for final drafting.

Summary

This chapter is a report of an investigation into the feasibility of the instructional subsystem of the model program during both development and operation. Different procedures were used in investigating and the six major components of the subsystem of the program (learning activities and materials, instructional procedures, sequence, student advisement, evaluation of student achievement, and faculty orientation). Feasibility of learning activities and materials and instructional procedures has been established through the development and testing of target PMs with college students during the period of the feasibility study and through the advice of UNIVAC educational consultants. The feasibility of the sequence of student activities through the model has been established through consultation with experts in the area of elementary teacher education. The feasibility of student evaluation has been established through the testing of the target PMs and through consultations with experts in measurement. The student advisement and faculty orientation components' feasibility has been established through a series of discussions with experts in the field of human relations training in the departments of counselor education and educational psychology, and a representative of the National Training Laboratory.

The staff conducting the investigation has concluded that as far as the University of Georgia and the State of Georgia is concerned the feasibility of the development and implementation of the model program instruction subsystem may be regarded as validated. It is assumed that similar validation can be obtained by most universities if procedures such as those reported herein are applied.

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Chapter V

Feasibility of the Evaluation Subsystem

J. P. Bauch and G. F. Shearron

The evaluation subsystem of the instructional program model has two major interrelated parts. One is student evaluation which includes all evaluative procedures for judging the initial characteristics, performance and teaching competency of students as they progress through the instructional program. The other is program evaluation which includes all evaluative procedures for judging the effectiveness of all modules, components, subsystems and phases of the instructional model.

A key factor considered throughout the designing of the evaluation subsystem is the cost effectiveness and overall efficiency of all aspects of the operation. The basic premise which guides all evaluation operations is the constant and systematic revision of all model activities in the light of collected and analyzed data. It is upon this premise of systematic renewal that the entire model is based.

Assessment data from both areas (student evaluation and program evaluation) are entered and stored through efficient data processing procedures. The central storage of these data facilitates easy management and systematic retrieval. Remote terminals are used in both entry and retrieval.

The evaluation subsystem serves to inform those persons in administrative and other leadership positions of the operation of the procedures within their sphere of responsibility. It also informs staff members across lines of responsibility and produces reports for use by major advisory and controlling groups and individuals. Students and their advisers are served by the evaluation subsystem through periodic individual progress reports and reviews on which they may base instructional and career decisions.

The relationship of the evaluation subsystem with other subsystems and phases of the overall program is both intimate and aloof. Evaluation is an essential function and consideration to all PM development or revision groups. The evaluation of all personnel in terms of performance and effectiveness necessitates direct contact of the evaluation subsystem with the administrative, instructional, and supportive staffs. At the same time, the evaluation subsystem analyzes and reports evaluation data in a disinterested and objective manner on all model subsystems and procedures. It is an implicit process through the model program as well as the means by which the model revises and renews itself toward systematic improvement of internal procedures and the quality of the teachers produced.

Evaluation Subsystem in Sustained Operation

The first part of the chapter describes and establishes the feasibility of the components of the evaluation subsystem of the model instructional program in sustained operation. The second part describes how these components through the processes of planning, designing, developing, and piloting will first reach initial operation and later the dynamic condition of sustained operation.

Candidate Selection and Admission

The candidate selection component is concerned with the recruitment, assessment, selection, admission, orientation and induction of candidates for the instructional program. It provides the source of students at a determined level of quality and proficiency to supply the entire operational phase of the elementary teacher training program. Candidates selected for admission to the program will have personal, physical, and mental characteristics which are considered minimal for satisfying the requirements for the instructional program. The long-range goals of a quality candidate selection procedures component are parallel with the overall goals of the project which provide a positive and growth-producing effect upon the elementary school population which it serves. These long-range goals are paramount to its operation.

As required in the original specifications, instruments selected or devised must be valid and reliable, provision for continuous revision must be evident, students must be selected on a non-discriminatory basis and the procedures must provide adequately for the progression of students in and out of the program.

The career field called for in the original specifications provides for a flexibility not previously enjoyed in elementary education programs. Entry will be accomplished at many levels: aide, teaching assistant, certified teacher, and specialist. Individuals wishing to enter the teaching profession will be able to initiate matriculation procedures based upon acquired levels of performance. The bulk of candidates are expected to enter the instructional program at the presently defined freshman year; however, transfer students and other individuals who may have temporarily terminated their education at some point will be able to be assessed for readiness to enter professional training at their levels of proficiency.

These provisions for entry into the education profession, which rely on the acquired levels of educational background, are equally valid for "regular" college students and for special groups entering the field. Multi-level entry provisions assure proper beginning points for Teacher Corps personnel, Head Start teachers and aides, former teachers without recent teaching and college work, and entrants from other professions.

Recruitment. The two major populations from which candidates will be drawn are recent high school graduates and recent graduates from junior college liberal arts programs. The recruitment procedures are not dissimilar for these two populations, and the section which follows describes the recruitment plans as applied to recent high school graduates.

Intensive recruitment throughout the State of Georgia will be accomplished under the following guidelines:

1. All secondary high schools are qualified to receive recruitment materials.

2. Participating colleges, both junior and four year, will participate in the recruitment of candidates.

3. Program presentation materials will be available including items concerned with the nature of the participating institutions, the special features of the model program and its goals for ultimate improvement of elementary school education, candidate choice of entry and latitude of career development, and cost and time effectiveness for the candidate.

4. Resource materials for the visitations to secondary schools and four year colleges will include: comprehensive applications for admission, printed brochures describing the program, slides of various activities involving elementary teachers and pupils, and a color/sound film designed to illustrate clearly the elementary teacher education program.

5. Scheduled periodic site visits to Georgia high schools and colleges for candidate recruitment.

6. Heaviest recruitment will occur in March and April and again in November. Periodic procedures will be followed to coordinate site visits with the College Day programs of the participating institutions. Major Georgia cities will be sites selected according to types of local institution as well as regional importance of the city as a site. Prime consideration during initial site visits will be given to informing school officials and students about the unique qualities of the model program and its differences from the currently operating program. The importance of complete understanding is crucial to the operation of staggered registration and multi-level entry.

7. Every effort will be made to recruit students of demonstrated superior intellectual abilities as measured by high school records, principal and dean recommendations, and other referrals. The inclusion

of honors program students, National Merit Scholars, Governor's Honors Program students, and other recognized superior students will add to the strength of the program.

Application. Prospective candidates requesting admission will receive a packet of information accompanied by application forms and a medical examination form.

Packet information prepared for this purpose will contain instructions regarding application procedures and descriptive information in brochure form describing the model program.

Packets will be available directly from the admissions offices of various Georgia secondary and higher education institutions.

An application may be submitted at any time during the twelve month year, and consideration within a month of its receipt will be guaranteed. Accompanying the application form will be the physical examination report, official transcripts from all previous colleges attended or from which the prospective candidate was graduated, and letters of recommendation from the high school principal and two teachers. In the case of college students, three letters of recommendation from faculty members who are familiar with the student's work will be required.

Physical examination. The comprehensive physical examination must be administered by the student's personal physician or a university physician. It is designed to reveal any abnormalities which might preclude a candidate's successful performance in teaching. Chronic illnesses which might involve low stamina on the job, obvious gross physical abnormality or disfigurement, and other predisposing factors revealed through examination are cause for the candidate selection committee to consider carefully before admitting a student.

Another purpose of the physical examination is to insure the student that he meets minimum standards for admission to a university program, and that he is in good general health to pursue his education in an uninterrupted fashion, as well as to insure absence of illness or disease which might threaten other members of the university community or the community at large.

In view of the fact that many currently available physical examinations are inadequate from the standpoint of thoroughness as well as from the standpoint of the actual physical examination of the candidate for admission, the examination used with this program will be designed to be as thorough as is economically possible. Medical consultants will have designed the examination from the standpoints of comprehensiveness and cost effectiveness. Initial emphasis on the medical aspects of admission avoids unnecessary later attrition due to predisposing debilitative factors.

Tests and personal interviews. Additional information concerning the candidate is obtained through testing and personal interviews. Provided the candidate meets the minimum standards for general admissions, a letter confirming this decision is forwarded to him along with a request for him to visit the campus of one of the participating institutions to obtain an interview with the Candidate Review Committee and take a series of four tests: The Minnesota Teacher Attitude Inventory, Edwards Personal Preference Schedule, Strong Vocational Interest Inventory (Teaching area) and the School and College Ability Test (SCAT) if the candidate has not previously been administered this test.

Minimum acceptable scores for the above instruments will be arrived at through consultation with representatives of all participating institutions as will as by inspection of the normative data included in each of the test manuals. Current empirical use of such instruments at the University of Georgia will be an additional index in determining the standards for review and admission. Special attention will be given to the reduction of cultural bias in all assessment procedures and instruments through simulated and empirical research.

The candidate review committee. The functional unit of personnel to make decisions regarding the entrance of potential candidates is the Candidate Review Committee. This Committee consists of the Assistant Director for Student

Selections, a representative of the Director of Teacher Education - Elementary, and a career development specialist affiliated with the university or college administration. Rationale for the composition of this Committee is essentially constructive. In the event that the prospective candidate ultimely decides not to enter teacher education, or fails to meet specifications of the model program, this Committee will be instrumental in assisting the student to redirect his abilities and interests to another academic or vocational pursuit. Economy of time is crucial to the student at all phases of university work, and it is felt that the constructive aspects of the Candidate Review Committee facilitate change for the student moving along in his career development. Activities of this Committee complement the entire student personnel orientation of the university system at large.

The prime function of the Committee is to examine carefully each of the prospective candidates for such personal characteristics which the program feels will (a) assist in positive pupil gain in elementary schools, (b) facilitate innovative techniques in teaching while continuing assessment of current traditional pedagogical models, (c) predict successful candidate performance in the model program, and (d) predict stable emotional-social health of the candidate while he is a student. Such a configuration of goals will allow the Committee to examine each of the candidates for a great deal of nonacademic information, such as affective qualities of adjustment, and such qualities as openness, flexibility, friendliness, communicative (verbal and non-verbal) skills, and general perceived impression. Along with the written test scores, the interview serves to acquaint the prospective candidate with the program, to allow him to direct questions to the Committee and to receive answers directly from them. The interview also allows the Committee to ask the candidate to expand his autobiographical written statements for the benefit of further general information.

Evaluation and decision. Following the scoring and scaling of the test data and after the candidate's personal interview the Committee will meet and each member will rate each candidate independently on the checklist of qualities on instruments such as the Likert scale. The Likert scale is shown in Figure 23. (Scores from written test instruments will not have been examined by the judges until after the personal interview has been accomplished to avoid bias.) After the personal interview and after independent ratings, profile sheets on the judges' rating will be generated. Discussion of int ... item point spreads is warranted where wide differences exist among judges on ratings of interview criteria. Consonance of judges' opinions of each prospective candidate will be one of the substantive features of candidate selection. Success on test instruments with concomitant success in the personal interview will be one of the chief predictors of ultimate final selection and approval for admission to the model program. Caution is inserted here, however with reference to the prospective candidate with minor deficiencies. When remediation of deficiencies is viewed as possible and worthwhile, written statements of conditional admission will be made on the permanent record, and the candidate will be made aware of such deficiencies for future constructive change. Periodic reevaluation of candidates on test instruments will be longitudinal measure of the success of the program and the effect on the candidates.

Early decision and notification. In the case of positive unanimous or near-unanimous decision in favor of accepting a prospective candidate, notification of the decision of the Candidate Review Committee will be issued immediately after the psychometric tests have been scored and evaluated and the personal interview completed. This feature of the program will serve to eliminate unnecessary correspondence between applicants and the Committee, as well as serve as a stronger recruitment tool in cases where the prospective candidate has applied to several institutions. Highly qualified students, actively recruited and positively notified will likely select the model program in which to study if immediate signs of approval of their qualifications are demonstrated by the Committee.

Candidate Personal Interview Criteria

	Low 1	2	3	4	High 5
Verbal Communication					
Sociability					
Warmth					
Physical Appearance					
Grooming					
Friendliness					
Expression of motivation for entering Teacher Education					
Poise					
Confidence in self					
Dominance-Submissiveness					

Fig. 23. Likert scale.

Early establishment of rapport, warmth, and positive regard between candidates and their instructors and supervisors in the model program is a desired high priority goal, whose long-range effects hopefully will carry into enthusiasm for personal and curricular development. Early decision is one aspect of candidate selection which serves to set it apart from traditional models of application. Additionally, the orientation and induction program designed with the student as the central focus lends a feeling of self-confidence to the candidate and is a helpful tool in building a healthy self perception for candidates entering the teaching profession. Positive feedback is then essential in all aspects of recruitment.

Applicants thought to be particularly unsuited to the model program are additionally assisted by the Candidate Review Committee when this body assists these individuals in exploring other career development possibilities.

Orientation and induction. Beginning post-high school candidates entering the preprofessional phase of the model program will enjoy the opportunity to participate in orientation which includes aspects reflective of new-student activities in a small college.

When the candidate receives his notice of acceptance it will tell him the campus on which he is to begin work, the month in which he will be admitted, and detailed arrangements for his housing, registration and enrollment. (On each application the students are required to list their first, second and third choices for campus, month in which to begin work, and housing facilities desired.)

When the student arrives on campus he will have already made arrangements for housing and have been informed with regard to the first orientation meeting. It is likely that he will arrive on a weekend and be ready to attend his first orientation session on the Monday following his arrival. However, before he enters the orientation session he will meet with his "student host" or "big brother," who is an upper-class student assigned to making certain that the entering freshman becomes readily acclimated to his new social environment. The student host will also answer immediate questions and familiarize the neophyte with features of the campus and its traditions.

The student host will guide the entering student to the first orientation meeting and introduce him to the director of orientation. There will be about twenty students and three or four staff members at the first orientation session. In addition to the director of orientation will be staff advisors to whom the entering students will be assigned for several months to come.

The orientation program continues as long as is necessary to provide the entering student with the essential details of the important venture which he has begun. Included in this program are such concerns as the overall nature of the program; the specific nature of the learning guides called proficiency modules or PMs; the effort unit system of grading and scholarships; and developing skills in the use of computers, teaching machines, projectors, and tape recorders which the student will be required to use in pursuing his studies. Informal spontaneous events such as morning and afternoon coffee or coke breaks, as well as planned picnics and evening meetings attended by professors and sometimes their wives, will provide the social setting for the new students.

Through the orientation program the students will have learned many facts and traditions of the campus which they are attending, they will understand the program in its total six year sequence, they will have become familiar with learning procedures and study routines and will have met the professors and their assistants who are charged with the responsibility of guiding them through the learning activities in which they are to participate. Also, they will have visited each of the learning centers and reference laboratories which they will be using during the period in which they pursue their studies. As the director of orientation becomes satisfied that particular students are ready to move from orientation to seminar assignments, these students are transferred to the program seminar units.

The seminar is a heterogeneous group of approximately twenty education students. Some have been in the seminar for almost two years and are near completion of their paraprofessional work while others are just beginning. Before entering the seminar the student will have been prepared by having been introduced informally to the seminar participants in a social setting and by having conferred with his seminar leader who is also his faculty advisor. During this conference the advisor explains to the student that initially he is not expected to participate actively in the seminar and that, as time passes, he will find himself comfortably joining in and making his contributions to the productiveness of these sessions. Thus, when he enters the seminar the student is somewhat prepared for it and begins the process of identifying himself with a group of individuals with common concern for professional education.

The student will stay in this seminar until he acquires the behaviors and knowledges he must have to be declared an assistant teacher. It may take some less than a year, and others in excess of two. The content for discussion in the seminar has great range. Some days are devoted to open "complaint sessions," others to special professional problems which are of timely importance and not likely to be contained in the prepared learning materials. There will be occasional field trips to places of professional interest. Whenever necessary program changes and scheduling problems will consume a portion of the session. From time to time, as students "graduate" from this preprofessional phase of the program, there will be social events to celebrate the occasion.

There will be times when the group attendance will be reduced considerably from the normal maximum of twenty. These will be times when members of the seminar are engaged in five week field experiences working in elementary school classrooms off campus. However, on returning from their field experiences, these students will prepare multi-media reports on what has happened, present them to the seminar, and discuss issues and problems which were encountered. These seminars will be managed, not led, by the advisors. Leadership in carrying out seminar activities will most often be assumed by students as an interested group of individuals seeking self-improvement in their profession.

Feasibility of Candidate Selection Component

Through the use of the described system of candidate selection, the immediate observation from the student standpoint is one of clearly regulated procedures. Ambiguities of the more traditional admissions policies have largely been eliminated.

Support for feasibility of candidate selection emerges from the staggered matriculation process throughout the year. This process is technically desirable to keep a constant flow of students in all phases of the model program. A distributed balance of students within PMs, for example, is noteworthy, allowing for accelerated rates of student progress and even distribution of resources.

As required in the original specifications it will be necessary to: (a) increase the pool of teacher candidates, (b) increase the input of qualified teachers, and (c) develop a teacher career field. An investigation of the feasibility of staggered admission indicates that continuous operation of the admission process directly assists the implementation of these features. These staggered entrance plans are feasible because they coincide both with the traditional college entrance periods (June, September, and October) and also with the new planned entrance-date periods. Discussions with university admissions officials revealed that a sufficient number of students now applies for admission throughout the year to assure the feasibility of this staggered plan. Discussions with selected groups of students currently enrolled at the University of Georgia, and with certain student leaders, revealed an interest in entrance to such a model program at the convenience of the student rather than only at the prescribed dates.

The schedule for admissions may be seen in Figure 24 which shows the previously mentioned staggered admission policy. Based on current enrollment figures and estimates of future enrollment, this number was broken down into four months of somewhat heavier enrollment (June through September) and five months of smaller enrollment of twenty students per month. This added flexibility of staggered admissions allows for the smooth entrance of 240 students over a twelve-month period.

An innovative feature of the admissions program allows the prospective candidate entrance who has interrupted his education earlier and found it previously impossible to return to college at traditional periods. Exemplary individuals might include qualified women whose educations were terminated due to maternity, male service veterans returned to civilian life, and transfers from other geographical locations who would otherwise be denied admission to college were it not for the flexibility of the present admissions model. Accessibility to education for these qualified individuals is an asset to the student and to the model program. The entry of persons in these categories is feasible because their competency levels will be assessed prior to entrance, and admission will not necessarily be based on numbers of courses, credits, or recency of college training.

Month	Estimated Number of Beginning Students to be Enrolled
June	40
July	20
August	20
September	40
October	40
November	0
December	0
January	20
February	20
March	20
April	0
May	20
TOTAL	240

Fig. 24. Staggered admission of students by month.

The feasibility for implementing the candidate selection component is also strengthened through the cooperative efforts of all involved parties. Examination of authoritative structures at the University of Georgia reveals the following agencies are directly involved: (a) registrar and director of student affairs, (b) Candidate Review Committee of Elementary Education, (c) university health services, and (d) additional faculty and staff from the Division of Elementary Education. Preparatory steps for the transition from conventional models to the model program have necessitated a high degree of interdependency among the agencies. Elimination of duplication of candidate personal data on applications, pooling of campus divisional resources, and increased clarity of procedural steps for application have assisted in simplifying the application and admissions procedure. These agencies and offices have pledged cooperation to the model program for development and implementation of these procedures. Especially noteworthy is the increased economy of time involved from the point of prospective candidate application to the decision to accept or redirect the prospective candidate. Early decision is a chief feature in insuring the feasibility of this plan.

Additional technical feasibility is supported by the uniform features of participating Georgia institutions which allow for feeding potential candidates into the program from throughout the state. The technical requirements for storage, analysis, and retrieval of data for selection are within feasible limits using currently existing computers and terminals. The programming and updating the procedures further contributes to the feasibility of the technical aspects of candidate selection. The central storage of such data has been judged a considerable improvement over the repetitive questionnaires and other forms currently in use by students as well as by admissions officials at the University of Georgia.

There is no potential conflict between regular admission standards at the participating institutions since the minimum acceptable standards for the institution are also the minimum standards for entrance to the model program. As adjustment in minimum standards can be studied in simulated and real models, the admissions standards can be modified accordingly. This is feasible through provision in the model for continual study of the quality of the input (students) in relationship to the quality of teaching performance.

Clear structure and clear decision points of selection allow for a psychologically healthy atmosphere for the prospective candidate. Arbitrariness in selection procedures serves only to increase the distance between the student and his program. The present candidate selection component involves the student in more active phases of his entrance into the model program. The personal interview, for example, is unusual at the undergraduate level. The decision to include it along with psychological test measures (MTAI, SCAT, Edwards, and Strong Vocational Interest Inventory) provides important data for the Candidate Review Committee which makes final selections, and is additionally helpful for students who have early opportunities to explore the area verbally with interested faculty members who are able to render assistance for entrance. The provision for redirection of students within a counselling framework, a feature omitted in many admissions programs, increases the psychological feasibility of these procedures.

The feasibility of implementing a comprehensive selection component has been determined through the participation of administrative and faculty specialists in admissions, psychometry, and student personnel services. Measurement specialists were used in reviewing and selecting appropriate instruments, scales, and observation guides.

Prediction of academic success and high quality teaching performance from currently available instruments and procedures is forced to rely on future validation, empirical verification, revision, and development of alternatives. The assessment battery specified in the model program is judged to be currently feasible because of the past predictive success of those instruments and procedures selected. The overall network and resource allocation during development and piloting contain design provisions for this further validation and verification of selected procedures.

The use of the comprehensive candidate selection plan, where final judgement is based on a standardized test battery, candidate personal data, attempts to assess affective factors, and structured interview procedures by the Candidate Review

Committee, was finally chosen as the most feasible approach. This decision was verified by specialists in teacher education, student personnel services, and measurement. During the feasibility study, certain promising findings were noted from the literature in support of the comprehensive approach. Smith (1967), for example, demonstrated that academic performance was highly correlated with certain personality factors after basic ability was controlled. Also, it has been demonstrated that teacher personality characteristics are predictive of and effective in producing changes in the scores of children in test performance (McNary, 1967). It was shown that such qualities as friendliness, energy level, emotional stability, etc. are directly related to children's verbal ability outcomes. The modification, testing, and continual monitoring of this and other selection procedures are provided for in the model program.

Evaluation of Student Performance

The sequence and rate of movement through the model program learning experiences is dependent on the acquisition of competence in previous learning experiences. This makes it essential that student performance be evaluated almost constantly and that evaluation data be made readily available to student, advisor, and other components.

The evaluation of student performance also yields the major data on which all revision and adjustments of the overall program are based. High quality student performance throughout the program is one of the prime criteria by which the model program will be judged and the assessment of that performance is the function of the student performance component of the evaluation subsystem.

There are various devices and/or procedures specified for the evaluation of student performance. Each is described briefly in this report. They are: (a) PM pre and post assessment procedures which determine the eligibility to begin a PM and the levels of performance and proficiency gained upon completion of the PM, (b) standardized tasks which provide measures of the skills, processes, and attitudes of the student or inservice teacher as he performs specific activities, (c) teaching performance guides which are comprehensive acts related to the processes of teaching, (d) products of performance, such as written compositions, scientific explanations, lesson plans, and artistic pieces, (e) related criterion measures, such as the achievement of elementary school pupils under supervision and parents' attitudes toward the instructional setting and (f) progress review procedures which are designed to provide long-range evaluations of students and consequently the program itself.

PM pre and post assessment procedures. The basic unit of student learning is the PM. Most of the PMs are sequential and successful learning depends on previously acquired behaviors. To determine the student's status with regard to the objectives of a PM and the extent to which he has the prerequisite behaviors essential for success in the PM learning experiences, each student undergoes a preassessment or pretest. The preassessment has been designed by the PM development group with technical assistance from evaluation specialists. GEM Bulletin #69-13, PM Evaluation Guidelines (Bauch, 1969) and GEM Bulletin #69-7, Estimating Costs for Development of Candidate Performance Evaluation Procedures (Payne, 1969) gives PM teams a framework for the pre and post assessment.

The level of performance on the preassessment directs the student into one of four actions: (a) if the student shows outstanding performance on the preassessment indicating that he has competency in the specified behaviors, he proceeds to the next PM in the sequence, (b) if the student has the prerequisite behaviors specified in the PM, he is directed to engage in selected PM learning tasks designed to provide him with the specified PM behaviors in which he is deficient, (c) if the student has most of the prerequisite behaviors but is not proficient in all necessary behaviors for success in the PM, he is directed to re-engage in selected learning tasks from previous PMs at the advice and direction of the advisor, and then undergo another preassessment, (d) if the student's test behavior indicates serious deficiencies which are unlikely to be corrected by re-engaging in PM learning tasks, specially prescribed remediation is required before he is allowed to engage in this or any other PM. If the remediation is successful the student again undergoes the preassessment. If the remediation fails, the student is counseled into a program more suitable for him.

Upon completion of the specified learning tasks in the PM, the student undergoes a post assessment. This assessment determines the level of proficiency acquired and verifies the extent to which he has acquired the performance behaviors specified. The level of performance on the post assessment directs the student into one of three actions: (a) if the student has acquired the specified behaviors at an acceptable level of proficiency, he proceeds to the next PM, (b) if the student acquired most but not all of the specified behaviors, the advisor directs him to re-engage in selected learning tasks in preparation for an additional post assessment, and (c) if after repeating the assigned tasks the student has failed to acquire the specified behaviors, he is referred for clinical assistance in the same manner as was described for the preassessment.

No credit is given for any PM until an acceptable level of proficiency has been demonstrated during post assessment. It is anticipated that at least 75% of the students will proceed through the sequence without repeating PMs.

Standard tasks. Standard tasks are relatively independent performances which are administered at the close of each PM block. They are represented by a number of separate instruments which relate to performances required of all students and inservice teachers at the close of each particular block of PMs. The student or teacher is required to carry on an activity under the supervision of a qualified observer who rates the student on a scale as he carries out the activity. These designated activities are derived from the set of performance behaviors which are of particular concern in developing the learning activities contained in the PMs within the block. Standard tasks are required in all areas of study (i.e., language arts, social science, natural science, art, health education) as well as paraprofessional, professional, and specialist areas of study and performance.

Examples of paraprofessional standard tasks which would be required at the end of PM block number two which is a paraprofessional field experience are:

1. Oversees pupils engaged in games familiar to them.

2. Tells a story to a group of pupils for recreational purposes.

3. Catalogs and files series of training materials under the supervision of the master teacher.

4. Makes the height and weight measures of pupils and records them.

5. Collects lunch money from pupils and records payments.

The standard tasks are appraised by whatever techniques are deemed appropriate. For certain tasks, such as writing a poem or preparing a piece of art there are end products to evaluate. Other tasks follow routine procedures and can be evaluated by a checklist, such as the tasks of cataloging and filing materials. Some standardized tasks can be checked for accuracy; for example, measurement in mathematics and the use of grammar. Other tasks require ratings. An example of the possible rating scale for guiding pupils in preparing a bulletin board is given in Figure 25.

Many of the standard tasks will be stated on "goal cards" such as those used for research by Bauernfeind at Northern Illinois University (Bauernfeind, 1966, 79). The goals stated on the goal cards will have been selected from previous PMs and will combine self-evaluation by the student with verification and/or rating by the advisor.

The apprentice teacher is assigned the task of having the pupils prepare a classroom bulletin board.

A. Teacher provides guidelines.

B. Apprentice teacher and pupils prepare board.

C. Teacher rates apprentice teacher in the task.

Performance Rating Scale

1	2	3	4	5
Apprentice teacher prepares board with available materials.	Apprentice teacher directs pupils in preparing board.	Pupils prepare board with materials suggested by apprentice teacher.	Pupils prepare board with materials of their selection.	Pupils are stimulated to design imaginative and functional board.

Fig. 25. Standard task rating scale.

Teaching performance guides. Teaching performance guides evaluate teaching skills which are comprehensive in nature and directly related to the student's or teacher's performance in a teaching-learning situation. The skills involve organizing acts into sequences, establishing sequences into procedures, and selecting procedures and materials to achieve objectives of a given system. These instruments are administered through observation of the student or inservice teacher working with pupils near the close of each practical laboratory experience, near the end of the internship, and near the end of the specialist phase of the program.

Specifications require that certain performance guides employ micro-teaching procedures. After the student "performs," the student and supervisor play back the video-tape recording immediately. In conference, the supervisor and student together examine the performance to find opportunities for significant learnings which the student did and did not treat adequately. (Although in this section of the specifications micro-teaching is utilized as evaluative in nature, it is a significant learning activity for the student which is provided for in PMs undertaken during practical laboratory experiences.)

Products of performance. Another evaluative procedure is the assessment of the products of performance. This procedure is used whenever applicable, within the PM post assessment, to obtain evidence for evaluating a standard task and for obtaining evidence from the more comprehesive teacher performance evaluations. Examples of products or performance are a composition, a poem, a comparison of two theoretical viewpoints, a speech, a painting, a musical composition, a lesson plan, or a diagnosis of the background regarding learning of an underprivileged child.

Related criterion measures. Certain factors in the teaching enrivonment were regarded as highly important in providing providing a broad evaluative base for teaching success. Thus, an evaluation subsystem was structured to include other criterion measures including pupil achievement, parental attitudes, peer ratings, supervisory ratings, and video-tape observations of teacher performance for evaluative purposes.

Achievement of pupils involves such conventional measures as elementary school achievement batteries. A parental attitude scale measures the parents' attitude toward the goals and objectives of the system. Peer ratings are appraised by inventories of what the teacher's contemporaries think of his effectiveness as a teacher. Supervisory ratings are obtained on checklists which reveal the supervisor's judgment of the teacher's effectiveness and proficiency in performing assigned tasks. The video-tape of the teacher performance is evaluated and scored in a fashion similar to that described in the aforementioned micro-teaching technique.

Progress review. After the student's progress has been appraised, the advisor normally advances the student into the next block or phase of the program. However, in the event of unsatisfactory progress, the student may be advised to enter teaching in a paraprofessional category or transfer to another program. If the student requires time to remove a deficiency, the paraprofessional route may be recommended while the student receives special clinical attention. If the student lacks qualities to become a professional teacher, a transfer may be recommended or the student may be dropped from the program. A hypothetical plot is presented in Figure 26. The abscissa represents teaching sessions (trials), and the ordinate depicts the number of opportunities for significant learning which the student did and did not deal with adequately. There are three items of special interest in the plots. The student, with practice, should eliminate untreated significant learning situations prior to graduation. The slope of line (1), computed by least squares method, indicates the rate at which the student is learning to deal with the situations. The level (ordinate value) of line (2) depicts the performance plateau for the student. These data are collected as possible predictors of success in a teaching position.

Progress review points and possible routes are depicted in Figure 27. In reading Figure 27, it should be noted that the final block represents a period of follow-up evaluation designed not only to determine the extent to which the student was successful as a teacher, but also to evaluate the instructional program itself. In other words, the evaluative procedures and devices described in this report will be used to collect data which will reveal strengths and weaknesses in the program, so that continuous improvement of the model becomes a continuing feature.

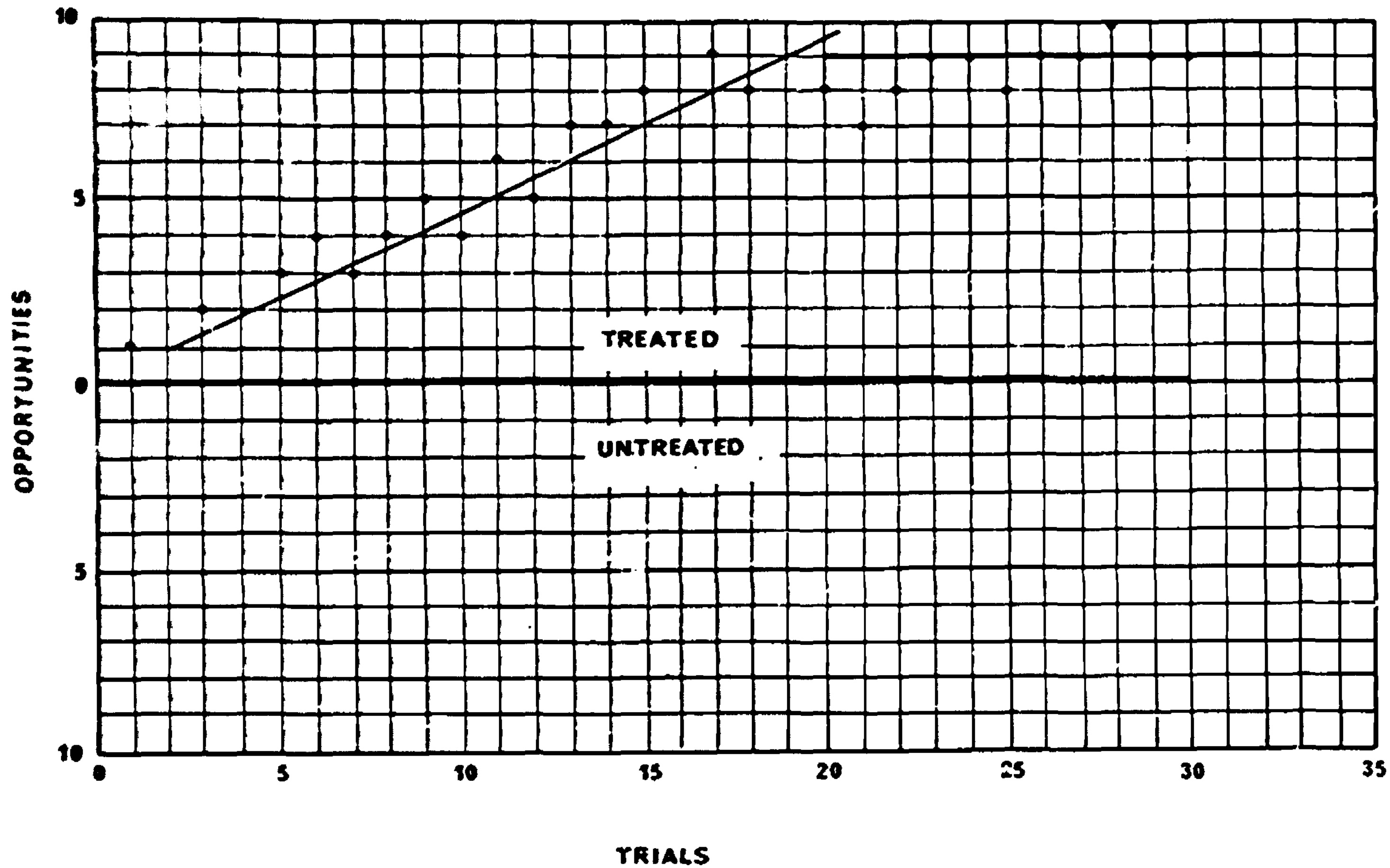


Fig. 26. Plot of significant learnings.

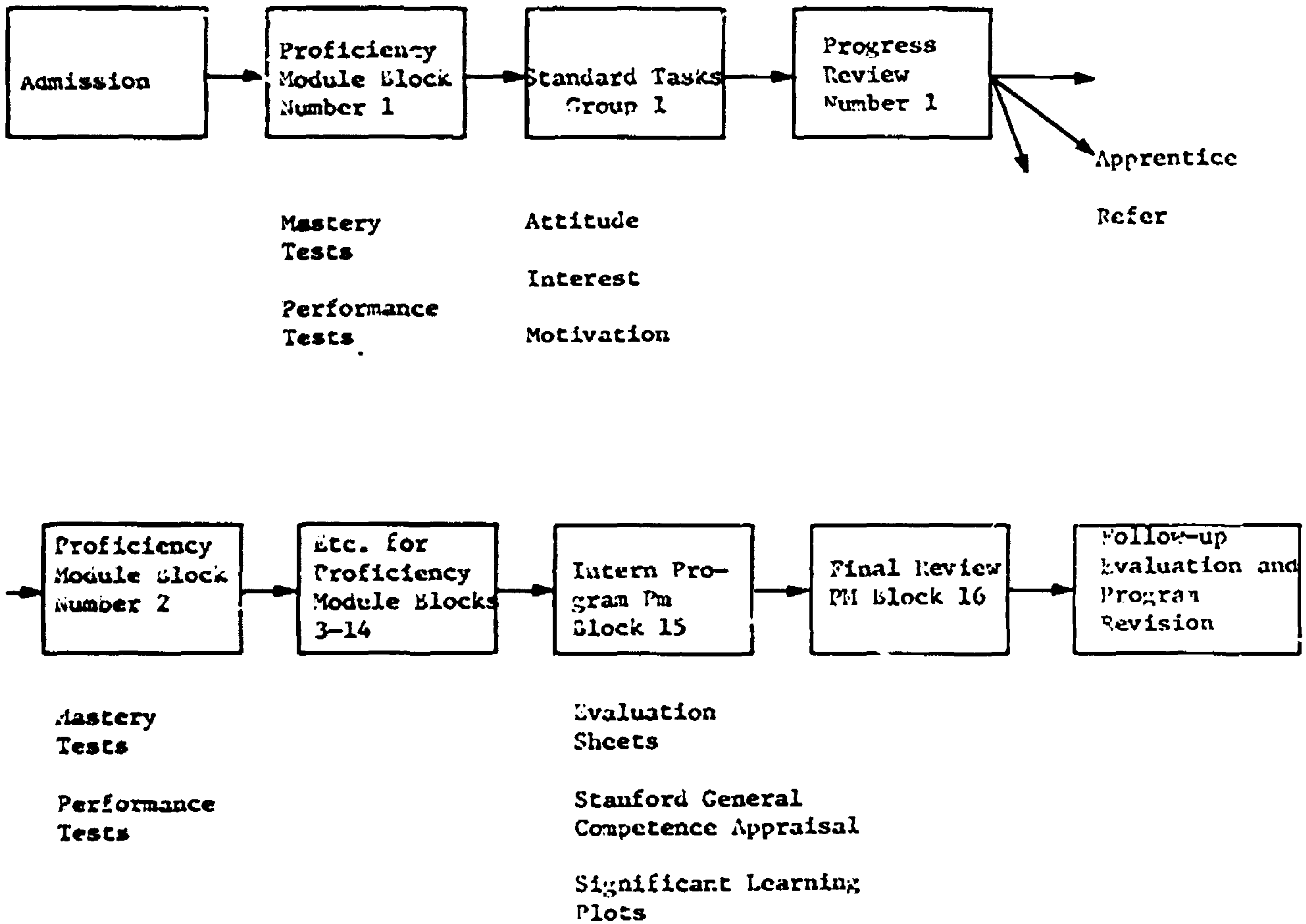


Fig. 27. Apprentice teacher progress review.

Feasibility of Student Performance Evaluation Procedures

The feasibility of the student evaluation component was established in several ways. First, the theoretical feasibility was studied by the staff in terms of the reasons for evaluating student performence in such a model program. Next, the effects of the procedures on students and staff were considered. The technical feasibility considerations include the availability of techniques, equipment, and competent personnel. Cost and resource allocations completed the determination of the feasibility of this component. The procedures were verified by specialists at the University of Georgia, considering theory, research, and available technical capabilities.

The performance specifications provided the bases for evaluation. Especially strong support for the general plan of performance specification was found in recent work concerning behavioral objectives. Mager's (1962) work has been further developed and expanded upon by Lindvall (1964), and also by Metfessel and Michael (1967) as they develop stragegies for using objectives organized in the taxonomies (Bloom, 1956; Krathwohl, Bloom and Masia, 1964) in evaluation. These sources validated the judgment that the procedures in the model program were feasible and that they were very promising practices for the improvement of teacher education.

Techniques for administering evaluative measures were tested during the piloting of the three target PMs during the summer and fall of 1969. Opportunities for informal evaluations were also developed in these modules. They include peer group evaluations, product evaluations, and observations of individual student behavior.

The use of video tapes has been established for evaluating some performance behaviors. The equipment and technical personnel are available. Portions of the evaluation in the cognitive domain can be done by computer operations.

The prime theoretical base for student performance evaluation is also a premise for the overall model: that the positive growth and achievement of children in the elementary school is directly related to the instructional performance of their teacher(s). The model was constructed in a manner which gave recognition to the performance of the child, the nature of the elementary school in the immediate future, the performance of the teacher(s), procedures for attaining the desired performance in a teacher education program, and specifications. Such a multiplicity of concerns necessitates procedures for determining the nature and quality of the performance of the prospective teacher; thus, the student performance evaluation component of the model. The body of research and literature on specific techniques of relating teaching performance to pupil performance (Justiz, 1969; Biddle and Ellena, 1964, for examples) contains evidence in support of these relationships.

Further, the specifications and ordering of the teacher education model relies on the sequential nature of most of the learning tasks and the career sequence. The attainment of one level of competence (e.g. completing the preprofessional phase) is proof that the student has attained those competencies which are prerequisite to the next grouping of learning tasks. And the data from systematic evaluation of student performance are the source of the decision-making as individual students progress through the program.

Systematic and incremental evaluation with feedback is also a basic concept in a general evaluation model. If persons are expected to progress through sequences of learnings, the assessment of their performance is necessary in the tracking and reporting of their performance. Students and their advisers are also expected to make choices of alternate routes such as those related to PM sequences throughout the model, and these choices are most logically based on data from previous performance.

The technical requirements of the student performance evaluation component have been determined to be within the feasible range of the model. Systems engineers and specialists in data processing from the UNIVAC corporation and IBM corporation were consulted and verified the technical feasibility of these procedures. One example of procedures currently available for organizing specifications into an evaluation framework is found in Payne's (1968) The Specification and Measurement of Learning Outcomes. Local specialists in measurement and data processing determined that the technical requirements were within the capabilities of currently existing equipment.

The evaluation of student performance requires some of the following activities:

1. selection and/or development of evaluative criteria

2. selection and/or development of evaluative instruments, techniques, procedures and procedures

3. administration of assessment procedures

4. data processing, storage and retrieval

5. reporting

In sustained operation, the student performance evaluation component is assured of the qualified personnel, technical assistance, hardware and software through provision for these during the development stages of the project. Qualified personnel are assured from the pool of faculty and staff who will undergo the orientation and specialized training necessary for their successful participation in the instructional and advisory program. Whether native or newly employed personnel, these persons will have been selected on the basis of their qualifications and competencies. Their abilities to specify effective evaluation procedures in their areas of speciality will be of particular interest in selection and training of instructional personnel. Technical assistance for instructional personnel, to assist in the specifying and designing of evaluation instruments and techniques, is assured through providion of specialists in measurement and evaluation. After instructional teams and PM developers have prepared the PM, they will call upon the measurement specialist for assistance in designing and preparing the evaluation procedures. Artistic and duplication specialists are also provided for, to assist in the layout and format of evaluation instruments.

Data processing systems and equipment are available to support the specified procedures, and the model itself provides for the constant revision of these procedures. The storage and processing of student performance data can be implemented on either an IBM 360/65 computer or Univac 9200 system. In either case, remote terminals will be used. Efficient entry of student performance data will utilize a digitape optical scanner for entry whenever appropriate, especially to reduce the time lag and personnel costs associated with card punching. Optical scanning equipment is currently in use for recording grades at the University of Georgia. While some of the storage and retrieval programs are currently available, most of the analysis and reporting software will be developed during the early phases of the project.

The procedures for assessing student performance and storing and reporting these data have definite psychological advantages over procedures currently in use. In the first place, the student and his adviser are systematically informed of quality and rate of progress. This procedure is feasible because of the provision for weekly entry and retrieval of progress data and reports. The structure is provided to increase the accuracy of the students' perceptions of themselves and of their competencies.

The systematic provision of progress reports to the students will significantly reduce the uncertainty associated with occasional examinations separated by large blocks of time and will also close the communications gap between student and adviser. Next steps in the sequence are based on previous accomplishments, and students are highly unlikely to be presented with learning tasks where their probability for success is low. Some of the psychological considerations associated with programmed instruction will have positive impact in the sequential and incremental learning tasks. When the student knows the level of expectation in advance, energy and effort can be directed toward those competencies. The positive effect of this situation on the mental health of the student contributes significantly to the psychological feasibility of the performance evaluation procedures.

In the evaluation subsystem of the Georgia instructional model, the operation of evaluation procedures will be guided by operational criteria. These criteria have been derived from the literature, developed from the project activities, and specified to guide the model operations. Evaluative criteria, the evidence framework against which the operations will be judged, have also been specified in this way. Thus, the evaluation operations are guided by criteria and judged according to criteria. The criteria assure a degree of objectivity; however, they are subject to revision as are all other parts of the model.

Selected operational criteria for the evaluation of student performance are presented as illustrations:

1. That student behavior and knowledge be evaluated in terms of replicative measures of adequate reliability and validity at each essential stage of progress.

2. That the student achievement evaluation instruments and/or procedures be selected or developed to account for all aspects of the behaviors required of the student (cognitive, psychomotor, and affective).

3. That the student achievement evaluation procedures utilize efficient information storage and retrieval equipment.

4. That the student achievement evaluation procedures involve an effective personalized student advisement and/or guidance program.

5. That the extent to which the student has satisfied the prerequisites for undertaking new learnings be systematically determined.

6. That students evaluate their own progress toward the objectives and be assisted in doing so. (This does <u>not</u> mean that self-evaluation is the only evaluative procedure to be used with students in the program.)

7. That the student's accumulation of experience and his capabilities provide the basis for determining the specific behaviors which he is to acquire and methods, materials, and procedures by which he is to acquire them.

8. That a student's performance be evaluated by comparing his achievements with the behaviors he is to acquire, rather than with the achievements of others.

9. That the program have as an integral element a system of continuous follow-up evaluation so as to provide for its continuous revision.

The application of "outside" criteria to the evaluation subsystem is one means of determining feasibility. One such set of criteria is contained in the 1967 Yearbook of the Association for Supervision and Curriculum Development Evaluation as Feedback and Guide (Wilhelms, 1967). Five questions are asked of any general evaluation system. These questions are answered as they relate to the instructional model evaluation subsystem.

1. Does the system facilitate self-evaluation?

Provision is made for self-evaluation by the student throughout the program, especially through self-rating within PMs. Much of the assessment done on other aspects of the evaluation subsystem relies on a degree of self-evaluation, since operations are judged against criteria. For example, the learning materials developed by teams of staff members can be self-evaluated by those teams through the application of the specified criteria. The same is true of all components of the subsystem.

2. Does the evaluation encompass every objective?

The evaluation subsystem is comprehensive, and each objective (specification) stands as its own evaluative criteria, since it is stated in behavioral terms and thus can be assessed. Every operation in the model is evaluated on a systematic schedule, as well as all evaluation operations themselves.

3. Does the evaluation facilitate learning and teaching?

This crucial question lies at the heart of the effectiveness of the evaluation subsystem. The expressed purpose of the evaluation subsystem is to provide feedback for constant revision of the model. The intent of that revision is to always improve the quality of teaching and learning, and to increase efficiency as well. The purpose of careful candidate selection and the evaluation of student performance is to allow for the best and most efficient learning. The evaluation of instructional personnel is also aimed at systematically improving the instruction.

4. Does the evaluation produce records appropriate to the purposes for which records are essential?

The central storage of all evaluation data, with central and remote retrieval provision, is the mechanism for keeping records. These records are readily available to students, advisers, and other personnel as needed. Since data are collected to provide for systematic revision of the model, record-keeping is highly appropriate.

5. Does the evaluation provide continuing feedback into the larger questions of curriculum development and educational policy?

Since the evaluation subsystem is itself a feedback, then the provision exists for basing curriculum decisions and broad policy on this feedback. The procedure for reporting to outside groups (e.g. advisory boards, policy makers in other agencies such as teacher certification, and professional organizations) assures feedback to both the model itself and to those persons, groups, and institutions externally associated with some aspect of the model.

Program Evaluation Procedures

Program evaluation is concerned with all activities associated with determining the overall effectiveness of the educational model. Although candidate selection and the evaluation of student performance described previously in this chapter receive little attention in this discussion, the reader must keep in mind that data from selection and performance evaluation are utilized in program evaluation procedures where appropriate.

All components and phases of the educational model are assessed, evaluated and provided with feedback from program evaluation processes. All feedback loops begin and end with program evaluation, and the systematic revision of the model is accomplished through these procedures.

The functions of program evaluation are: (a) to gather data relative to the program's effectiveness, (b) to analyze and interpret data, and (c) to provide objective reports of the findings to serve as a basis for program revision. The process is circular and constant, allowing for the systematic evaluation so vital to the continuing success and improvement of the model.

<u>Target concerns.</u> It is the concern of program evaluation to systematically assess all facilities, personnel, procedures, and functioning components of the instructional program in sustained operation. The following is an illustrative list of concerns:

1. facilities, equipment, and materials
2. personnel
3. management systems
4. survey of society and relevant research findings
5. simulation program
6. student personnel services
7. revision procedures
8. faculty orientation and training
9. clinical procedures
10. reciprocal agreements and institutional change
11. scheduling program
12. overall model program

The assessment of any of the aforementioned concerns follows a general sequence of events of which the highlights are:

1. Accumulate data in accord with time and cost limitations.
2. Subject data to analysis.
3. Apply operational and evaluative criteria.

4. Prepare objective report of findings.

5. Deliver report to persons or agencies concerned.

6. Resume data accumulation.

Program evaluation is dependent on the central storage system and the operational units of the instructional program as its source of data. Objectivity is approached through the application of operational and evaluative criteria which determine the expected quantitative and qualitative performance. Selected operational criteria to guide the program component require:

1. That the program evaluation instruments and/or procedures be selected to account for not only all aspects of the teacher performance behaviors (cognitive, psychomotor, and affective), but also all other components of the program (candidate selection, instruction, program evaluation, staff orientation, and administrative organization).

2. That the program evaluation procedures are indefinitely continuous throughout sustained operation.

3. That program evaluation procedures utilize efficient information storage and retrieval equipment.

4. That the program evaluation procedures have a comprehensive systematic system for analysis and feedback.

5. That the overall design of the model program be sufficiently flexible to insure the possibility of incorporating new but compatible practices as needed.

6. That the procedures and instruments for program evaluation provide for continued investigation of cost effectiveness of operations.

In addition to regular and systematic evaluation procedures, the program evaluation component has responsibility for conducting <u>special studies</u>, and for assessing the <u>cost effectiveness</u> of the instruction model. Special studies are assessment and evaluation activities which are not a regular part of the evaluation processes as described in previous sections. These studies are initiated by any functional unit within the operational framework and/or by individuals or groups (e.g. Dean of the College of Education) outside the model framework. The studies are conducted by the program evaluation personnel and reported to the source of the request.

In the model educational program two major factors are considered in determining cost effectiveness. They are the teacher education program and the elementary school program. The behavioral specifications are for the student who is to become the teacher; however, the teacher, in turn, is measured by the improvement in achievement of the elementary school pupil. Thus, the cost effectiveness study involves a broadly conceived system which extends beyond the immediate concerns of teacher education.

In a cost effectiveness model there are three items of interest: inputs, outputs, and their relationship. The inputs are those for which money is spent. The outputs are the benefits which are received from the expenditures. The relationship predicts how the output will change for a given input change. Unfortunately, the difficult tasks of measuring effectiveness and defining relationship combine to render predictions which, at their best, are only estimates. Simulation models will be of special value in studying cost effectiveness.

One of the most desirable outputs is an increase in overall achievement. This increase is measured by conventional achievement batteries, performance tests, and scales. The increase in achievement is equally appropriate as an effectiveness measure for both the student in the college program and the pupil in the elementary school. The increase in achievement covers the entire range of content: knowledge, performance, and attitudes.

The effectiveness measure for equality of educational opportunity can be estimated from a lack of statistical significant correlation between the socioeconomic level as obtained in the biographical information blank and achievement in content. The measure is equally appropriate for the apprentice teachers and the pupils.

A measure of productivity can be estimated initially from the starting salaries offered to the student teacher at graduation. During the folow-up, inquiry is made into the increase in salary of the teacher. Productivity is probably not an appropriate measure for the pupil, unless the elementary school is the terminal educational institution for him.

The school variables are appropriate measures of effectiveness for the student teacher and the pupil. Extensive school records have been maintained for such items as attendance, attrition, graduation, and continuing higher education. Measures of these items for the student teaching program are appropriate to use in appraising the effectiveness of the selection and training procedures for the apprentice teacher. Again, the same statistics computed for the elementary school constitute one measure of the improvement affected by the educational model program.

The increase in utilization of facilities and equipment, if accompanied by an increment of achievement, reduction in learning time, or the like is an indication of usefulness of the item in the program. The utilization is an indication for both the teacher education and elementary school programs.

After the inputs and outputs are measured, the alleged relationship existing between them is estimated. The estimations are achieved in various ways, and usually by whatever means is possible. In certain cases, an item is added to the program and an increment of achievement is hopefully realized. In this case, the experiment is controlled so that the item is the cause for the change and the increment of achievement is the result. Another estimate of relationship between inputs and outputs involves factor analysis. The principal components are identified and the weighting of certain measures on those components are computed. If the program measures happen also to be effectiveness measures, a comparision of their relative effectiveness is obtained from the weights. When the effectiveness data are analyzed, other estimates might be feasible. As a final consideration, professional judgment is necessary for making decisions in situations lacking complete information or procedures for thorough analysis. As the content of the cost effectiveness analysis shifts from the more routine and exact, such as changing of attitude, the role of professional judgment based on available information becomes increasingly critical in selecting the inputs to finance for desired outputs.

<u>Computer simulation in program evaluation</u>. To fulfill the specifications presented in the original design of the instructional model a computer simulation model of the instructional program in sustained operation becomes a basic tool for carrying out program evaluation procedures. This computer simulation model provides for each of the hundreds of specific activities which are required for the operation of the instructional program and is characterized by both versatility and flexibility. Each activity is assigned costs for personnel, facilities, materials, and equipment as well as a minimum, norm and maximum time factor. Data collected during the period in which the model is to be implemented into sustained operation were first verified and then assigned to these activities as quantitative elements. As the instructional program continues in sustained operation, problems will arise which may be quickly resolved on the basis of the findings resulting from simulated adjustments based on considered judgments. For example, serious losses might be alleviated by a simple rearrangement of a sequence of events.

Also, a computer simulation model provides valuable information regarding such concerns as: adjustments of the program to changing student enrollments, cost control related to instructional innovation, and feasible steps to cost reduction through adjustments in sequencing.

The use of computer simulation as an engineering strategy in an area (education) where the underlying science is not clearly explicit and the hard data are not completely available must be viewed with cautious enthusiasm. The difficulties of the application of sophisticated simulation models in such fields have been discussed by Hartley (1969), Oettinger (1969), Silvern (1965), and Forrester (1961). The general scientific paradigm which directs the application of simulation models in the instructional model program calls for repeatable hard data first, then tentative mathematical models of the known real phenomena, then analytical experiments with these models, then real experiments with selected cases, then <u>continual improvement</u> through <u>continual interaction</u> of all the four previous steps ad infinitum or until a satisfactory steady state or an insurmountable obstacle is encountered.

The study of feasibility and the planning for future development of the model program have been closely guided by this paradigm. As the first step of the paradigm reaches a certain stage of completeness, the first mathematically trivial models become useful for studies of allocation, utilization, and scheduling, for the optimization of cost effectiveness, and for the determination of critical areas of timing and resource competetion. Here a computer becomes useful not only because of complexity of the simulation model, but also because of the large amount of data, the large number of cases which must be examined, and the number of times the calculations must be repeated as conditions change and data becomes more precise. This project has now reached this stage of development and has a PERT/COST model (PMS/360) operating on the University of Georgia IBM 360/65 computer for investigation and management of costs and activity scheduling. Many of the results of this feasibility study have been obtained through use of this model and it will be used in the future on a continuing basis.

In general the creation of simulation models and computer programs will be for coordinated use both in management and in continuing research and development. It will be carried through three further stages: development of mathematically sophisticated dynamic models of processes and subsystems; interrelating of these processes and subsystems to form a computerized, adaptive, self-improving overall system simulation model; and continuing operational use of this overall system model, both as a management information, data processing, and control system and as a tool in research for continually improving the system itself and all its processes, components, and subsystems.

As a tool in evaluation, the simulation model proceeds with the ability to enter dependent variables while allowing other independent variables to remain constant. In quasi-experimental and experimental manipulations, simulation is carried into reality to test out the feasibility of certain behaviors, methods of technical operations, and student performance behaviors. The simulation also provides a model in which error may occur without any real danger to ongoing systems.

In addition, the creation and operation of the overall system model will aid conceptualization, help to assure consistency and completeness of design and smoothness of operation, enable immediate transferability to other institutions, and facilitate rapid investigation of consequences and implementation of changes due to revised goals, technological breakthroughs, changes in community environment, etc. Some modeling of the environment and some forecasting will also be done, but with emphasis on such practical factors as being prepared to handle children already born or exploring advantages of possible cooperative arrangements rather than on such highly speculative factors as attempting to detail the course of the future or being prepared to utilize likely technological breakthroughs.

The guiding philosophy in these developments will be to increase the power, the flexibility, the rate of improvement, and the stability of operation of the present system as rapidly as possible through gaining and utilizing new knowledge and understanding while simultaneously striving to lower costs through more effective and efficient techniques, better organization and management, and increasing use of cooperative arrangements and automation -- guided always by ultimate human and social goals, cost effectiveness considerations, and a meticulous insistence on an empirical basis for every feature of the system model and a feature of the system model for every important empirical factor.

As the next stage of model design begins to provide viable models of individual processes, new studies will be added to the present cost, allocation, and scheduling investigations and these investigations themselves will be directed toward the outlining of cost-effectivenesses tradeoffs and the formulation of policies. For instance, new studies can begin on the concurrence of the empirically-based portions of various models of the teaching-learning process for design purposes while areas of conflict and omission in these models can be documented for research purposes. Meanwhile, use of the first-stage models can be directed toward outlining cost effectiveness tradeoffs for such alternate processes as paper-and-pencil vs. computer-console evaluation of student performance to aid in formulating policies for the implementation of automation.

As the overall system model becomes operational, studies of interaction effects and system dynamics can begin, both on interactions among components within the system and on interaction of the system with its environment. For instance, within the system there are obvious cost-effectiveness interactions between candidate recruiting procedures, candidate selection criteria, remedial PMs for entering candidates, number of pathways and degree of development of each within the curriculum PMs, elaboration of facilities in remedial clinics, etc. In the environment there are obvious advantages to cooperative arrangements with other institutions in developing and testing PMs, both in combining expert knowledge and in sharing the cost of work or of engaging private contractors where contractors would be more efficient.

In summary, the project will proceed to utilize computers and simulation to their fullest cost-effectiveness potential simultaneously in operation and in research while avoiding both the restrictions and duplications which come from doctrinaire insistence on maintaining an artificial separation between management and research uses of computer simulation models and the omissions and "illusions of adequacy" which come from to little interaction with empirical facts and goals. The fundamental scientific paradigm which has guided development and management thur far has proven itself practical, effective, and economical and has demonstrated itself to be definitely feasible for carrying forth the further development, the implementation, and the sustained operation of the system through creation and use of a computerized overall system simulation model.

Feasibility of Program Evaluation Procedures

The overall framework and guiding principles of any "systems" approach to the planning and management of complex activity necessitates systematic evaluation of program components. Systematic evaluation is an absolute necessity if this approach is to maintain the system in the dynamic state of self-renewal. Decision-making and revision rely directly on collected data as reported by the program evaluation component. The collection, interpretation, and dissemination of information is theoretically justified on this basic point. There exist no theoretical conflicts because the operation and evaluation of all model program activities are formally bonded together in the total systems and management approach.

The technical feasibility of program evaluation procedures was established by identifying the necessary personnel, techniques, and resources for carrying out the program evaluation component. Since all data collected throughout the model program from all sources is stored and available (within certain restrictions) for immediate retrieval, the regular and systematic evaluation and reporting is feasible. Central storage also allows for the special evaluation studies called for in the specifications.

The collection, storage, retrieval, evaluation, and reporting procedures called for in the program evaluation were also judged feasible by the model program staff through the specification and description of each particular activity. Each activity during sustained operation and each event during the development and piloting of program evaluation has been accounted for in the overall PERT network in Volume II. These activities and events have been assigned the necessary resources for their successful operation and completion. They have also been coordinated and integrated with all other activities in the overall instructional program and management system. This careful specification of resources and coordination with other components was checked by key staff and verified by consultants in the field to assure the feasibility of the program evaluation procedures.

To further verify the feasibility of the program evaluation component, operational criteria are used to guide the procedures. To insure continual improvement, evaluation criteria are used to evaluate the program evaluation procedures.

Data processing for program evaluation is well within the capabilities of currently-available hardware and facilities. The entry of data, wherever appropriate, is done directly from recording forms. An optical scanner will eliminate the card-punching step and increase the efficiency, and such a scanner is currently in effective use for entry of student grade reports and other data at the University of Georgia. Technicians at the University of Georgia Computer Center, as well as faculty specialists in data processing, confirming, confirmed that the addition of several remote terminals and the direct connection of an additional optical scanner are definitely feasible at the present time. Current use of computers within the university setting demonstrates the wide flexibility and feasibility of retrieving student information for a variety of reasons. An example of such retrieval currently used at the University of Georgia is in the registration process, where personal data on students is periodically reproduced for immediate use by registration officials. The ability of the computer in adding and deleting information on students is additionally helpful.

The continual study of cost effectiveness in the program evaluation component is feasible because systematic monitoring and/or computer simulation of all subsystems and components is implicit in the overall systems design. The use of PMS/360 (Program Management System) composite computer program to determine the original cost calculations increases the feasibility of cost effectiveness studies. PMS/360 has the capability of providing cosg effectiveness data throughout the development and during sustained operation of the model program.

The feasibility of using computer simulation as a tool for program evaluation at the current time is sufficient, as judged by systems analysts, for beginning the simulation of certain variables within certain components and subsystems. Simulating the variation of entrance requirements, for example, can be done to identify the effects of the variations on rate of progression, percentage of PMs skipped or failed, and other variables. As the simulation within components and subsystems becomes more sophisticated, the interaction between and among components and subsystems can also be simulated. The ultimate goal is to subject the entire project to a simulation model as the project reaches sustained operation. And since a number of simulation models are currently available in education as well as other fields, the feasibility of this approach is assured.

Strategy for the Development of the Evaluation Subsystem

The overall feasibility of the evaluation subsystem of the instructional model in sustained operation has been validated to the satisfaction of the investigators and hopefully to that of the reader. However, this subsystem is still conceptual rather than real. In order to realize full-scale operation available materials must be obtained, equipment procured and new materials must be designed, drafted, tested, revised and piloted. Staff must be selected and trained to carry out the program. All components of the subsystem must be tested for both internal compatibility of modules and effioient interaction within the subsystem as well as among the subsystems. The plan or strategy for moving from the conceptual subsystem to the operational subsystem is therefore as important as validating the feasibility of the conceptual subsystem in sustained operation.

Chapter III presented a broad overview of the strategy for implementing the instructional model into sustained operation. Volume II contains detailed descriptions of the hundreds of activities which have become a part of this strategy along with PERT charts showing the sequence and relationships of events over the five year development period. In this part of Chapter V an attempt is made to provide the reader with a summary and illustrative information specifically concerned with the strategy for implementing the evaluation subsystem into full-scale operation.

Development of the Evaluation Subsystem Implementation Strategy

The first step in developing the strategy for implementation was designing a broad conceptual model to accomplish the mission. This evolved through conference interaction of project directors with specialists in systems design, management and engineering. This overall system was studied and revised. The result of that revision was an increased specificity. For the evaluation subsystem, for example, some single activities from the conceptual model expanded into over fifty activities when the detailed PERT network for the operation was completed. Figures 28 and 29 are PERT networks associated with the evaluation subsystem modified from Volume III of this report to illustrate the complexity of the proposed procedures and the detailed planning which is characteristic of this study.

Figure 28 presents the overall PERT network and the configuration of a typical sequence of evaluation events. To illustrate that sequence, the path of one event is followed. Activity PPD09-18 is entitled Plan and procure personnel, facilities, equipment and material for evaluation of student personnel services. When this activity is completed, it is immediately followed by PPD11-18, Design and draft student personnel services evaluation procedures. These procedures are then coordinated with all other procedures in this part of the network, revise, and begin the testing path. PPT09-16, Plan and procure personnel, facilities, equipment and materials for testing the evaluation of student personnel services is followed by PPT13-15, Test student personnel services evaluation procedures. The sequence ends, in this illustration, with PPT15-02, Coordinate and revise all tested procedures.

Illustrative Development Activities

The designing and costing of the activities for facilities, personnel, equipment, and materials in relation to time factors required considerable staff effort despite expert consultant assistance. For example, each activity shown in the PERT network had to be designed through the conceptualization and development of subactivities. To illustrate the relationships between activities as shown in the PERT networks and subactivities, the specific list of subactivities for activity PET13-03, Test student progress procedures, is used.

1. Retrieve pretest and posttest data on 15 randomly

selected students who have completed a block of at least 10 PMs.

2. Compile data in summary form including profiles of progress and identifying recurring areas of strength and/or difficulty.

3. Deliver accumulative evaluative report to student.

4. Student meets with adviser to discuss accumulative evaluation.

5. Following discussion, student completes reaction form on accumulative evaluation procedures. Adviser also completes an evaluation form of the procedures.

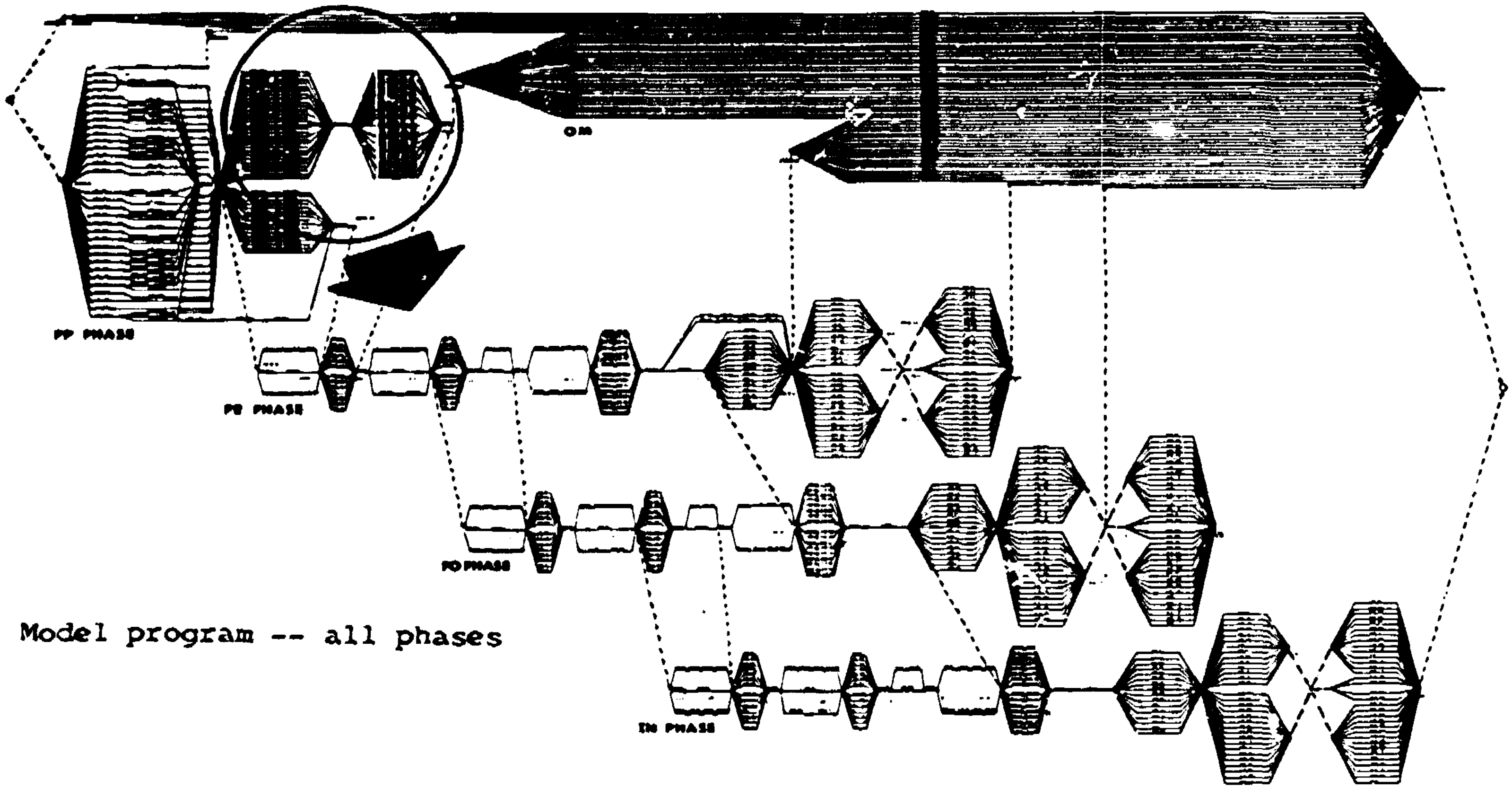
6. Tabulation and analysis of reaction forms from the 15 students and the evaluation forms from the advisers.

7. Interpretation and evaluation of results.

8. Preparation of recommendations for revision of accumulative evaluation procedures.

This list of subactivities has been accounted for in the development strategy by the allocation of resources to the activity. In this case, the information retrieval, time of staff advisers, space needed for advisement, materials needed for reports, development of reaction forms, and other resources were considered in determining the cost and time factors. These resource allocations, by individual activity, were then grouped and tabulated to determine the overall resource needs for this activity in the evaluation subsystem and eventually the entire system.

The resource allocation was recorded on resource estimation sheets, and one of these sheets was completed for each activity appearing in the detailed PERT charts developed during the feasibility study. The activity number was recorded, and the person or team responsible then estimated (with consultant assistance) the resources necessary for completion of that activity. A reference guide listing the most common resources (faculty time, professional services, space, equipment, etc.) and the



Model program -- all phases

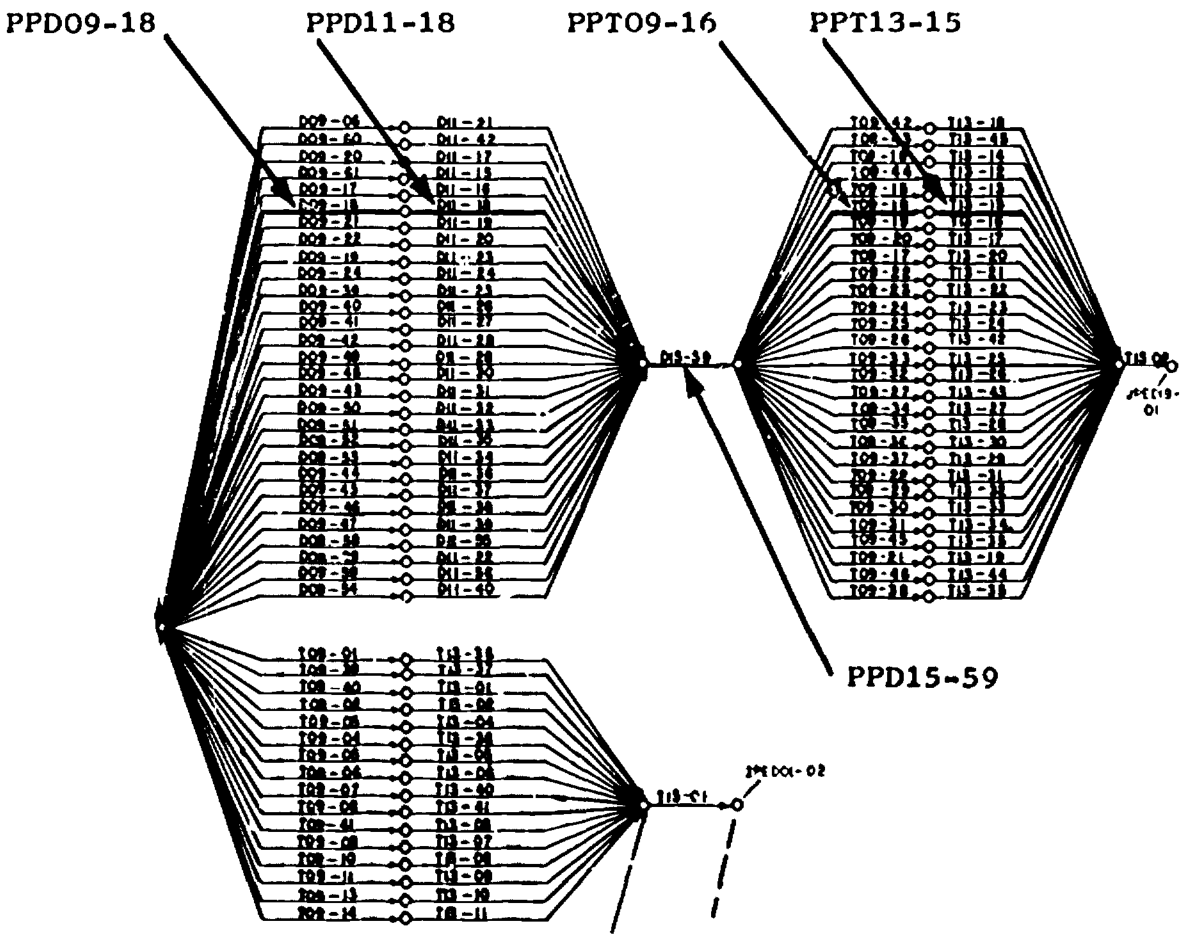


Fig. 28. Typical sequence of evaluation events.

unit costs for these resources was provided. After the subactivities had been conceptualized, the type and amount of resource allocation was determined.

To illustrate this procedure for determining the cost per activity, PED11-17 is used as an example. This activity is entitled Design and draft candidate pretests and posttests and refers to those actions which will produce a pretest and posttest for each of the PMs in the preprofessional phase. Figure 29 shows the relationship of this particular activity to the subnetworks preceding and following this activity. The position of these subnetworks in the overall PERT network is also shown.

The designing and drafting of the candidate pretest and posttest will be done after the PM has been drafted. Since the PM will have designated the content and competencies required for satisfactory completion of the PM, the assessment must coincide with the content and competencies at the level of proficiency stated in the PM. The instructional staff, assisted by a specialist in proficiency assessment, will select and organize the content and competencies to be assessed. A production specialist will assist in setting the format and layout of the assessment forms, and these will be duplicated.

The resources necessary for these tasks are as follows:

One assistant professor	one day
One proficient assessment specialist	two hours
One production specialist	four hours
One graduate assistant	two days
One secretary	one day
One one-man office	one day
One two-man office	two days
One secretarial station	one day

Paper, stencils, duplication materials necessary for pretest and posttest.

When the unit costs for these resources are calculated and summed the total cost for this activity is approximately $300.00. Since there are 90 PMs in the preprofessional phase of the model which require this activity for their development, the total cost for designing and drafting the 90 assessment instruments for this phase is 90 times that sum.

The costs for each of the activities in the evaluation subsystem were determined in this way. The total cost of the model was made up of the costs of the total activities in the subsystems, plus the cost of major equipment utilized in more than one subsystem. Data processing equipment, for example, will be used in storing assessment data as well as scheduling of student PM sequences.

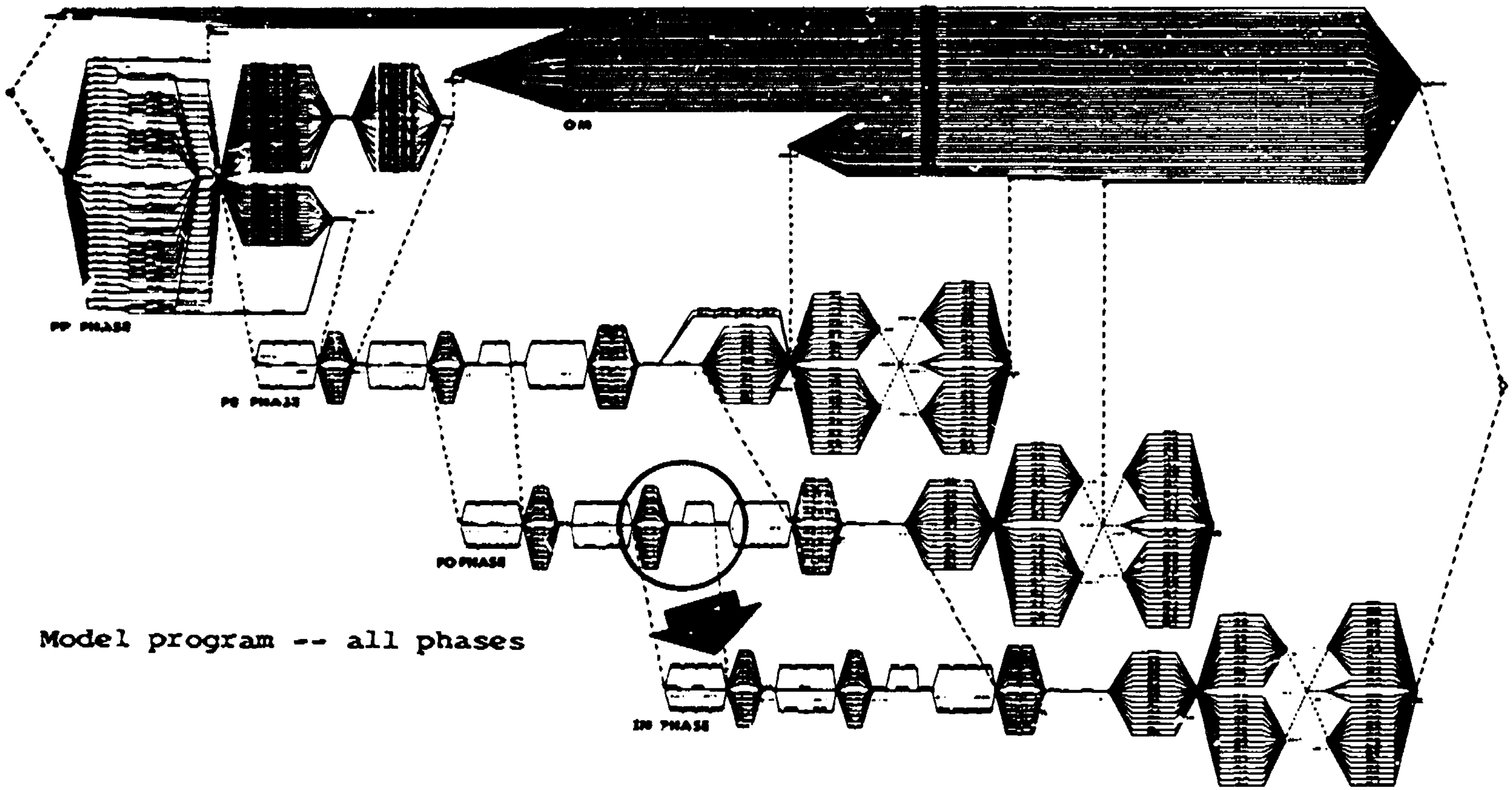
It is recognized that the cost for designing and drafting the assessment instruments for each PM is not likely to be the same (i.e. exactly $300.00 for each). The fluctuations in costs among them, however, will likely cancel themselves over 90 PMs.

During this study a system was developed (Payne, 1969) so that the actual costs for design and development of the assessment measures for a particular PM can be predicted with considerable precision. But such prediction is only possible after the PM itself has been designed. This system for predicting actual costs will be useful in allocating and balancing resources during the development and revision stages of the model.

Illustrative Operational Activities

During the sustained operation of the model, the certain activities specified in the overall activity list and on general PERT charts will be taking place. To illustrate the nature of these activities and the more specific steps which will take place, examples from the candidate selection component are described in this section.

Under activity OM018-19, entitled Operate candidate selection and orientation, the following describes specific



Model program -- all phases

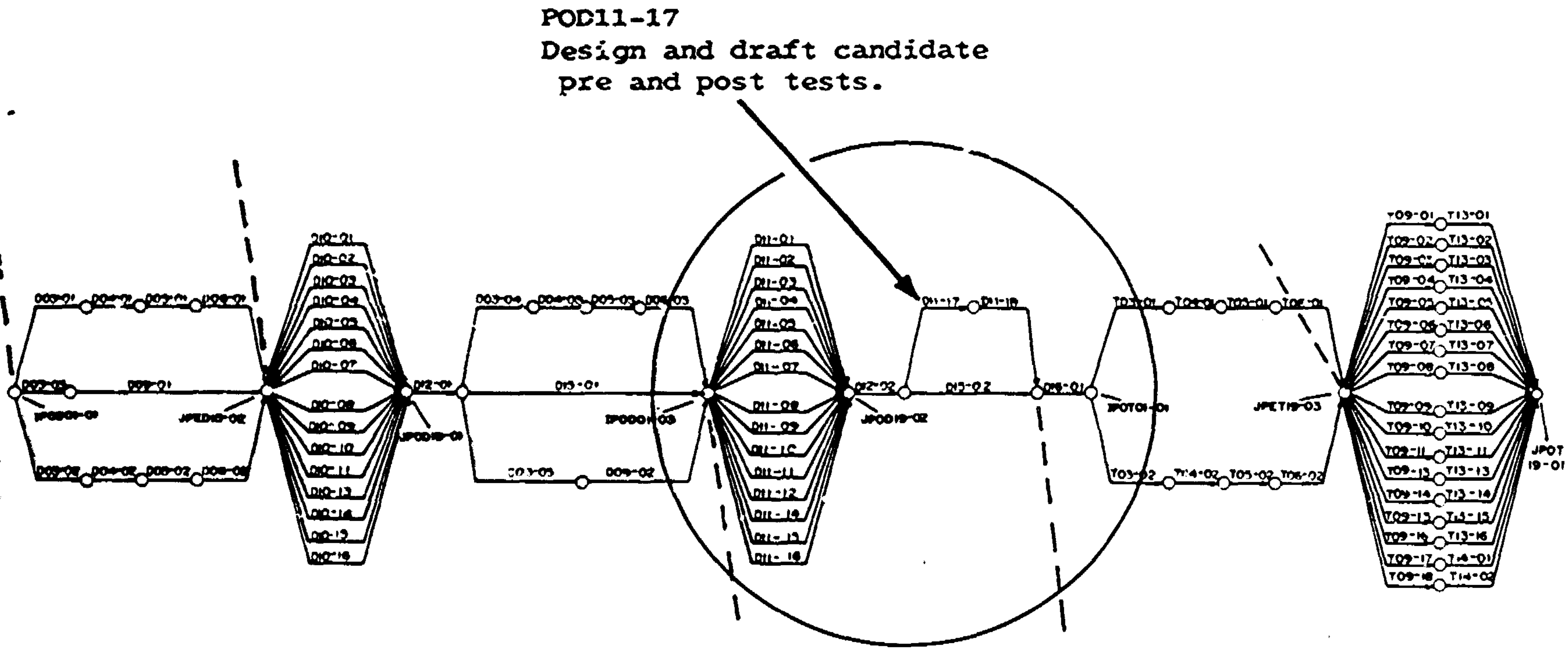


Fig. 29. Activity POD11-17 in relation to the professional phase (PO) and model program PERT networks.

events which will take place.

Recruitment activities will occur within the state on a rotating basis following operational guidelines created during the development phase of the project. The maximum amount of time for one complete site visit encompassing all participating institutions (both secondary and college) should not exceed ten working days. Cycling of site visits includes two to four per year in order to communicate clearly the purposes, methods and procedures of the model program. Decreasing the number of site visits during sustained operation will occur as information dissemination becomes effective in making information available to the general public, participating institutional officers, and to high school students themselves. Figure 30 presents a flow chart of the recruitment-admission processes.

Multi-media information dissemination activities require the revision of the tapes and films designed during development to update content and to include suggested revisions made by participating staff members and audiences. Close approximation of media products to the reality of the model program is an implicit assumption for sustained operation.

Staff time allocation for all participating members of the Candidate Selection Committee may best be seen in the following activities:

1. Participation in site visits.

2. Contribution of ideas and suggestions for media presentations.

3. Appointment to Candidate Review Committee to select new students.

4. Continuous evaluation of psychometric instruments used to review the affective qualities of prospective candidates.

5. Presentation of ideas for replacement of psychometric instruments and the addition of new instruments as needed.

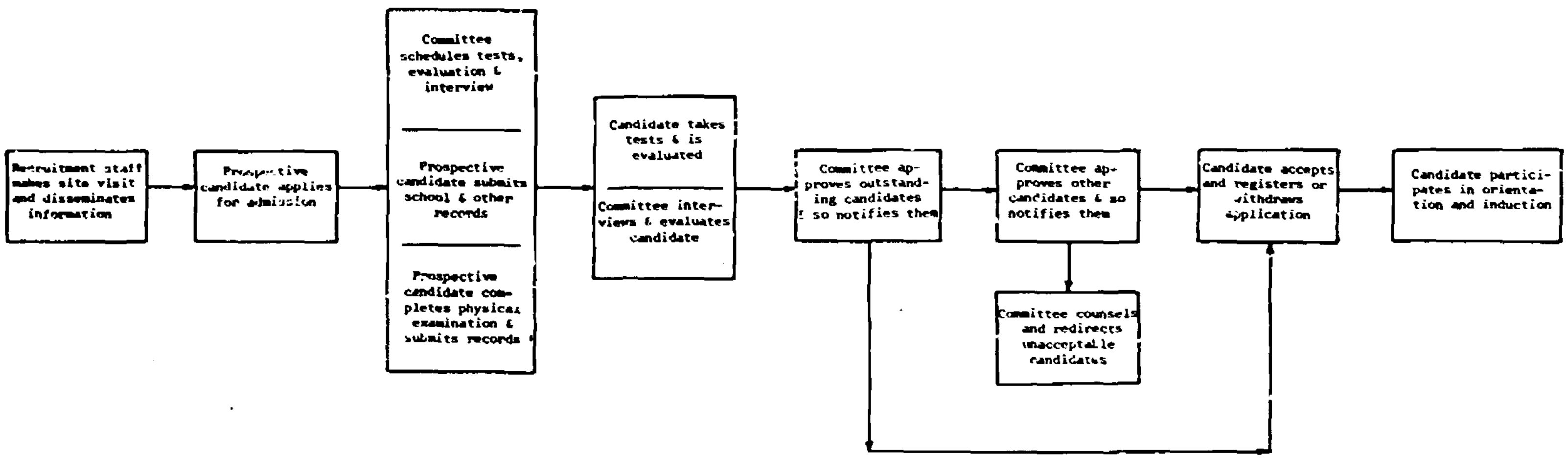


Fig. 30. Flow chart of events in condidote selection components.

6. Review of the process of candidate selection to assign relative weights to the various components of selection. These include test scores from previously attended insitutions, recommendation to the program of a prospective candidate by the principal, the personal interview, and candidate personal interview criteria. A scale will be devised for this purpose.

7. Instructional and advisement duties as related to proficiency modules and student advisers.

8. Receiving feedback from currently enrolled students to determine whether recruitment procedures accurately reflect the overall procedures of the Model Program.

9. Continuous updating and revision of candidate selection procedures.

10. Participation in regular staff meetings.

11. Consulting opportunities with other institutions which are in research and development activities for their own candidate selection procedures.

Participating members of the Candidate Review Committee charged with the responsibility of selecting model program students should enjoin one sixth time for those responsibilities directly involved with the mechanics of actual selection. Site visit team members who are also a part of candidate review should enjoin one quarter time aside from instructional duties. Continuous processes of review will be accomplished by all members of the instructional faculty and require no predetermined time to be reserved, except as the program requires periodic meeting.

Rotating schedules of participation as a member of recruitment and candidate review will be determined on a yearly basis. In all cases, no less than two members of the review committee will be old members, assisting in continuity of the procedures.

A further task accomplished during sustained operation will be evaluation of the admissions process by level of entrance into the model program. This task specifies therefore the methods of attracting students to the following levels: teacher's aide, teaching assistant, general elementary teacher, and specialist. Selection procedures common to all levels will be examined collectively. Procedures indigenous only to a specific level will be evaluated separately. Such methods may include: evaluation of the predictive data of successful candidates who have been graduated from the institution; feedback obtained from candidates themselves immediately after admission and then at the end of their program to test differences in the perception of the process; scrutiny of admissions policies of other institutions offering elementary teacher education curricula.

Summary

This chapter is a basic report of an investigation into the feasibility of the subsystem for evaluation of the model program during development and operation. The major components of this subsystem which were studied are candidate selection, the evaluation of candidate performance, and overall program evaluation. The feasibility of these evaluation procedures was validated through the careful conceptualization of these procedures in the systems design of the model program and through discussions with appropriate officials at the University of Georgia. Officials at other institutions and specialists in the field were also consulted. Study of selected literature and research findings, cost estimation, and various other procedures were employed to validate the feasibility of the evaluation subsystem.

Upon completion of these studies, the evaluation subsystem has been judged to be feasible for development and implementation of the model program at the University of Georgia. The procedures used in determining this feasibility can be used at other universities outside of the State of Georgia as well.

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Chapter VI

Feasibility of the Management Subsystem Components

J. B. Ayers and G. F. Shearron

The purpose of the management subsystem is primarily one of facilitating the operation of the instruction and evaluation subsystems already described. That is, the components of either the instruction or evaluation subsystems no matter how theoretically sound and practically designed cannot function effectively unless the management subsystem provides the vehicles by which their objectives may be met. Thus, the management subsystem focuses concern on necessary modifications in university procedures, staff organization, control of project functions, and the allocation, control and accounting of all resources.

The task of investigating the feasibility of the components of the management subsystem is twofold. On the one hand is concern for the feasibility of the instructional program in sustained operation and on the other hand is concern for the feasibility of the five year strategy designed to implement the model into a program in sustained operation.

The investigation of the feasibility of the management subsystem began with an examination of the specifications. While they were sufficient to provide the conceptual model, numerous details of concern necessary to validating the feasibility of the model were required. For example, the original specifications called for the abolishment of the conventional grading system but no steps had been taken to determine whether this could be done, and if so how it would be accomplished. Specifications also called for year-round education or the discontinuance of quarters and semesters, individualized instruction with an effective scheduling system, monthly or staggered registration, portal schools collaborating efforts with the university, a staff organization radically different from tradition, and a systems approach to management. These were regarded as desirable specifications, but they had not been validated or examined sufficiently at the time the model of the instructional program was presented to be regarded as feasible. It is the purpose of this chapter to supply the details and provide evidence of the feasibility specifications for the administration and organization of the model as regards its functioning during the sustained operation of the instructional program, and to describe what are regarded as feasible activities designed to implement the model program into operation.

Organization and Administration during Sustained Operation

This discussion of the organization and administration of the model program in sustained operation is concerned with institutional change, management systems, scheduling technology, and mutual arrangements with other professional agencies.

Institutional Change

For the model program to be successfully developed and implemented numerous changes in policies and procedures will have to take place in most university settings as the specifications for the operation of the model program are new to most college campuses. Thus, the administration must be made aware of these specifications and the benefits to be accrued by the institution if they are implemented. Also of importance to institutional change are the specific changes that must be made in the legal and administrative organization of the institution. Specific areas of concern include: orientation of faculty and administration to the new methods of operation (see Chapter IV), year-round education, staggered registration, tuition, credits, grades, student activities, scholarships, student housing, relations with public school districts, certification and accreditation.

Year-round education. The model program encourages institutions of higher learning to be operative 12 months a year. With this program there is no need for semesters, quarters, summer vacations or spring recesses. Such a plan obviously provides for more continuous use of the student's time. It will also provide for increased utilization of the professional staff, many of whom are "vacationed" 3 months out of the year. Similarly, physical facilities and materials which are partially used at times and overloaded at others will be provided more uniform attention with considerable savings.

Year-round education with individualized instruction will also provide in other ways for the conservation of human resources. For example, the capable student with limited financial assistance might well be able to keep a part-time job and continue learning activities through what are now lengthy vacation periods, and the student who loses 6 weeks through illness will be able to resume his responsibilities without the serious losses which are evident under the conventional semester or quarter system.

The University of Georgia presently operates on a four quarter basis with the usual recesses. Discussions with administrators at the University of Georgia have led to the conclusion that no problems are likely to develop in extending the University's present program to meet the needs of the model program. It seems therefore feasible that other institutions would be able to adopt a year-round schedule for operation of the model program.

Staggered registration. Each fall, winter, spring, and summer long lines of students are seen on campuses across the nation waiting to enroll in colleges and universities. Thousands of students must be registered, advised, enrolled, and accounted for all at once. They must be processed through dormitories, lunch rooms, clinics, book stores and ticket desks. The efforts of all administrative, instructional, technical, and clerical personnel are extended long hours in preparation for the event. Technological equipment from pencils and typewriters to calculators and computers are all required on an overload basis. The University of Georgia is no exception to this rule.

The model program is designed to encourage the practice of staggered registration. That is, insofar as enrollment in the model elementary teacher preparation program is concerned, registration of beginning students could take place whenever a suitable number (for example, 25 to 30) were ready and facilities were available. Specifications require that registration take place monthly. Thereafter, each student will enroll in the next PM block as soon as he has completed the prerequisites.

Discussions with the registrar of the University of Georgia have led to the conclusion that staggered registration is feasible for the model program since it is already policy to permit students seeking credit for independent study to enroll on any desired date and complete the enrollment when course requirements have been satisfied. A more complete discussion of the aspects of scheduling are discussed later in this chapter.

Tuition. At present most students at colleges and universities are assessed a fixed charge for tuition and other fees. For example, a full-time student at the University of Georgia is required to pay a maintenance fee quarterly. In addition, he is assessed fees for student activities, student athletics and health. If the student is a nonresident of Georgia, he must pay additional fee. If a student takes less than a full lo (less than 12 quarter hours of credit) he is assessed a fee based on the number of quarter hours of credit for which he is registered.

The model program as modified by its feasibility investigation will require each student to pay a fixed charge each quarter plus an amount for each PM that he undertakes. The amount assessed for each PM will be based on the complexity of the work in terms of time, materials and equipment required. For example, a PM that requires considerable use of computer assisted instruction will probably cost the student more than one which requires less costly materials and equipment. The fees to be paid by each student will be established during the initial operation phase of the model program.

It is assumed that all students will pay the usual student activities, student athletics and health fees on a quarterly basis. If a student is a non-resident of the state, he will pay any additional fees on a quarterly basis as set by the laws of the state.

Special dispensation will be made for students enrolled in the on-the-job track of the model program. In this case the student will pay a fixed charge each quarter proportional to the overall amount of credit for which he is registered, plus the charges fixed for each PM.

Based on consultation with the registrar of the University of Georgia, this plan is feasible. However, during the development and initial operation phases of the program more detailed plans must be made for implementing the fee system through the Vice President for Business and Finance.

Credits. The model program proposes that the normal system of credits in terms of quarter or semester hours be abolished. However, in order to account for students who find it necessary to transfer to other schools or universities and to account for problems associated with election to honor societies and graduation with honors it is necessary to establish a basis for credit.

The feasibility investigation led to the development of the Student Effort Unit (EU) system for establishing credit. An EU is defined as a quantitative approximation of the amount of effort required of an average student to acquire a defined set of specific behaviors. The total number of EUs in the model program is 3,000. Of this total the first 1,000 EUs represent the preprofessional phase, the next 1,000 EUs the specialist phase. Table 4 shows the specifications for the distribution of EUs among areas of study and types of PMs by instructional program phases. The equivalents for an EU are defined as follows:

1 EU = 2 clock hours of effort

10 EUs = 1 quarter hour of credit

15 EUs = 1 week of effort (30-45 hours)

150 EUs = 1 academic quarter (10 weeks of work or 15 quarter hours of credit).

In turn this system can be converted to a semester hour equivalent by multiplying by a factor of 2/3. That is 10 EUs = 1 qtr. hr. = 2/3 semester hour.

The proposed system of credits will allow for the computation of a grade point average if desired for each student. This is more fully explained under the section entitled Grades.

Table 4

Student Effort Unit Distribution

	Prepro-fessional	Professional		Specialist				
	A	B	C	D	E	F	G	H
Language Arts	200	50	(300)	0	(500)	(50)	(50)	Undetermined because Type H PMs are individually prepared by the student in conference with his advisor. Type H PMs may be substituted for Types D, E, F and G upon advisor's approval.
Social Science	200	50	(300)	0	(500)	(50)	(50)	
Natural Sciences	200	50	(300)	0	(500)	(50)	(50)	
Mathematics	100	50	(300)	0	(500)	(50)	(50)	
Fine Arts--Art	50	25	(300)	0	(500)	(50)	(50)	
Fine Arts--Music	50	25	(300)	0	(500)	(50)	(50)	
Foreign Language--Spanish	0	0	(300)	0	(500)	(50)	(50)	
Foreign Language--French	0	0	(300)	0	(500)	(50)	(50)	
Foreign Language--German	0	0	(300)	0	(500)	(50)	(50)	
Health, Safety, and P.E.	100	0	(300)	0	(500)	(50)	(50)	
Gen. Paraprof. & Prof. Educ.	100	300	0	0	0	0	0	
Internship	0	150	0	0	0	0	0	
Human Devel. & Learning	0	0	0	50	(500)	(50)	(50)	
Instructional Media	0	0	0	100	(500)	(50)	(50)	
Pupil Personnel Serv.	0	0	0	0	(500)	(50)	(50)	
Prof. Dev. & Curr. Plan.	0	0	0	100	(500)	(50)	(50)	
School-Community Coordination	0	0	0	0	(500)	(50)	(50)	
Evaluation	0	0	0	100	(500)	(50)	(50)	
Social Foundations	0	0	0	50	0	(50)	0	
Sub Total	1,000	700	300	400	500	50	50	Undetermined
Total By Phases	1,000	1,000		1,000				

The administration of the University of Georgia has indicated that this plan for credit is within the legal framework of the University and can be adopted on a trial basis during the initial operation of the program. Adoption of this system of credit on a trial basis will require approval by the University of Georgia Curriculum Committee. Preliminary investigation suggests that this approval can be obtained.

Grades. The model program requires that the standard letter grading system be abolished. Under the model program students are judged to have completed a PM or block of PMs when they have satisfactorily exhibited the behavioral specifications set forth for that portion of the requirements. Therefore, each student must exhibit all of the behavioral specifications of a particular block before he is allowed to proceed to the next. In order to graduate and be certified at any one of the three career sequence levels he must have satisfactorily exhibited all of the behavior specifications assigned to that level.

The model program grading system is based on a pass or fail. If a student fails to complete all behavioral specifications of a PM or block of PMs the first time he undertakes the work, he will be allowed to repeat the work a second time in order to meet the minimum behavioral specifications. If after clinical assistance and advisement a student fails to exhibit the desired behavioral specifications after attempting a PM or block of PMs a second time his case will be critically reviewed by the staff with a view toward redirecting him into another program more suitable for him. If a student does outstanding work in a particular PM he will be assigned a grade of Pass with Honor. The criteria for a grade of Pass or Pass with Honor will be established for each individual PM jointly by the developers of the PM and the instructor of the PM. Adoption of this system will allow flexibility in judging the competency of each student in relation to other students. This will further allow for distinction to be made at graduation, that is graduation with honors, and also for election to honor societies.

For accounting and credit purposes a number will be assigned to each level of grading. A Pass with Honor will carry a numerical value of 2.0, a Pass a value of 1.0 and a fail a value of 0.0. Calculation of a grade point average will be accomplished by standard procedures such as those outlined by the University of Georgia (University of Georgia Catalog, 1969, pp. 31-2). The highest possible grade point average is 2.0.

In order to establish the feasibility of the grading system proposed for the model, a survey was made of student opinion. During October, 1969, an informal survey was made of 176 juniors, seniors and beginning graduate students enrolled in courses in the College of Education at the University of Georgia. These students were asked to indicate a preference for either the present grading system (A, B, C, etc.) or the system proposed for the model program. A total of 125 or approximately 70% of the students indicated a preference for the model program system of grading. It can be concluded that the majority of potential students for the model program will accept the grading system.

In order to validate the legal feasibility for this grading system discussions were held with the Registrar and the Vice President for Instruction of the University of Georgia. Both agree that the grading system is feasible and will be adopted on an experimental basis by the University of Georgia Curriculum Committee.

Student activities. Students in the model program will pursue student activities as outlined by the college or university in which they are enrolled. Student activities dependent on grade averages (see Grades) will be handled in the manner prescribed by the institution. No special provisions are made for student activities under the model program.

Discussions with the University of Georgia administration have led to the conclusion that the model program is feasible with regard to student activities, and that these matters should be handled by the institution.

Scholarships. Scholarships for students enrolled in the model program may be handled by the college or university in the manner set forth in its rules and regulations. No special provisions are necessary in the model program for scholarships.

Discussions with the University of Georgia administration have led to the conclusion that the model program is feasible with regard to scholarships and that these matters can easily be handled by the college administering the program without change in policy.

Housing. The model program encourages institutions to be operative 12 months a year and to pursue staggered registration. In addition, the program requires that students pursuing the program full-time alternate between work on campus and practical laboratory experiences in public schools (Johnson et al., 1968, pp. 185-228). These requirements necessitate students moving in and out of dormitories at irregular intervals and also locating housing in the community in which they will perform their professional laboratory experiences.

The two major concerns of housing are for on-campus housing or community housing while the student is pursuing work on campus and for off-campus housing while students are pursuing their paraprofessional and professional laboratory and internship experiences. After discussions with the Director of Housing at the University of Georgia it has been concluded that it is feasible for students to live in University owned housing as needed for their on-campus phase of the model program. Because of the need for holding rooms vacant for students entering the program at staggered times and also relocating on-campus at irregular intervals it appears that it will be necessary to increase room rent about 25% over present costs. This is still lower than for comparable off-campus housing.

Placing elementary education students in schools for their professional laboratory experiences requires that housing facilities for these students be made available during their five and ten week stays in the centers. Again after discussion with the University of Georgia Housing Director it does not appear feasible for the on-campus Housing Office to handle these arrangements.

From experience with student teachers and from a concerted effort to identify housing that is available in the areas of Metropolitan Atlanta, Gainesville and Richmond County, Georgia, it is known that adequate housing for individuals desiring a short term arrangement of five or ten weeks is not available.

During the development phase of the model program it appears feasible that arrangements for the provision of adequate housing facilities will be secured through the avenues of block lease agreements with apartment owners or through agreements to lease dormitories newly constructed specifically for the purpose of housing these students. Such arrangements must be made by the Board of Regents of the University System of Georgia which has endorsed the model program and offered its cooperation. It is believed, therefore, that such arrangements as necessary can be facilitated.

The University of Georgia Director of Housing has indicated that student costs for housing in such arrangements may be somewhat higher than comparable on-campus housing. However, these costs will be borne by students and not absorbed by the model program.

Living in University sponsored housing in the centers will be required of all students for the purposes of accommodating such arrangements and providing appropriate counseling and supervision of these off-campus students.

Public school districts. The model program requires close cooperation between various public school districts and the college in which the model is implemented. There is a need for contractual arrangements between the college and the various cooperating school systems. A precedent for such arrangements has been established. The Board of Regents of the University System of Georgia has for a decade contracted on a yearly basis with the Clarke County (Georgia) Board of Education to pay an annual sum for the College of Education of the University of Georgia to utilize Clarke County's public school classrooms as professional laboratory facilities.

During the development phase of the model program contractual arrangements will be finalized for facilities and other resources, amount and method of payment for services of laboratory sponsoring teachers and clinical instructors and training of these personnel, as well as arrangements for joint appointments or appointment of public school personnel as professors.

There is a need to clearly identify the legal status of the elementary education students while they participate in professional laboratory experiences in public schools. During the development phases of the model program efforts will be made to arrange for legislative and State Department of Education action which will clarify this matter. It is deemed vital to the success of the model program that participating elementary education students be able to function in professional laboratory experience classrooms free from inordinate threat of lawsuits and with the opportunity to grow professionally without the physical presence of the laboratory sponsoring teacher or the laboratory clinical instructor.

Consultation with administrative and legal staff of the University of Georgia and with school districts presently cooperating with the University in providing laboratory facilities indicates that these legal concerns are feasible and necessary for the development and operation of the model program.

Teacher corps. The University of Georgia, College of Education and Atlanta Public Schools are cooperatively sponsoring a racially integrated Teacher Corps program. The candidates for the program have a college degree in some field, such as arts or science, but lack professional education and inservice training. Two full years of work and study are necessary to complete the program requirements. The first year program consists of two phases, the preservice preparation program and the inservice program. During the preservice programs the interns live the life of students, and earn 16 quarter hours of academic credit in sociology, psychology, and curriculum. During the inservice phase of the program, Teacher Corps interns work in the schools in the morning and attend late afternoon classes. A full summer quarter's academic load and second year of internship in the Atlanta Public Schools complete the second year of the program and the academic requirements of the Master of Education degree.

The University of Georgia Teacher Corps project, based in Atlanta inner-city schools, has had impact on the model and the feasibility study. For example, Teacher Corps interns have evaluated and reacted to selected specifications from the specialist phase of the model. To determine the feasibility of the provision for local responsiveness, the interns have expanded the "local conditions" specifications into details and suggestions for gaining competencies.

The Teacher Corps programs are viewed as special applications of the model, and are expected to serve in this special capacity during piloting of PMs and throughout the development of the overall project. The administrative and instructional agreements between Teacher Corps and the Division of Elementary Education already exist to expedite a close and direct relationship. The Atlanta project will serve as a special-purpose site for the testing and modification of selected professional and specialist PMs since Teacher Corps projects are dedicated to the encouragement of institutional change.

Certification. The model program's effort to define the job of the teacher began with the establishment of goals and objectives for the elementary school (Johnson, et. al., 1968, pp. 253-69). From these, pupil learning behaviors and teacher teaching behaviors were derived. Teacher teaching behaviors were categorized into paraprofessional tasks and professional tasks. An examination of these tasks revealed that different competencies were required and these differences led to job classifications.

Both the teacher pool and the analysis of the job of the teacher suggested the need for a career development sequence for teachers. Therefore, the position of the model program is that such a pattern would necessitate four categories of teaching personnel: aide, teaching assistant, teacher with an area of competency, and specialist (Johnson, et al., 1968, pp. 231-49). For these four categories of teachers to effectively function in the schools, they must be certified by the State Department of Education.

At present certification is provided by the Georgia State Department of Education for teachers holding a bachelor's degree or higher. There are three certificates, one each for teaching target age groups of 4 to 9 years, 6 to 12 years and 9 to 12 years. These would correspond in the model program to the teacher with an area of competency or to a specialist.

The Georgia State Department of Education was consulted by the Chairman, Division of Elementary Education with regard to certification, not only for these new career levels of school personnel, but also with regard to overall certification of the model program for the preparation of teachers. The State Department of Education has agreed to certify the model program on an "experimental basis." Therefore, it appears feasible that model program graduates will be certified. It seems reasonable to assume that similar provisional or experimental certification for the model program can be obtained from any State Department of Education.

Accreditation. The teacher education programs at the University of Georgia are accredited by two agencies. The National Council for the Accreditation of Teacher Education (NCATE) directly accredits the program of teacher education. Indirectly the program is accredited as part of the overall University accreditation by the Southern Association of Colleges and Schools (SACS).

In February, 1968, the Faculty Executive Committee of the College of Education at the University of Georgia accepted an invitation from the American Association of Colleges for Teacher Education (AACTE) to be one of eight representative institutions to participate in the AACTE/NCATE Feasibility Project for the purposes of testing a new proposed set of accreditation standards and also seeking accreditation of the teacher education programs by NCATE.

As a result of an intensive self-study made by the faculty of the College of Education from March 1 through November 1, 1968 a site visit by teams representing AACTE and NCATE in February, 1969, the teacher education program of the College of Education was accredited for a ten year period (Institutional Report Vol. I, Vol. II, Vol. IIIA & Vol. IIIB, 1968).

The accreditation team recommended certain changes in the elementary teacher program at the University of Georgia (NCATE Report, 1969). A review of the model program indicates that it satisfies the standards of NCATE and that all of the recommendations of the team had been included in the model program. Therefore, it is anticipated that no problems will arise during the next accreditation which will take place in 1978, well after the model program is in sustained operation. It also seems reasonable that the program would be accredited if it were placed in operation in another college.

Accreditation of the model program by SACS is also feasible. According to SACS (Standards of the College, 1968, p. 7), the educational program must be clearly related to the purposes of the institution. This relationship between purposes and program must be demonstrated in policies of admission, content of curricula, requirements for graduation, instructional methods and procedures, and quality of work required of the students.

The model program meets these criteria. Further, "The Commission encourages member institutions to conduct experimental programs." (Standards of the College, 1968, p. 5). In order that the model program be recognized by SACS, the President of the University must submit the program to the Executive Council of the Commission (Standards of the College, 1968, p. 5).

Management

Specifications for the administrative organization of the model program were originally specified by Johnson, et al. (1968, pp. 210-222). However, after consultation with experts in the field of management a modified system for management of the model program was developed. This management system is centered on the assumption that the model program functions should be the basis for determining the administrative organization that will implement and sustain the program. Persons who have achieved professional status for their high level of academic or professional competency will focus their attention on their area of specialization. Persons trained in business will be employed for nonacademic types of managerial activities.

The management component of the Organization and Management subsystem consists of the model program's relationship to the University of Georgia and to the political structure of the State of Georgia. The state legislature and executive branch are the final authority for all branches of state government, including tax supported public institutions. The Board of Regents, appointed by the governor and confirmed by the legislature, exercises control over all public higher education in the state. Control from the Regents to the University is depicted in Figure 31.

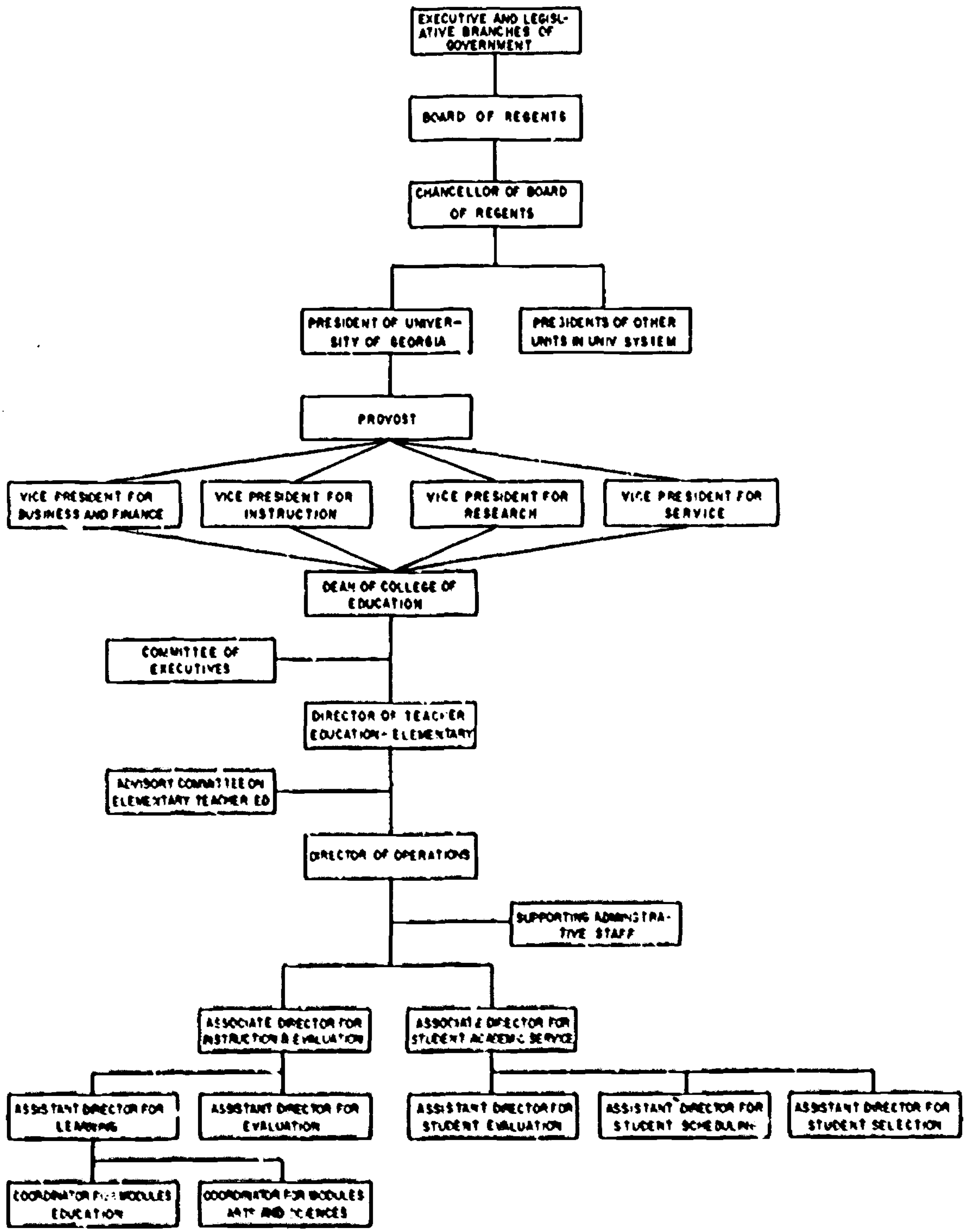


Fig. 31. Administrative structure in relation to the University of Georgia and to the State of Georgia.

Figure 31 also provides information on the line staff organization of the University of Georgia and the position the College of Education occupies in this framework. The Dean of the College of Education is responsible for all activities within the College. The model program is a part of the total program. Advising the Dean is the Faculty Executive Committee made up of associate deans, division chairmen, outside consultants, members of the State Department of Education, and representatives of other institutions using the model program. The function of this committee will be to review the progress of the model program and make policy recommendations.

The Director of Teacher Education - Elementary (currently called Chairman, Division of Elementary Education) will be the chief executive officer of the model program and will exercise budgetary and policy making control of the total operation. Advising the Director will be a committee made up equally of students, public school teachers, and personnel representing the model program staff. The Director will appoint a Director of Project Operations who will handle the day-by-day operation of the development, piloting and implementation phases of the project. The Director of Project Operations will report directly to the Director of Teacher Education - Elementary.

A supporting staff including systems analysts, cost accountants, and additional supporting personnel will provide the technical expertise necessary to develop the feedback model and control costs. The Director of Project Operations will head this staff.

Job descriptions for the additional positions on Figure 31 are found in Volume III, pages 11-51. The two major divisions in the management subsystem are instruction and evaluation, and student services. This appears to be the most logical way to separate staff functions. However, overlapping will necessitate the establishment of close working relationships between the two divisions.

The division on instruction and evaluation will be responsible for the continuous development and evaluation of all student learning experiences. The success of the model program depends upon the evaluation of students and programs in such a way that it will provide the feedback necessary for continuing program improvement. The competencies to be developed in the instructional program are also the basis for evaluation. Therefore, these elements cannot be separated.

The program's division on student services deals with selection, scheduling and counseling of students. In this division students are brought into the model program, scheduled for their learning experiences, and counseled and guided as a result of the continuous evaluation of students in the instructional program.

In addition to personnel, the management component of the model program will be responsible for the management of all facilities connected with the project. In order to ascertain feasibility a study was made of the facilities available to the College of Education at the University of Georgia (Ayers, 1969c). Based on this study it has been concluded that adequate facilities for carrying out the development and operation of the model program will be available. On January 1, 1971 the College of Education will move into two new buildings. These structures will provide the majority of the special facilities required for conducting the program; for examples: closed circuit television, a language laboratory, special observation facilities, testing rooms, science laboratories, adequate administrative offices, and facilities for remote computer terminals.

The management component through utilization of the scheduling component will control all facilities on a one-to-one basis. Scheduling of all facilities will be continuously controlled, i.e., a student will not be assigned to a classroom or other facility unless a work space is available.

The management component as described is the result of work by the model feasibility staff and its management consultants. The legal structure in the State of Georgia will not change nor will the present total University administrative organization. There will, however, be significant changes within the College of Education. The departmental structure now used in the Division of Elementary Education will be replaced by the management subsystem detailed above which has the approval of the Dean of the College of Education and a Committee of Deans appointed by the President of the University of Georgia to implement the model program. This committee includes the Deans of Education, Arts and Sciences, and Business. The Vice President for Instruction, the Provost and the President have also approved.

Scheduling

An investigation was made in order to determine the feasibility of the scheduling of all aspects of the model program. This investigation was made by a series of discussions with experts in the fields of computer technology and systems analysis.

The primary concern of the scheduling component of the model program is the student. The academic time schedule should be arranged so that a student is permitted to begin a new area of learning whenever he is ready to do so. In addition allowance should be made in the time schedule and course load requirements of the program for individual differences among qualified students in their potential, rates of learning, health and physical stamina, financial resources, and other such variables. Finally, all students should be provided equal opportunity to receive high quality instruction (Johnson, et. al., 1968, p. 189).

The basic conclusion of this investigation was that a manually oriented filing system would severely limit the number of students the system could handle. Therefore, a computer oriented filing system is a mandatory requirement to handle the relatively large number of students (approximately 1500), (Ayers, 1969b) that are likely to be passing through the model program by the time it reaches sustained operation.

The system of scheduling for the model program is basically one of establishing and maintaining a computer storage filing system on the progress of each student, the status and capabilities of faculty and staff, and the status of physical space and equipment. Students in the model program will be handled on a distributed basis; therefore the filing system must be capable of continuous daily up-dating and access.

The system described in the following paragraphs is based on the assumption of continuous up-dating and access. The assumption has been made that the system will be implemented at the University of Georgia using existing computer hardware. This system can be implemented on an IBM 360/65 computer with remote terminals. Comparable computer equipment such as the Univac 9200 could also be used. Software required for this scheduling system must be developed.

Program and file description. Six basic programs will be required for this scheduling system. These programs are: (1) file maintenance (one for each file program), (2) testing program, (3) evaluation program, (4) scheduling program (5) miscellaneous reporting programs and (6) master internal central program. These six basic programs supplemented by other programs will operate the system.

The filing system of the operation will require eight basic files. Each file in the system will contain two types of basic information: (1) identifying, background, and performance history data, and (2) current status data. The eight basic files are discussed in the following paragraphs:

1. The student record file will contain one record for each student in the system. A record will contain, in addition to technical data, other information relating to his chosen curriculum, performance history and current assignment, and review schedule. The record will be updated

for every testing and new assignment period. Figure 32 depicts the relationship of the student record file during testing. The relationships of this file to other aspects of the system is shown in the figures which follow.

2. The testing decision tables will be used to assist in the testing of a student at an assigned review period. The tables will be developed by the faculty and updated as information is fed back from the field via a reviewing group. Conceptually they can be visualized as two column tables: assigned task versus examination question or performance request.

   The student will report to the system via a remote terminal at an assigned review period. The testing program would assess his student record to determine his last assignment and issue test questions versus performance inventory per the testing decision table. Figure 33 shows file relationships in the testing program.

3. The evaluation decision tables will be used to assist in evaluating a student's performance in a test. The tables will be developed and maintained by the faculty and staff, using feed-back information from the field. The tables will consist of questions or reported actions versus acceptable response columns.

   The student and/or assigned faculty member would report test responses via remote terminals and the program per the evaluation decision tables would evaluate the student's response. Figure 34 shows file relationships in the evaluation program.

4. The scheduling decision tables will be two column tables of chosen curriculum and performance data versus new assignment alternatives. The scheduling program using the decision table information as a base can build a CPM network or linear programming matrix with faculty, space, and equipment restrictions supplied by the appropriate files to determine in an "optimum" sense the student's next assignment. Figure 35 shows file relationships in

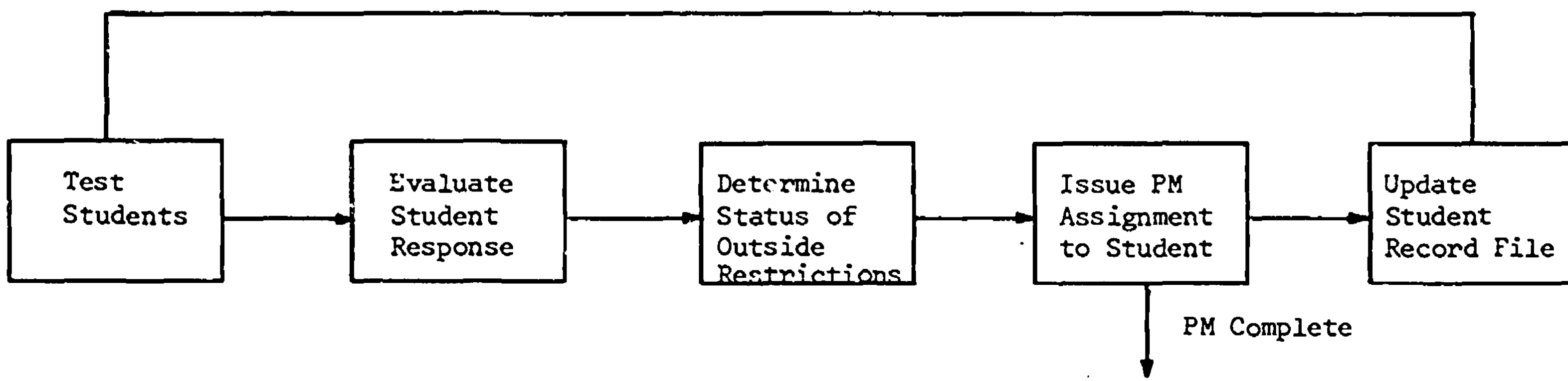


Fig. 32. Student record file flow for testing through file updating.

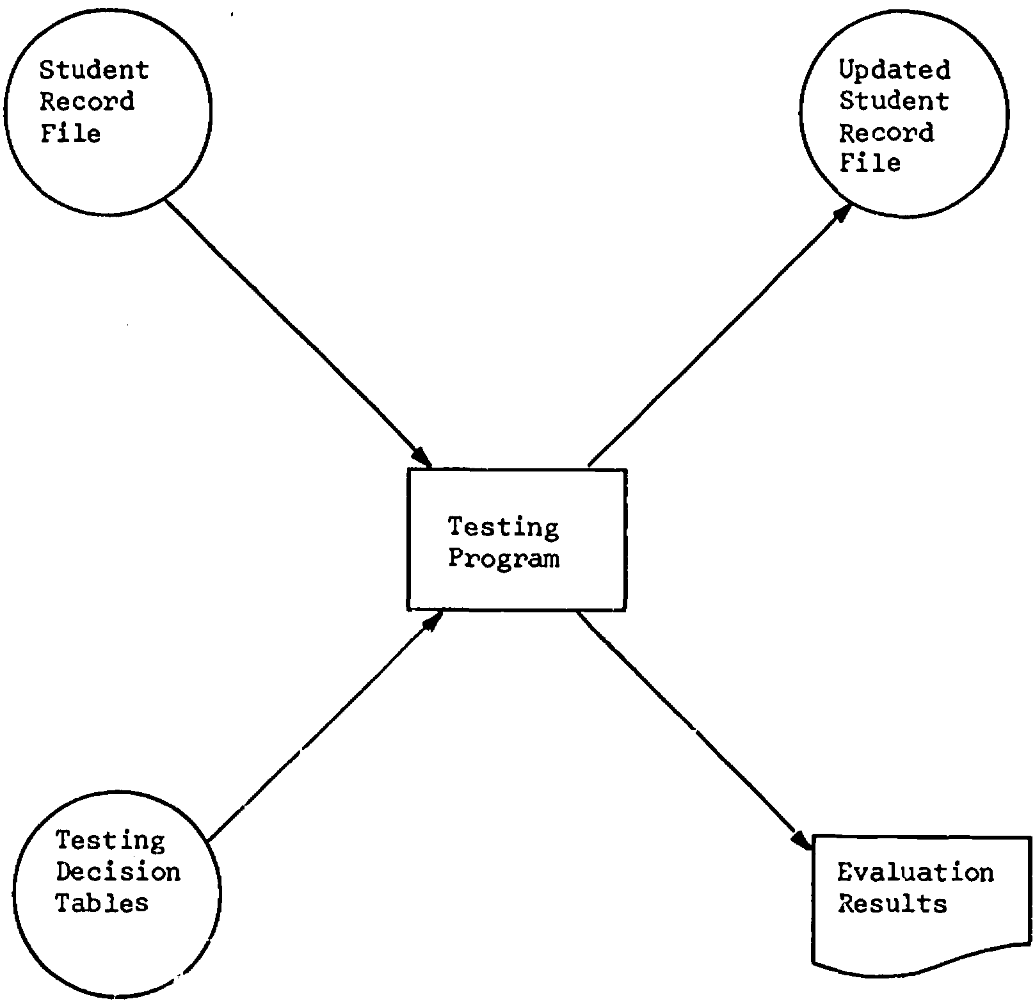


Fig. 33. File relationships in the testing program.

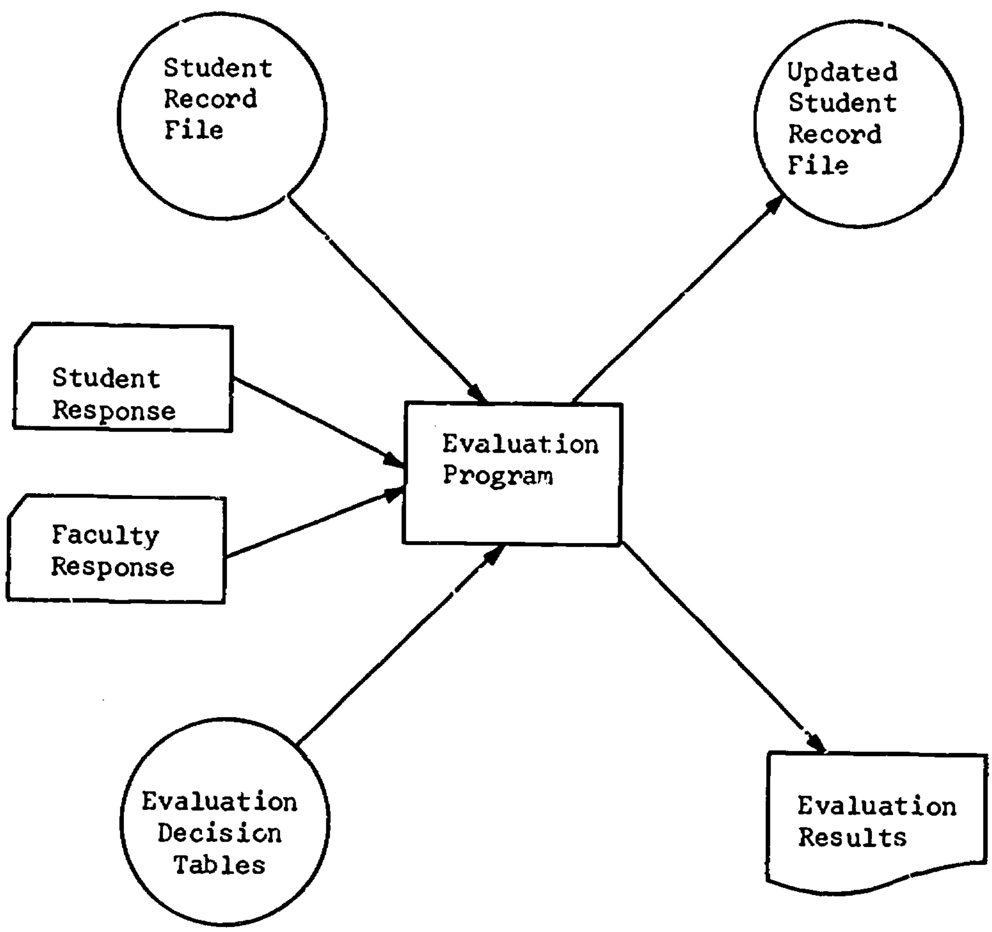


Fig. 34. File relationships in the evaluation program.

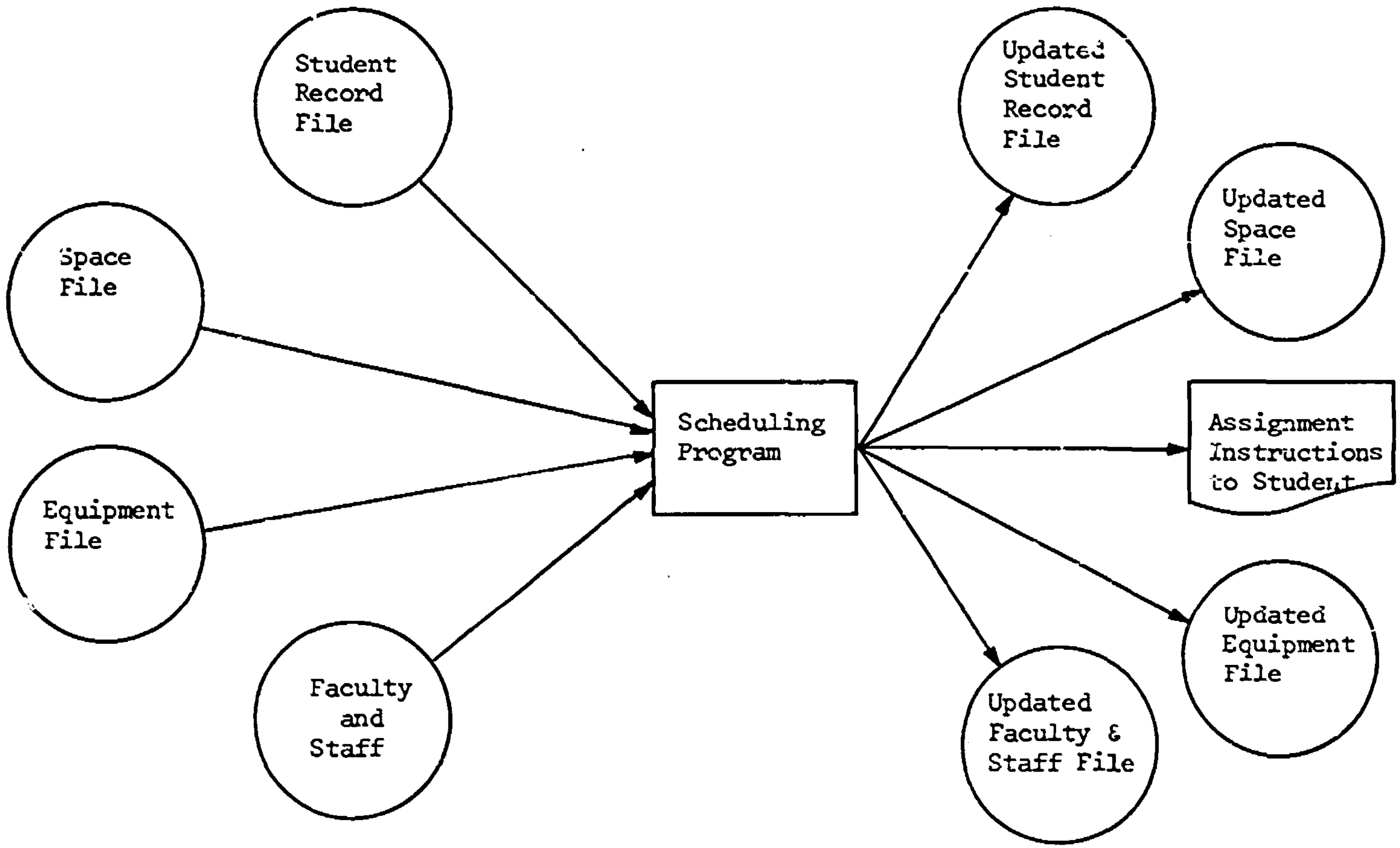


Fig. 35. File relationships in the scheduling program.

the scheduling program.

5. The faculty and staff file will contain a record for every faculty and staff member. Each record will contain, in addition to identifying data, information representing fields of specialization, capabilities, and current load information. The file will be updated whenever such information changes, particularly each time a new student is assigned to a faculty member. Figures 33 and 36 show the relationship of this file to testing and other files in the system and also to the master file updating and report generation subsystem.

6. The space and equipment files will contain a record for each space unit or unit of equipment. The files will be updated each time a student is assigned to a space or equipment unit. Figures 33 and 36 show the relationship of this file to testing and other files in the system and also to the master file updating and report generation subsystem.

7. The accounting files consist of information pertaining to budget, expenditures, income, inventory, etc. They will be maintained in the traditional manner. The files will be used in conjunction with various reporting programs to provide estimates and performance information to the administration. The relationship of this file to master file updating and report generation is shown in Figure 36.

8. The internal central files and programs will be internal to the computer system and used to facilitate the handling of the many remote terminals associated directly with the operation of the computer system.

This same system of scheduling can be used by other colleges in the State of Georgia using the model program through remote terminal connections with the University of Georgia.

A scheduling system using existing computers with software of a kind described here developed in the initial phases of the project will be adequate to accommodate the number of

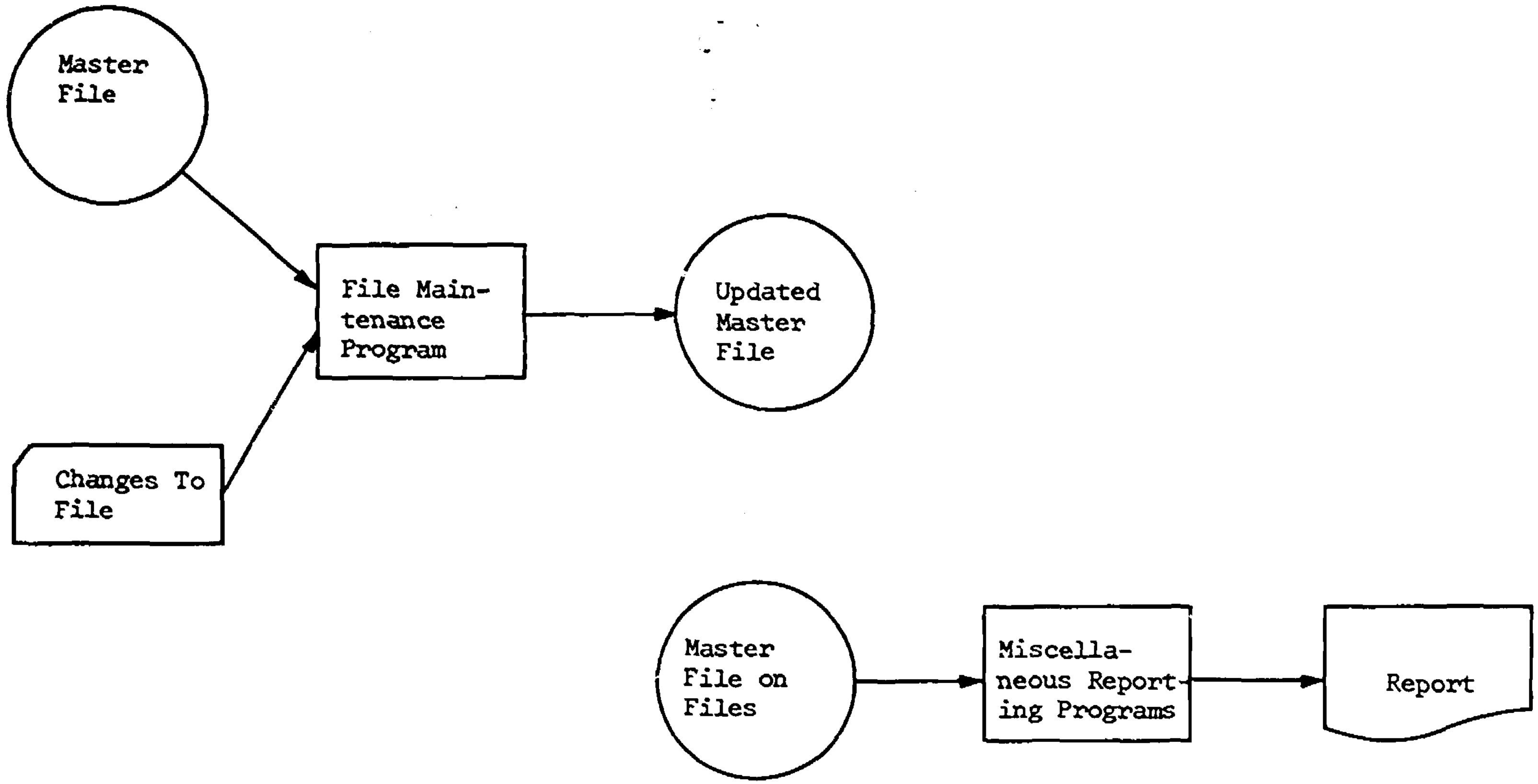


Fig. 36. Master file updating and report generation.

students likely to be enrolled in the model program whether at the University of Georgia or in other colleges. The scheduling procedures established in this investigation are therefore feasible for the model program.

Mutual Arrangements (Collaborations) within the Profession

Specifications for the model program require the involvement of numerous local and state agencies for effective development, implementation, and sustained operation. City and county elementary school districts will cooperatively participate in the training of elementary school teachers by providing exchange personnel such as coordinators, supervisors, principals, and classroom teachers to work with the model program on a shared basis. They will serve as instructors or program development specialists (visiting professors), as they concurrently assume part-time roles for their specialties in their local school system. Also, these school systems will provide materials, laboratory settings, opportunities for paraprofessional employment of the students as aides or assistant teachers, and recommendation and/or sponsorship of certain students for special training. In addition, they will open the doors of their curriculum libraries and elementary school classrooms for study, reference materials, elementary school learning materials, and for such activities as observation, paraprofessional participation, supervised teaching field studies and demonstrations.

As regards state organization involvement, commitments have been made by the Regents of the University System of Georgia for awarding degrees and by the State Department of Education of the State of Georgia for awarding teaching certificates. Tentative reciprocal agreements have been made to provide cooperative working relationships with the junior colleges of the state and with other interested colleges and universities. These agreements will parallel the preprofessional phase of the program in those institutions where lower division students would enter the model sequence in what has traditionally been called the "junior year."

Agreements with research and development centers and regional laboratories which are concerned with early childhood education, education of the culturally disadvantaged, education of non-English-speaking children, and elementary education have been made to share their research findings, programs and facilities to the mutual advantage of these organizations and the model program operation.

An Ad Hoc Committee of Educational Materials and Resources has recently been appointed by the Dean of the College of Education. The purpose of this committee is to, "Be certain that no faculty member or student in the College of Education misses an important idea that could be available through the use of the best available educational resources." (Ad Hoc Committee, 1969). This committee is investigating the educational resources now available to the College and making recommendations for the acquisition of such new resources such as a computer-based information retrieval system for education.

Field experience and internship. The specifications of the model program (Johnson, et al., 1968, pp. 222-25) require each student to complete a minimum of five laboratory experiences and one internship during the preservice and professional phases of the program. Provision is made for each student to function as a teaching aide for two blocks of time for a minimum of five weeks each. Each student also functions as a teaching assistant for three blocks for a minimum of five weeks each. An internship period for a minimum of ten weeks in length is provided for each student in PM Block 10 of the progessional phase. The six professional laboratory experiences together provide for each student to experience working with age groups at his projected grade level of teaching as well as with age groups above and below this level. Attention is also given to insuring that each student works with children of various socioeconomic and ethnic characteristics.

The placement of elementary education students in large numbers into public school classrooms implies very close cooperation between public school systems and the college. Student enrollment will approximate 1,500 when the model program reaches the sustained operational level in 1975-76 (Ayers, 1969a, 1969b). It is estimated that at this level of enrollment a minimum of 403 classrooms will be needed during each year.

A survey was made of the 20 school systems in Georgia that cooperated closely with the College of Education of the University of Georgia during the 1968-69 school year in providing facilities for observation and student teaching at the kindergarten and elementary levels (Ayers, 1969a). All school systems surveyed indicated a willingness to continue and to expand their program of cooperation with the University of Georgia College of Education. For purposes of this report the school systems were grouped into four geographical areas as follows: area 1, immediate vicinity of Athens, Ga.; area 2, Metropolitan Atlanta; area 3, Northeast Georgia and area 4, immediate vicinity of Augusta, Ga. Table summarizes the results of the survey and indicates that a sufficient number of public school classrooms are available within a reasonable distance of the University of Georgia campus for the placement of elementary education students in professional laboratory experiences.

Table 5

Summary Of School System Survey

	Area 1	Area 2	Area 3	Area 4	Total
No. of Elementary Classrooms in use during 1968-69	458	7,331	744	744	9,277
No. of Elementary Classrooms available during summer 1969	19	806	75	25	925
No. of Kindergarten Classrooms available during 1968-69*	11	389	10	0	410
No. of Head Start Classrooms available in summer 1969	15	181	34	20	250

*Includes a limited number of children in other types of programs for children under six years of age.

Students entering the University of Georgia from junior colleges and other institutions of higher learning will be required to participate in one professional laboratory experience of a minimum of five weeks prior to continuing with the remainder of their program.

A student who presents evidence of having had public school teaching experience or having served as a teacher aide or other paraprofessional in a public school situation for at least five weeks will be exempt from the requirement provided he has acquired the behavioral objectives established for the preprofessional laboratory experience.

The conceptual vehicle for implementation of the professional laboratory experience component of the model program will be the professional laboratory experience center. The center will consist of a cluster of schools identified as portal schools (Sowards, 1968, pp. 118-25).

Portal school. The portal school concept (Sowards, 1968, pp. 118-25) is a group of schools that will be established in school systems maintaining a close working relationship with the University and indicating a willingness to participate in the model teacher education program. Portal schools will have leadership favorable to innovation, new curricula, differentiated staff, and extensive use of media in the instructional program. The function of these schools will be to provide: transition from the university preservice phase to full-time teaching in the inservice phase, in school situations that operate in harmony with the model program. Concomitant benefits should accrue to the cooperating school systems through providing a supply of teachers who would assume leadership in other schools in the system. The schools themselves would serve as demonstration centers for promotion of change within the system.

Preservice and inservice education is a continuous uninterrupted sequence in the model program. Teacher performance specifications can be effectively implemented in a portal school setting. Some of the specifications deal directly with the transitional period between the university campus and the classroom. The program is a feedback model with continuous evaluation of each component. Evaluation in the portal school will provide valuable data that is easily accessible.

Each portal school will be equipped with adequate audio and video taping facilities for use by the elementary education students as they function in their various roles of teacher aide, assistant teacher, and intern, and also other materials and equipment for use in PMs that may be taken while in these centers.

Each center will be staffed with a manager whose function will be to coordinate placement arrangements for laboratory experiences, and to make available to elementary education students currently within the center the resources required by the students engaged in learning tasks contained in professional laboratory experiences PMs (Johnson, et al., 1968, p. 223).

Initial plans have been made to establish four centers in North Georgia. These centers will be Metropolitan Atlanta, Gainesville, Athens, and Augusta. The portal schools identified with a center will be located within a 35 mile radius of each other; however, they must be physically located in several different school systems.

Portal schools will be identified and selected by the school system administration on the general criterion of their overall adaptability and value to a teacher education program. Some of the criteria to be used in their selection will be the quality of the educational program being offered in the school, the willingness of the administration and the majority of the school faculty to work with the program, and the ethnic and socioeconomic population of the school community. Additional criteria for identification and selection of portal schools will be specified during the development phase of the model program.

In order to insure continuity in services to the portal schools, the professional laboratory experiences component of the model program will vary somewhat in the length of time which students work towards completion of the learning tasks in these PMs. All students will be required to remain in their assigned laboratory experience placement for the entire five or ten week period in order to allow time for evaluation of their experiences and to minimize the administrative problems caused by shorter periods in the classroom. Students who complete the required learning tasks in a shorter length of time will undertake additional PMs.

It should be noted that in some centers portal schools may be utilized on a revolving basis, whereby those being used one year may be different from those used in the same center another year. This feature will enable local school administrators to distribute the impact and benefit of the influx of elementary education students over a broader base.

Public school elementary classroom teachers in portal schools will function as laboratory sponsoring teachers and/ or laboratory clinical instructors. The former will work with elementary education students serving as teaching aides and assistant teachers during their five preintern experiences. The latter will work with student interns during their ten week internship. Special preservice orientation and inservice training sessions will be provided for these instructors to insure their effectiveness. Adequate and reasonable renumeration will also be provided.

Identification and selection of the laboratory sponsoring teachers and the laboratory clinical instructors will be accomplished jointly by local school system administrators and an appropriate college representative. Specific criteria for selection will be established in the development phase of the model program. These will relate to current teaching effectiveness, teaching experience, professional certification and educational qualifications.

Within each center provision will be made to identify certain better qualified laboratory sponsoring teachers and laboratory clinical instructors. These will be designated specifically for working with individual students who cannot complete the required learning tasks within the established five or ten week period and will need further time and assistance.

Additional personnel assigned to the centers will be known as clinical professors. They will work with the elementary education students and the laboratory sponsoring teachers and clinical instructors of one or two portal schools. Mention of these personnel is made here to emphasize the facts that 10 to 15 elementary education students will be assigned to each portal school and that the utilization of college personnel in this manner will provide for maximum efficiency and effectiveness. The center concept with portal schools will enable one clinical professor to become extremely well acquainted with portal school staff members and the school community, and will enable this person to function effectively as a resource person for the school and the elementary education student by being constantly on the scene. It will provide the opportunity for continuous appraisal of students' progress and the conducting of seminars on a continuing basis, both for preservice and inservice personnel.

Clinical professors may be drawn from college or public school personnel, or employed on a joint appointment basis. Past experience with supervisory personnel working with student teachers under similar appointments has shown that such arrangements are possible and effective.

The on-the-job track. The on-the-job track of the model program is designed for those individuals who must work in order to complete their college education. The individuals who enter the model program through the on-the-job track will be employed on a full-time basis in a school district at their appropriate level of competency and will pursue college work in the model program on a part-time basis.

For example, a student may enter the on-the-job track directly from high school, working full time as a teaching aide and taking preprofessional PMs on a part-time basis. At such time as the student desires, he may leave full-time employment in the school district and pursue work on a full-time basis toward his college degree. As part of the on-the-job track a student will engage in a continuing seminar with an advisor from the model program. The student in the on-the-job track will be exempt from the paraprofessional laboratory experiences provided he has demonstrated the behavioral competencies specified for the experiences.

The student entering through the on-the-job track will be subject to the same screening devices, testing, etc., as those students who are pursuing work in the program on a full-time basis.

Initially students enrolled in the on-the-job track will be confined to areas around portal schools. However, it is anticipated that, as the program becomes larger, the track will be expanded to include school districts located throughout the state.

Students will take their PMs at junior and senior colleges in the state that are participating in the model program (see Mutual Arrangements (Collaborations) Within the Profession). Special materials and equipment will be available at these portal schools in order that PMs can be completed within the school. The PMs that are completed in this manner will necessarily be of an individual nature.

Professional participation. Numerous professional organizations will take part in the model program during sustained operation. These organizations will participate directly in the operation of the program or indirectly by providing consultative service, legal advice, or methods for the implementation and operation of the program.

The Board of Regents is the governing body of the higher education system in the State of Georgia. All units of the University System, including 16 senior institutions and 11 junior colleges, are controlled by this body. The Board of Regents will facilitate the model program by providing ultimate authority in all matters associated with colleges and universities using the model program. The Board of Regents will be the liaison agency in all matters that require legislative action for operation of the model program. The Board of Regents has endorsed the model program.

The Georgia State Department of Education has endorsed the model program and has agreed to issue certification to students graduating under this program. During the sustained operation phase of the program this agency will give advice and support wherever possible. Members of the State Department of Education will serve on the Committee of Executives of the model program.

Bachelor's degree granting institutions and junior colleges in the state will participate in the program during sustained operation. Initially it is anticipated that several junior colleges and at least one senior college other than the University of Georgia will adopt the model program for use in their institutions.

After each phase of the program has been in sustained operation for one year, the satellite institutions will begin implementation of the program. The administrative organization of each of these institutions is similar to that of the University of Georgia; therefore no problems with regard to implementation should be experienced.

As the program is successfully tested in these institutions the model program will be made available to all of the institutions in the State of Georgia.

Other institutions in the state have agreed to cooperate with the program by providing facilities for students to take PMs while they are working (see On-the-job-track).

Letters of interest in the model program from these various institutions are on file. Representatives of these institutions will serve on the Committee of Executives.

The preprofessional phase of the model program closely parallels the core curriculum adopted for junior colleges in the State of Georgia (Regents of the University System of Georgia, 1967). The major difference between the junior college core curriculum and the preprofessional phase of the model program is in the requirement of paraprofessional laboratory experience. Therefore, it is anticipated that no problems will arise with the transfer of students from junior colleges. Provisions have been made for laboratory experiences for these students (see Field experience and internship).

During sustained operation other organizations such as professional societies, research and development centers and regional educational laboratories will participate in the model program. Liaison will be maintained with these organizations and recommendations and results of research will be utilized for modification and improvement of the model program.

For example, the Research and Development Center in Educational Stimulation at the University of Georgia is currently supporting a variety of research projects. These projects are exploring the basic hypothesis that early and continuous intellectual stimulation of children three through twelve through structured sequential learning activities will result in higher levels of ultimate achievement than would otherwise be attained. The Research and Development Center has agreed to make its research results known for possible incorporation into the model program.

The Southeast Regional Education Laboratory is currently engaged in a number of projects in the early childhood education program. Again this organization has agreed to provide information and assistance to the model program in sustained operation by providing facilities for observation, laboratory experiences, and research findings.

Numerous other professional organizations have agreed to provide information and support to the model program during sustained operation by consultation.

Figure 37 presents a diagram of the flow of information from these various organizations into the model program and the resulting modification.

The feasibility of professional participation in the model program has been established through direct consultation with the various agencies involved. Letters of agreement between these agencies and the staff of the model program at the University of Georgia have been exchanged. It seems feasible that these organizations would provide the same assistance to any institution that adopts the model program in sustained operation.

Organization and Administration During Development

This chapter has been concerned primarily with the feasibility of the management subsystem of the model instructional program while that program is in sustained operation. However, for any dynamic model to reach a condition of sustained operation there must be a feasible strategy for its attainment. Chapter III outlines that overall strategy and Volume II provides detailed reports of all development activities. However, for this report to be considered complete it must contain reference to the specific management development activities provided in the strategy. Attention is given to three major areas of concern: management of personnel and facilities, management of institutional change, and scheduling.

Management Component During Development

Throughout the development stages of the model program the management component of the model program will be similar to that proposed for sustained operation (see

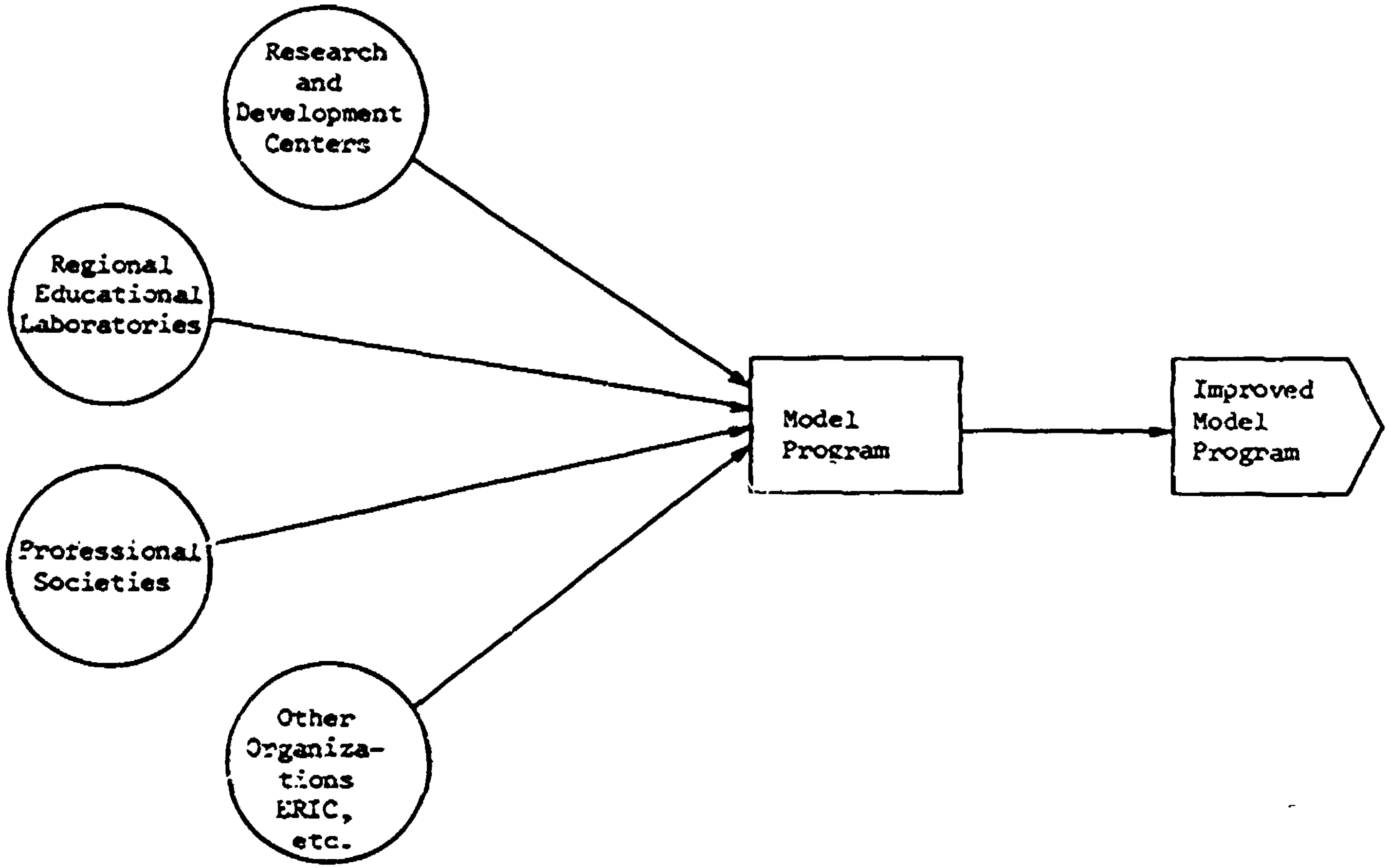


Fig. 37. Flow of information into model program and resulting changes.

Figure 31 Administration and organization chart). However, during the early stages of development of each instructional phase of the program the Division of Instruction and Evaluation will be concerned primarily with the development of PMs, instruments for student evaluation, and the evaluation of the instruction program. Concurrent during this initial period the Division of Student Academic Services will be concerned with the development of criteria for student selection, scheduling and evaluation. As the various phases of the program progress from stage to stage (see Figure 5) the emphasis of these two divisions will gradually shift from planning and developing materials to working directly with students.

A complete list of the activities, resources and costs for the overall managememt of the development phases of the model program is contained in Volume II of this report and job descriptions of essential personnel are included in Volume III The overall management activities during the five year development phase have been designated with the symbol OM and include some 55 separate activities. Figure 38 taken from Volume II shows the relationship of the overall management activities to the total project. These activities fall into four major categories: planning and procuring of facilities, equipment and materials; revision; evaluation; and operation of the various components of the model program. All activities are continuous throughout the duration of the five year development period.

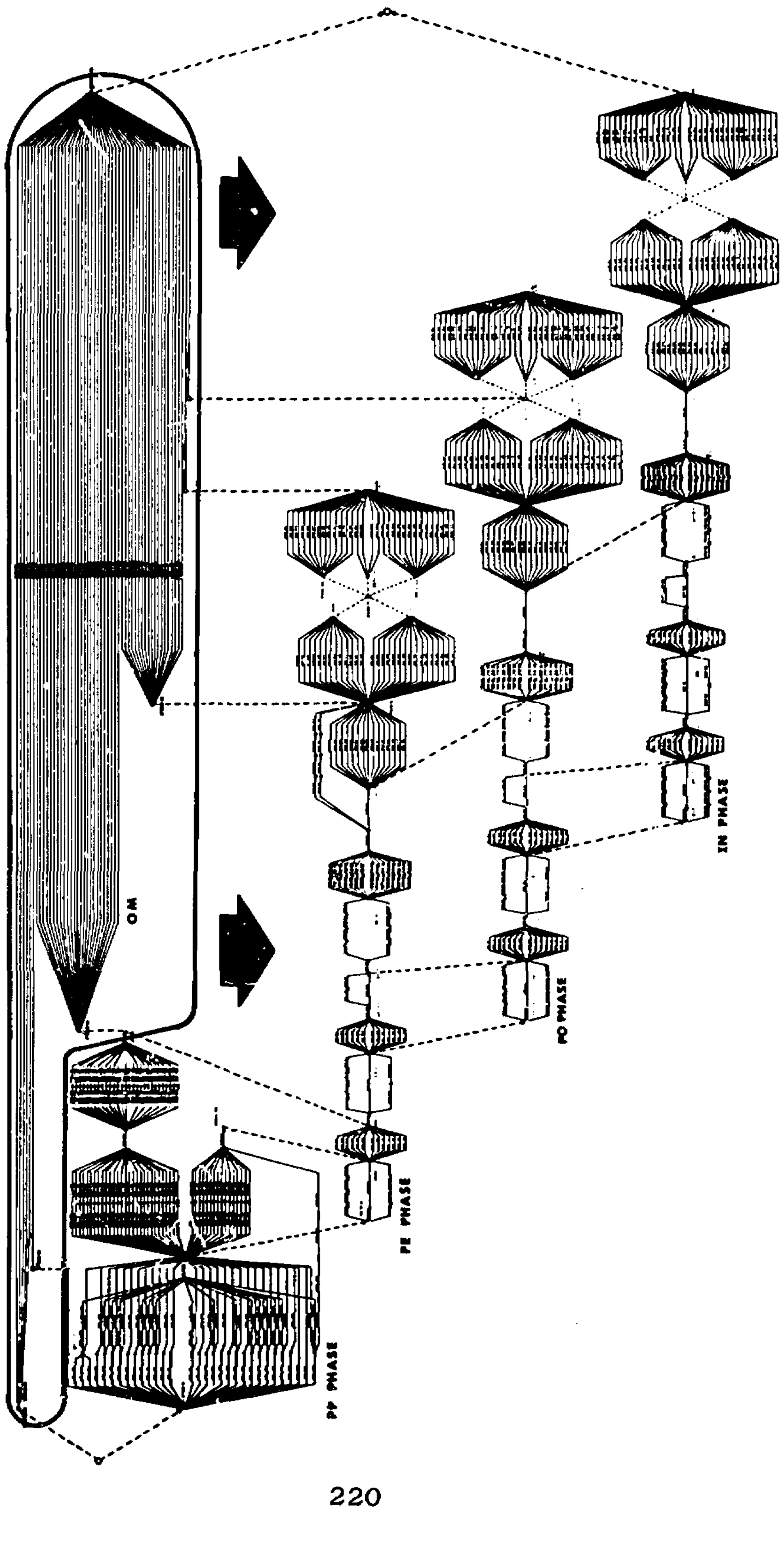
One activity illustrative of overall management activities is <u>Activity OM-018: Operate project management</u>. This activity is concerned with the overall management of the project during the six stages of development. This activity will require key and supporting staff and office space. The key personnel for this activity are the Director, Division of Elementary Education and the Director of Project Operations. These staff members will be supported by an administrative assistant, the project business manager, two executive secretaries and a clerk typist. These staff members will devote essentially full time to this activity. Another activity illustrative of overall management is <u>Activity OM-015-02: Revision of facilities, equipment and materials</u>. Here attention is centered on the revision of specifications for the overall facilities, equipment and materials needed for the development of the project. It is estimated that during each year of the five year development the Director of Project Operations will devote one day, while the two associate directors will spend five days engaged in conferences and visiting other projects to gather ideas and evaluate equipment and materials for possible inclusion in the development of the model program. These key personnel will be supported by the project business manager for 15 days and an administrative assistant and a secretary for 7½ days each. Office and conference space and travel costs are included in the resources for this activity.

These activities are only illustrative of the 55 activities that overall management will carry out during the five year development of the model program. The majority of the activities follow the pattern outlined above. All activities were developed by educators in consultation with experts in the field of management and are regarded as not only feasible but integral parts of the activities of the model program.

Development of Institutional Change and Mutual Arrangements

For the model program to be successfully developed numerous changes in policies and procedures will have to take place in most university settings as the specifications for the model program are new to most college campuses. Thus, the administration must be made aware of these specifications and the benefits to be accrued by the institution if they are implemented. Also of importance to institutional change are the specific changes that must be made in the legal and administrative organization of the institution. Concurrently with changes in policies and procedures in the university setting, mutual arrangements (collaborations) within the profession must be made.

Volume II of this report lists all activities, resources, and cost necessary during the five year development period of the model program to finalize the necessary institutional changes and mutual arrangements within the profession. Tentative arrangements for institutional change and mutual arrangements were made during the development and feasibility study of the model instructional program. A more detailed explanation of the necessary institutional changes and mutual arrangements is presented in previous sections of this report.


OM
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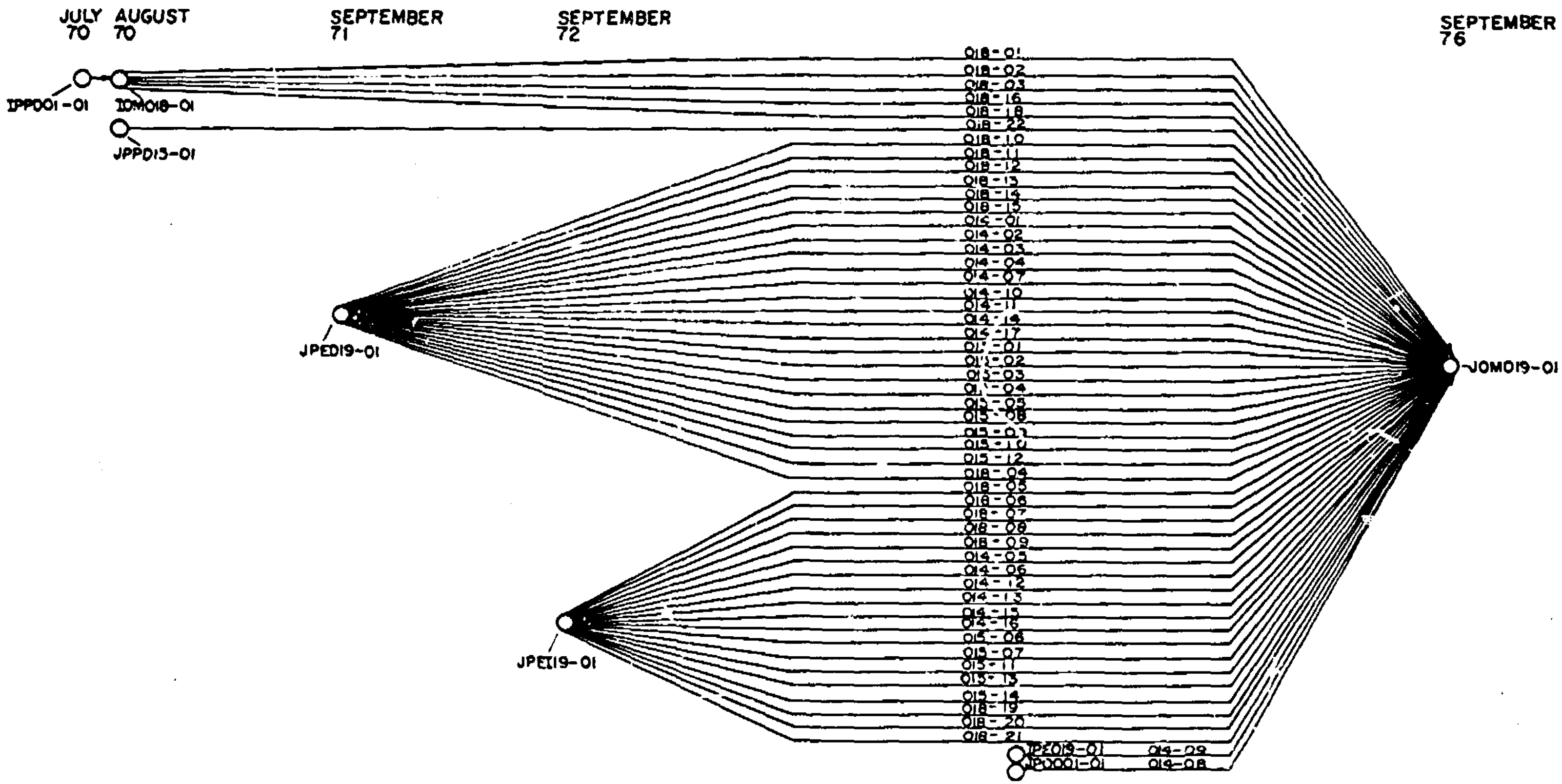

Fig. 38. PERT network: Overall management (OM).

The majority of the activities to effect institutional change and to develop the needed mutual arrangements will require conferences between various staff members of the model project and representatives of the various institutions such as the University of Georgia, school districts, research and development centers and other professional organizations. These activities occur at various points of the model program.

Activity PP-D15-07: Revise reciprocal agreements component criteria is illustrative of an activity concerned with the development of mutual arrangements. It is centered on the revision of the criteria for reciprocal agreements and will occur during Stage I of the development phase. This activity is primarily an internal project matter and will involve very little consultation with outside sources. Included in this activity will be a revision of all criteria related to mutual arrangements with organizations outside of the University. It is estimated that this activity will require about 20 days for completion and will involve the Chairman, Division of Elementary Education and the Director of Project Operations for one day each. The associate and assistant directors will devote about three days each to this activity. Supporting this activity will be a half-time secretary and resources for a nominal amount of travel. The facilities for this activity will include office and conference space.

Another activity which focuses on mutual arrangements is Activity PP-D11-02: Design and draft reciprocal agreement procedures. It follows the previously described activity. It involves conferences between the model staff and representatives of various agencies to design and draft necessary reciprocal agreements for the development of the model. At this same time initial agreements necessary for sustained operation will be made. It is estimated that this activity will require about 35 days and will involve the Director, Division of Elementary Education and the Director of Project Operations for two days each. Each of the associate and assistant directors of the project will be involved in this activity for five days each. A secretary will support this activity for the duration of 35 days. Resources for travel and conferences have been provided. Facilities necessary for this activity include office and conference space. This activity will finalize agreements among the various participating agencies.

These activities are only illustrative of the activities that must be completed during the development of the model program. All activities were developed by professional educators in consultation with experts in the field of management and are regarded as not only a feasible but an integral part of the development of the model program.

Development of Scheduling Component

During the development stages of the model program the scheduling component for sustained operation will be designed, developed, piloted and put into initial operation. The development of the scheduling component will be carried out during six stages as outlined in Figure 5. The assumption has been made that the system will be implemented at the University of Georgia using existing computer hardware (an IBM 360/65 system) with remote terminals. The software required for this scheduling system will be a major concern during development.

A complete list of the activities, resources, and costs required for the five year development and subsequent operation of the scheduling component is contained in Volume II of this report. Volume III contains job descriptions for the personnel required to develop the scheduling component during its various phases. During Stage I (see Figure 5) an applications systems analyst supported by a secretary will make initial plans and designs for the various program files of the scheduling component. In Stage II the systems analyst supported by two senior programmers, a secretary and a key punch operator will develop the scheduling component for the preprofessional phase of the model program. At this same time initial rental of remote terminals will be made for student use in the preprofessional phase of the program. During Stage III this group will pilot test the scheduling program with the preprofessional students and begin development of a program for the professional phase. The development of the scheduling component will continue until the total program is developed for all phases of the model program. It is anticipated that by the end of the final stage the complete scheduling component will be developed and that only a senior programmer will be needed for maintenance and updating of the system during sustained operation.

Based on a series of discussions with experts in the field of computer technology and system analysts, this plan is feasible. Sufficient time, personnel and resources have been allocated for the development of the software for the scheduling component using existing computer systems, in particular the IBM 360/65 system maintained at the University of Georgia.

Summary

This chapter is a basic report of an investigation into the feasibility of the subsystem for organization and management of the model program during both development and operation. A variety of procedures were used in investigating the three major components of the subsystem of the program (institutional change and mutual arrangement, administration, and scheduling). Feasibility of institutional change and mutual arrangements has been established through a series of discussions with the administrative and legal staffs of the University of Georgia, public school districts and other agencies such as the Board of Regents of the State of Georgia, research and development centers, regional laboratories, junior colleges, and other senior colleges. The feasibility of the administrative and scheduling components has been established primarily through consultation with experts in the fields of management and systems analysts and computer technology, respectively. Other activities leading to the validation of the feasibility of these components include direct questioning of students, and questionnaire investigations of various professional groups. The major investigations are summarized in GEM Bulletins 69-2, 69-4, and 69-5 (Ayers, 69 a.b.c.).

The staff conducting the investigation has concluded that in so far as the University of Georgia and the State of Georgia is concerned the feasibility of the development and implementation of the model program may be regarded as validated. It is assumed that similar validation can be obtained by most universities if procedures such as those reported herein are applied.

Chapter VI

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Chapter VII

Cost Data and Their Effect on the Feasibility of Developing and Operating the Model Program

J. B. Ayers, C. E. Johnson and G. F. Shearron

The purpose of investigating costs is to provide cost estimates for both the development and sustained operation of the model instructional program and, on the basis of these estimates, to determine the extent to which it may be regarded as feasible to develop and operate the model program.

This chapter begins with a discussion of the theoretical considerations that formed the basis for estimating costs, then describes the actual procedures used. Next, the findings of the cost investigation are presented objectively. The chapter ends with a discussion of the feasibility of proceeding with the development of the instructional program giving consideration to alternatives based on available funds.

Some Theoretical Considerations

The systems approach, fundamental to the proposed management of the instructional program in operation as well as its proposed strategy for development, is equally fundamental to the strategy for determining estimated costs. However, particular attention must be given here to the analytic method since it is not only basic to the utilization of the systems approach in general, but its application in determining costs varies somewhat to its applications in other chapters of this report.

The Analytic Method

Throughout the design, testing, and subsequent operation of the overall model it is concluded that each major and minor subsystem and unit of the overall system would be subjected to separation, identification, articulation, and evaluation. From these analyses which occur both before and after utilization of the units in the system, the goal of optimum design is more likely to be reached. It must be recognized that the primary design objective, the model program itself, has as a theoretical base a parallelism with analytical methodology. In addition, contemporary management control systems are built and manipulated using subcomponents that can be measured and rearranged much like mechanical, electrical, or chemical processes of design. This approach to structuring and controlling a system is basic to the intelligent application of the new techniques and the new technologies such as computers. Therefore, from the very start, the prime system has been approached with a homogeneous design philosophy. This must be reflected in the cost estimation procedures through the selection and designing of relevant subsystems.

Subsystems of Cost Analysis

To avoid specious varieties of the systems approach, the design for estimating costs has incorporated thinking from the philosophical, theoretical, structural, conceptual, and pragmatic aspects of systems methodology. The approach that is reflected in this report is structured on interlocking program components of the educational model as the prime product. This primary objective is supported by a number of structural subsystems for cost analysis as is shown in Figure 39 which provides a conceptual diagram depicting the major relevant subsystems which were considered in estimating costs.

The power or control function. The power function is normally implied in the organizational subsystem. It has a specialized control function or an overall authority separate and distinct from the other subsystems. The organization and communication subsystems closely complement the power function. Since the power function inherently is the responsible intellectual nucleus of this program, it contains the authoritative thrust in order to close the systems loop in a meaningful manner. Recognition of this function is fundamental to estimating and controlling the behavior of the myriad of subunits that must be directed toward the final goal. Any gross malfunction in this subsystem disrupts the discipline necessary to the design and operation of a management control subsystem.

Organization. The configuration of the various people,

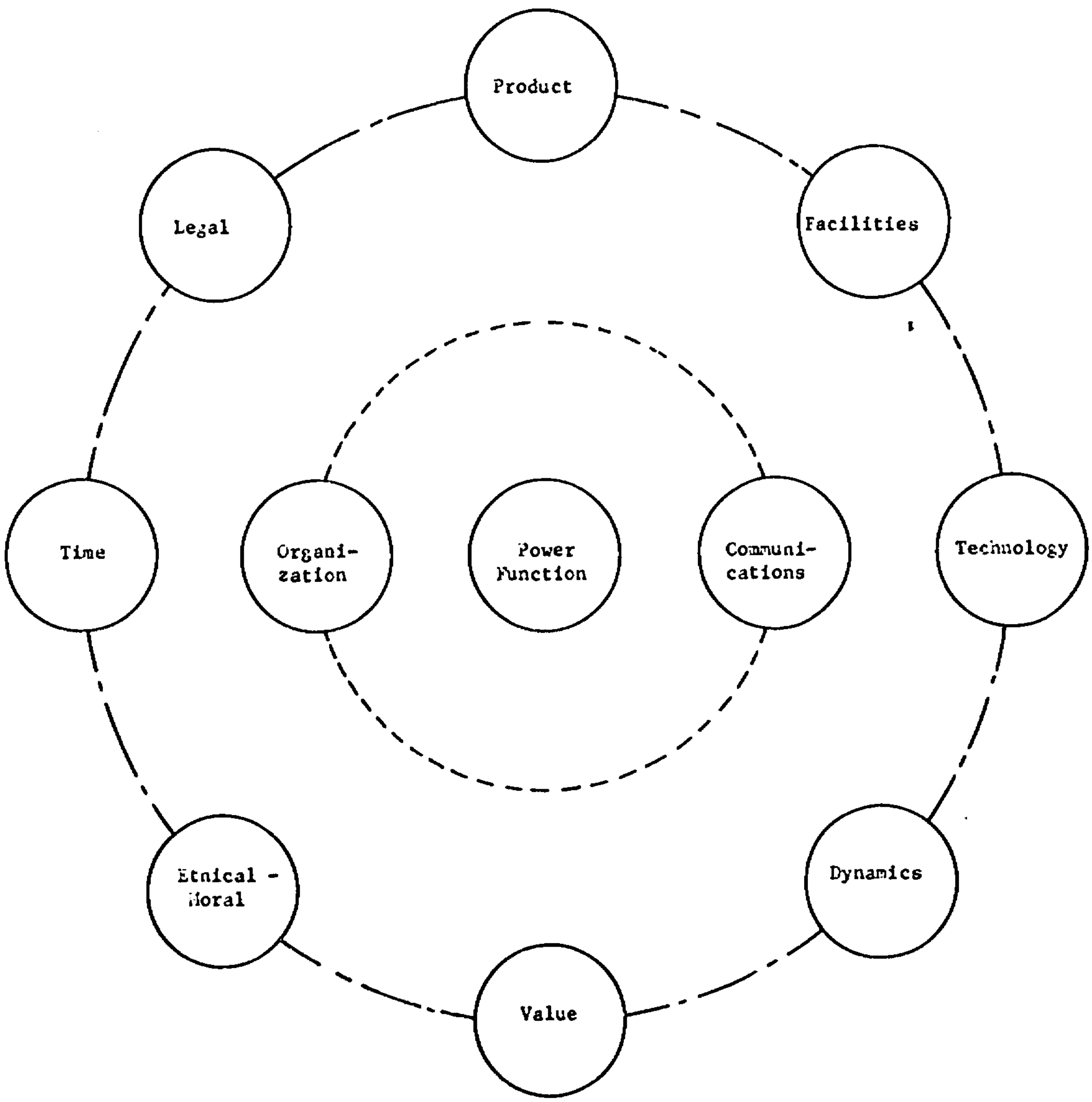

Fig. 39. A conceptual diagram depicting the relevant subsystems included in estimating and control.

machines, buildings, money, and communications into a meaningful working whole is the main thrust of the organizational subsystem. While there is some relationship to the standard notions of organizations of people, it is much more comprehensive because it configurates all the parts--people being only one of the parts. It is further concerned with a Gestalt-like effect that comes with an integrated system.

Communications. Parts of the system such as facilities, product, time, dynamics, and value must be superimposed with a communications subsystem that links them all together in a meaningful way. This concept is usually best described with a subordinate network similar to electrical devices that relate and describe the functioning of complex mechanical systems. Within the communications network there are likely to be system hierarchies.

Value. In designing and operating a system, each component should be able to produce an output more useful than its input. The notion that the overall system is functioning in an optimal manner is best approached by being concerned with the usefulness ratio of each part. Modeling of this part of the system is usually approached by giving each input and output value a numeric monetary assignment. It is the conceptual base for the application of techniques such as benefit-cost analysis, critical path method, and others.

Time. In pragmatic systems modeling, the time function is a basic conceptual part. For example, by applying more money to parts of a design, the time vector can usually be shortened. Contrariwise, time can usually be added and less money used. Assimilating the time function into the overall model is usually coupled closely with the value function, but it is also the key part of coupling all the modes, components, and subsystems into an efficient working system.

Facilities. The facilities subsystem incorporates the physical parts of the system under numerous subheadings such as buildings, equipment, and supplies, all of which are accounted for in costing procedures.

Technology. A peculiarity of systems design pertains to the state of development of each component in relation to the others as well as the classical past, present, and future of the design. For example, in this research traditional and futuristic educational methods and management methods must be carefully put together, tested, and evaluated. Therefore, it is proposed that each component be given an analytic evaluation for its state of technology.

Products. An instructional program reflective of the educational model in its entirety is the expected output and its effectiveness will be reflected by the products which are the students educated by the instructional system. Their effectiveness, in turn, will be determined by their ability to direct the learning activities of children in such a manner that the educational objectives are achieved.

Dynamics. The conceptualization, development, evaluation, and operation of the system on a real time scale is an inherent part of the model. The proposed management control system incorporates the movement, the intrasystem dynamics and the subsystem interfaces in such a way that the overall model is integrated on a real time basis. Traditional concepts such as scheduling, estimating, planning, production, and cost management are all used, but in a dynamic system configuration.

Legal. In general this systems design will be generated and used within the existing legal framework. Final negotiations with state and other institutional organizations regarding such matters as certification, degree requirements, credit hours, grade point averages, class attendance time, tuition, scholarships, and costs for learning materials must be made. In addition, there are routine matters of a contractual nature that must be considered as the program progresses.

Ethical and moral. The overall goal of this enterprise appears well within accepted domains of ethical and moral behaviors. The basic viewpoint underlying the conception of the model program gave considerable attention to this aspect. However, concern for this subsystem is included here to exhibit thoroughness and to reassure the sponsors of the research that this subsystem has been given systematic treatment as an implicit part of the management control system.

Procedures

The procedures used to obtain cost estimates for the development and operation of the instructional program were comprehensive and detailed. Cost data were estimated for the various resources needed for each of the hundreds of activities required. These detailed costs items were reviewed, validated and computer stored. The data were then retrieved to provide time and cost estimates for each activity of each component (i.e. student selection, performance behaviors, learning materials, etc.) through each phase of the instructional program (i.e. preprofessional, professional, and specialist), and through each phase of program development (i.e. planning, developing, piloting, initial operation, and sustained operation). Volume II of this report presents these detailed time cost data. It was from these voluminous technical reports that the summary figures and tables of cost estimates presented in this chapter were prepared.

Cost Resource Categories

The cost categories used in this study were determined after careful review of the literature and recommendations of management consultants. It was concluded that costs estimation should be based on six resource categories: key personnel, supporting personnel, facilities, travel, materials, and equipment.

Key personnel refers to the academic, research, and managerial personnel required to develop and operate the model program. Supporting personnel refers to the persons assisting key personnel in the development and operation of the model and includes such personnel as research assistants, consultants, technicians, artists, draftsmen, editors, stenographers, and clerks. Job descriptions for these individuals are contained in Volume III of this report.

Facilities refers to overhead costs essential to the operation of institutions of higher learning such as sites, buildings and furniture and to basic central equipment such as typewriters, dictaphones, tape recorders, duplicating equipment, calculators, and projectors. It also includes the general services available in most institutions of higher learning such as janitorial, maintenance, security, and library.

Travel costs are included in such activities as those designed to establish the model program at colleges and universities other than the one which is sponsoring the project, staff to visit other exemplary programs, travel associated with the establishment of reciprocal agreements with agencies outside the sponsoring institution, and dissemination activities.

Materials refers to both expendable items and instructional materials needed for the development and operation of the model program. For example: office supplies; curriculum guides; maps, charts, and globes; science laboratory materials; taped lecture series; duplication supplies; video and audio tapes for recording new instructional series; printed instructional guides; student orientation bulletins; tests and evaluation checklists; and staff orientation workshop items. In consolidating data for the summary of development and operation costs for this chapter, travel costs and computer time costs were assigned to the materials category as the methods budgeting and cost control at the University of Georgia follow this policy.

Equipment refers to major mechanical devices needed to develop and operate the model program in its entirety. It includes items such as computer instruction consoles, teaching machines, projectors, recorders, closed circuit TV installations, listening stations and portable TV equipment.

<u>Resource Cost and Time Estimation</u>

In order to determine an accurate cost for each activity it was necessary to estimate specific resources, the quantities needed, and the time that the resources would be used in carrying out the activity. In addition an estimate was made of the time (in days) necessary to complete all aspects of the activity. Three time estimates were made for each activity. These include an optimistic or minimum time, a median or most likely time and a pessimistic or maximum time to complete the activity. Figure 40 shows a completed cost estimation sheet for activity PPD15-10 (Revise facilities, equipment, materials component criteria.) This activity occurs during the preparation

RESOURCE ESTIMATION SHEET Estimator JBA

Activity Number PPD15-10 Activity Same As -

Factor to Multiply Activity By -

Time* (days)			Resources Needed (Type, Quantity, Time)	Estimated Costs ($) (For Office use only)
O	M	P		
20	30	40	Personnel (Key) 1 Full Professor 2 da. 2 Associate Professors 10 da. each Personnel (Supporting) 1 Administrative Assistant 30 da. 1 Secretary 15 da. Facilities 1 Executive Office 2 da. 2 Offices 10 da. each 1 Office 30 da. 1 Secretarial Station 15 da. Travel Travel to visit exemplary projects. Est. at $400 Materials - None Equipment - None	

* O = Optimistic Time, P = Pessimistic Time,
M = Median Time

Fig. 40. Resource estimation sheet for activity PPD15-10.

for the development phase of the project and is centered on the revision of the criteria for facilities, equipment and materials. The resources for this particular activity are different from all other activities in the network. However, the resources for some activities in the network are identical to others, and still others differ only by a constant factor. The median time estimate for the illustrative activity is 30 days; however, the person preparing the estimation sheet indicates that it might be possible under ideal conditions to complete this activity in 20 days. On the other hand, it is indicated that under difficult conditions it could take up to 40 days. The resources for this activity are key and supporting personnel, office space, and travel. No special materials or equipment other than those normally provided such as office supplies, desk, and chairs were judged to be required for this activity.

An examination was made of all proposed activities in order to provide a list of specific resources which would be needed to carry out the activities. This list was analyzed, duplications eliminated and a cost determined for each item by searching current catalogues, consultation with experts (i.e., on the development of audio visual aids and other instructional materials), and searching financial records. A cost was established for each item as of July 1, 1969, and a number assigned to each item for use in computer computations. Figure 41 illustrates how types of personnel and resource cost numbers are listed. Salaries for all levels of personnel are based on wages paid by the University of Georgia to its staff during the 1968-69 fiscal year. A complete list of the resources used for computational purposes is shown on pages 225-227 of Volume II of this report. All data were recorded for later computer usage.

Projected Cost Increases

In order to compute the cost of personnel during the five year development and subsequent sustained operation period of the model program it was necessary to adjust salary rates to reflect increased cost due to inflation (Consumer Price Index) and raises in salary. The average percentage increase in the Consumer Price Index (Bureau of Labor Statistics, 1969, p. 279) for each year for the period 1962-1968 is shown in Figure 42 along with the

Resource Number	Description
1.3.1	Educational Media Specialists
1.3.2	Librarians
1.3.3	Computer Programmers
1.3.4	Consultants (According to Salary Group)
1.3.4.1	Consultants $300 per day
1.3.4.2	Consultant $200 per day
1.3.4.3	Consultant $100 per day
1.3.4.4	Consultant $ 50 per day
1.3.5	Production Personnel (Develop Materials, Transparencies, A-V Tapes, etc.)
1.3.6	Artists

Fig. 41. Illustration of how types of personnel and resources cost numbers are listed.

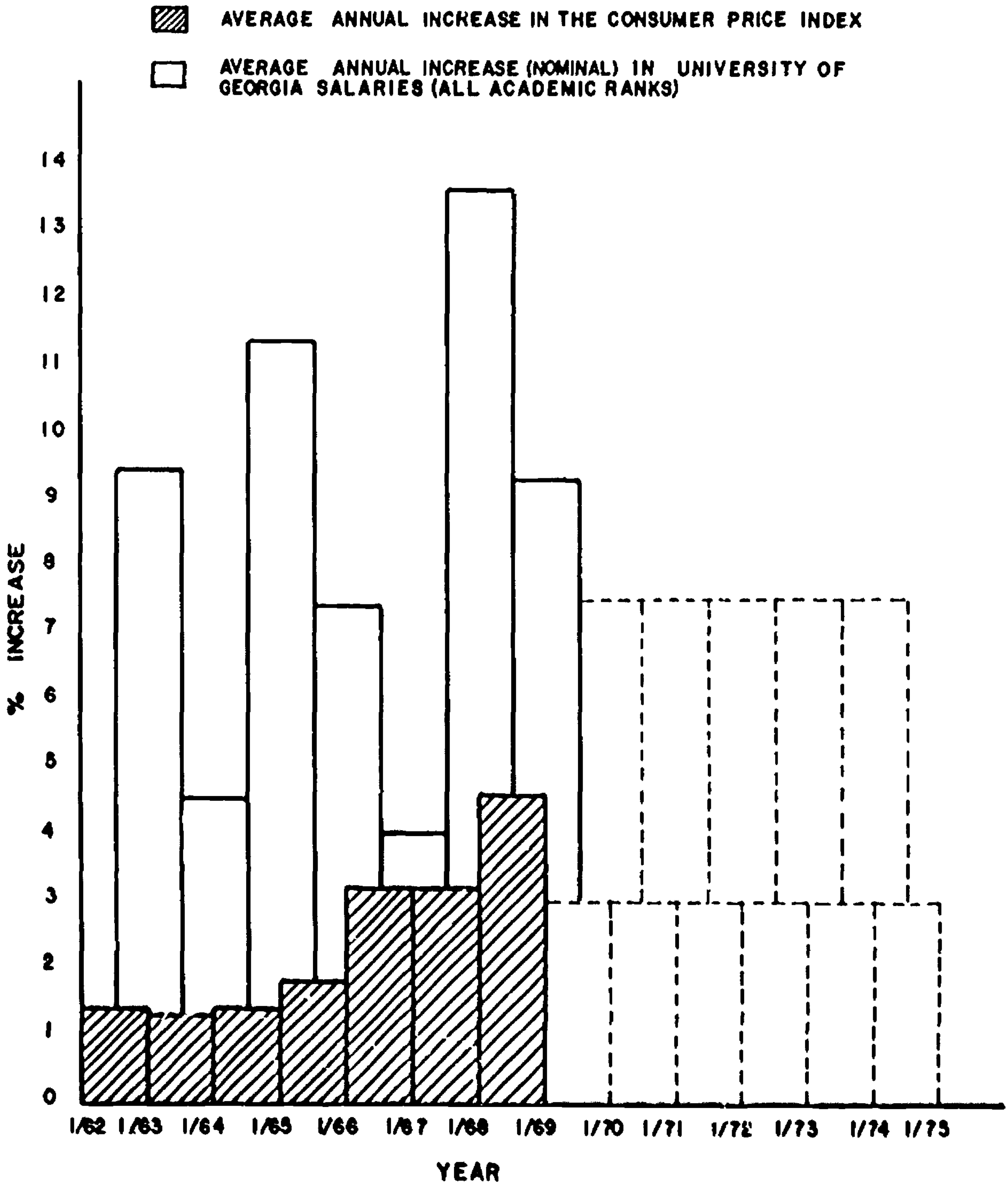

Fig. 42. Average annual percentage increase in Consumer Price Index and faculty salaries.

average percentage increase in salary (nominal) for all academic personnel at the University of Georgia for the fiscal years 1962-1963 through 1968-1969. Extrapolation based on the opinion of management and economic consultants provided the estimate that the Consumer Price Index will increase at an average yearly rate of 3.0% and the average annual increase (nominal) of faculty salaries will be 7.5% or a real increase of 4.5%. These data were coded for computer usage in constructing rate tables.

Assumptions Affecting Estimated Costs

All cost data were computed on the assumption that when the program is in full operation the total student enrollment will be 1,200. Both the preprofessional and the professional phase were assumed to have enrollments of 480 each, and the specialist (inservice) phase 240. On a monthly basis this would mean that an average of approximately 20 students would be admitted to each the preprofessional and the professional phases each month and 10 would be admitted to the specialist phase. Similarly, 20 students would exit each month from the preprofessional and professional phases, and 10 from the specialist phase.

It was further assumed that because of the individualized nature of the instructional program that some exceptionally well qualified students might complete the requirements of the phase in which they were enrolled in half the normal time while others might require one and one-half times the average. For example, it was estimated that the average student would require 18 months to complete the requirements of the preprofessional phase and that the major portion of the students would take from 13 to 24 months. A relatively few students would meet the requirements in from 9 to 12 months, or require more than 24 months.

Another assumption which affects cost estimations and should be kept in mind in interpreting tables and figures which appear later in this chapter was that costs for materials, equipment and personnel at the University of Georgia (and in the colleges, universities and public schools to be associated with the model program) approach the national average. A preliminary investigation failed to reveal any firm index. However, a small random sample revealed wide variances across the nation. It was concluded that this study should provide precise data in a technical report and that institutions which varied considerably on cost indices would then be able to convert the reported cost estimates into more exact ones for their institutions

Data Processing

Data processing involved the use of Project Management System/360 (PMS/360) which is a comprehensive set of computer data processing programs that make available some of the more advanced management techniques used by both government and industry. The system provides critical path and general cost analyses as well as PERT and PERT-Cost capabilities. It has a flexible add on and substitution capability that allows for the addition of other management oriented routines.

PMS/360, as used in this project, has employed three computer program modules to generate the data found in Volume II of this report. Figure 43 shows the interrelationships of the three computer program modules (processors). Following is a brief description of these three application techniques, or processors.

The network processor is the key program module for executing the PERT and other critical path analyses. This module includes a work-sequencing operation that treats the project as a series of interrelated activities, some of which are done in parallel while others are done serially. When displayed graphically these activities represent the network for the project. These networks are found in Volume II of this report. The longest path through this network determines the time required to complete the project and is called the critical path. All other paths through the network have some slack with respect to this critical path. The job of project management during the development and operation of the model program then becomes one of so scheduling both critical and non-critical work that it takes best advantage of available resources while making the critical path as short as feasible. Special features of the network processor include: variable size data fields; variable ordering of input elements on data cards; a calendar capable of specifying holidays and vacation periods; optional use of master files; networks may contain up to 254 subnets ranging in size up to 32,000 activities; ability to

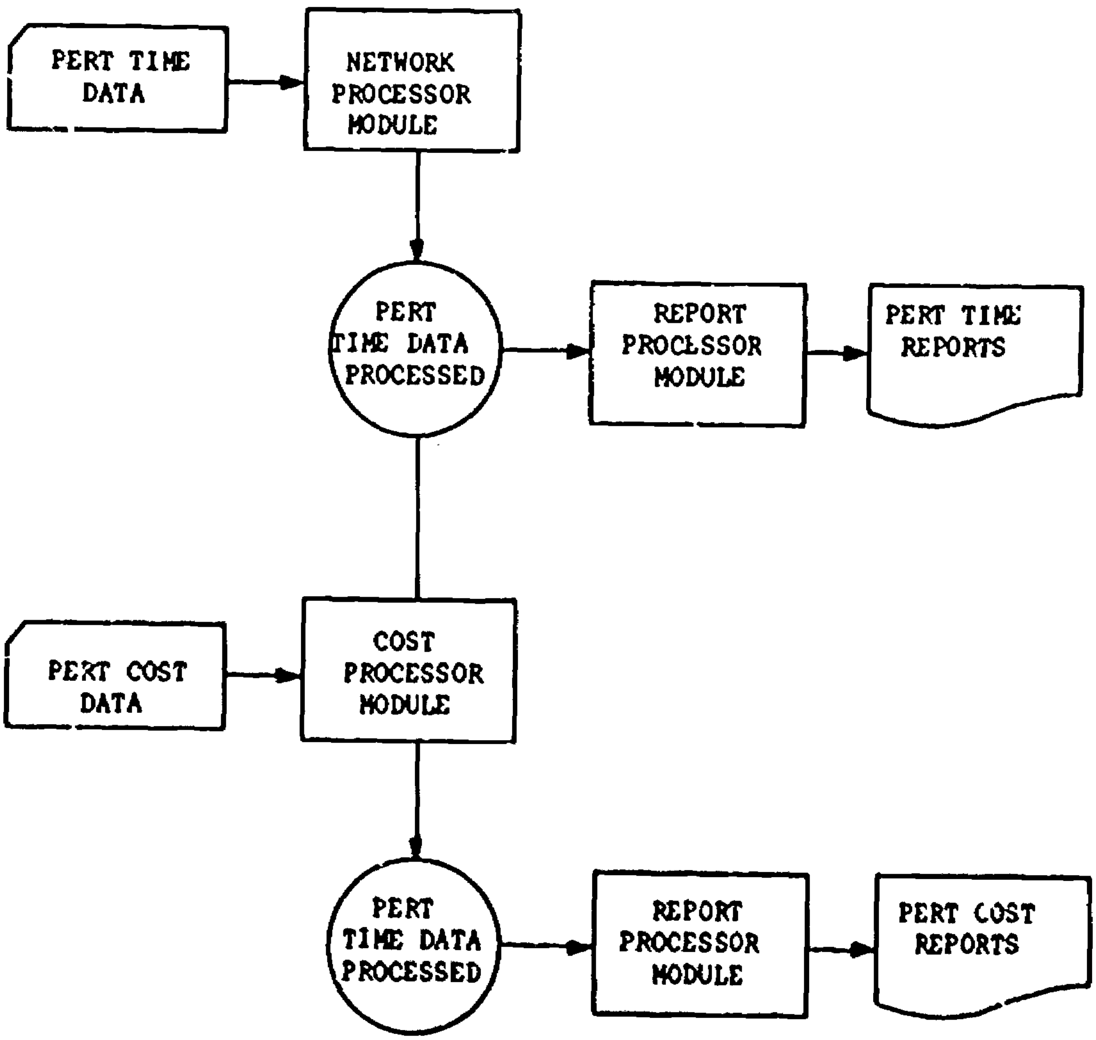

Fig. 43. Interrelationships of PMS/360 processors.

accept time durations in days, weeks, or months; and nine levels of milestone summarization.

The cost processor module is a collection of project oriented manpower, material and cost planning control subroutines which can be used in conjunction with the network processor or in a separate application. The cost processor has been used in conjunction with the network processor in this project application of PMS/360. Special features of the cost processor include: an accounting calendar for variable cost reporting periods; rate tables for budgets, actuals, estimates, commitments and obligations; charge number rate tables for application of factors such as general and administrative fees; nine level work breakdown structure for product oriented cost reporting; nine level organization breakdown structure for function oriented cost reporting and others.

The report processor for the PMS/360 system is designed for use in output report preparation for the network and cost processor modules, or as an independent module within the framework of PMS/360. Its special features include: a set of PERT network reports, selected PERT-Cost reports and statements that allow the user to define his own special reports.

In order to implement PMS/360 with any project the user must be familiar with the fundamentals of critical path, PERT and PERT-Cost techniques. References on critical path, PERT, PERT-Cost and operation and applications of PMS/360 are contained in publications prepared by IBM (1968a, 1968b). In addition, users must have access to personnel thoroughly familiar with PMS/360 and OS/360 job control language to install the system in their organization. The programming language of PMS/360 is written in OS/360 assembler language and operates under the control of OS/360 and uses the QSAM data access method. The system configuration for PMS/360 requires a maximum of 44K data bytes of core storage over and above the requirements of OS/360. Larger core size will permit increased data capacity including network size.

Volume II of this report contains additional information on PMS/360 including job control language, PERT and PERT-Cost data, and computer results obtained in this feasibility study.

Estimated Costs

Summaries of estimated costs for the development and operation of the instructional program are presented in the tables and figures which follow. They are based on computer analyses of the detailed cost data reported in Volume II.

General Information Concerning Tables and Figures

All terms which are used in summarizing the cost data have been previously presented in this report. Definitions for the cost categories which appear in the top row of the majority of the tables (materials, equipment, key personnel, and supporting personnel) were defined earlier in this chapter. The phases of the instructional program (preprofessional, professional, and specialist or inservice) are defined in Chapter I. The components (planning; candidate selection; instruction, education; instruction, arts and sciences; evaluation; training of university staff, and management) have all been dealt with in detail in Chapters III through VI. Planning is the first stage of the development strategy and is described in Chapter III. Candidate selection is dealt with as a component of the evaluation subsystem in Chapter V. Instruction, education means the same as professional education, and instruction, arts and sciences means the same as general education; both are defined in Chapter I and discussed in detail in Chapter IV. Evaluation refers primarily to the student evaluation and program evaluation components of the evaluation subsystem described in Chapter V. Training of university staff is the same as the staff orientation and induction program component described in Chapter IV, and management refers to the activities of the components reported in Chapter VI.

To maintain simplicity in summarizing cost data both computer processing costs and travel costs were assigned to the materials category. This is in keeping with budgeting and cost control policies maintained at the University of Georgia. Persons desiring to single out these and other specific costs are referred to Volume II.

As regards the rounding of numbers, in all instances the costs are rounded to the nearest five hundred dollars. Also except where specifically noted costs for facilities or capital are not included.

In examining the tables the reader must keep in mind the difference between development costs and operation costs. In general, development costs, sometimes referred to as program costs, are those costs required to design and implement the model into sustained existence. These include activities classified as planning, developing, and piloting. Operation costs, sometimes referred to as project costs, are those costs which maintain the ongoing program, and in the case of sustained operation is the total amount assigned. As regards initial operation, part of the costs are operation costs, but because of particular special effort associated with the initiation of a new program for such activities as evaluation and revision, a portion of the cost of initial operation must be considered development costs. The reason for this differentiation between development and operation costs is that in most instances institutions seeking to implement a model program would require supplementary funds only for development.

Estimated Total Costs for Development and Operation

Table 6 presents the estimated total costs for the development and operation of the program model over the fiscal years 1971 through 1976. Table 6 is read as follows: The total estimated costs for the six year period is $18,370,000. Of this total $4,737,000 will be required for materials, $796,500 for equipment, $8,746,000 for key personnel and $4,089,500 for supportive personnel. The components are reported by rows. One row provides a breakdown of costs for the training of university staff during this period: $17,500 will be needed for materials, $3,000 for equipment, $31,000 for key personnel, and $15,000 for supportive personnel. The total needed for this component is $66,500.

Estimated Costs for Development and Operation by Fiscal Years (1971-76)

Tables 7 through 12 are breakdowns of Table 6. They present estimated total cost for development and operation by fiscal year from 1971 through 1976. These tables are read the same as Table 6.

Estimated Costs by Fiscal Years for Development and Operation of Each Phase of the Model Program

The following tables present estimated development and operation costs for each phase of the program by fiscal years.

Preprofessional phase. Table 13 presents the total estimated costs for development and operation of the preprofessional phase of the model program over the fiscal years 1971 through 1974. Tables 14 through 17 are breakdowns of Table 13 by fiscal years. They are read the same as Table 6.

Professional phase. Table 18 presents the total estimated costs for development and operation of the professional phase of the model program over the fiscal years 1971 through 1975. Tables 19 through 23 are breakdowns of Table 18 by fiscal years. They are read the same as Table 6.

Specialist phase. Table 24 presents the total estimated costs for development and operation of the preprofessional phase of the model program over the fiscal years 1971 through 1976. Tables 25 through 30 are breakdowns of Table 24 by fiscal years. They are read the same as Table 6.

Estimated Costs for Development and Operation by Stages

Figure 44 presents the estimated costs for development and operation by stages. Figure 44 is read as follows: The estimated cost for overall management and control (referred to previously as management) is $2,430,000; $226,00 will be required for development of the preprofessional phase, $1,945,000 for piloting of the preprofessional phase, etc.

Estimated Project Costs for Development and Operation by Fiscal Years

Table 31 presents the estimated total project costs for the fiscal years 1971 through 1976 for development and operation. Project costs are the same as development costs and program costs are the same as development costs.

Table 31 is read as follows: the total estimated cost for development and operation is $18,746,000. It is estimated that the total program cost is $5,880,500 and the total project cost is $12,499,500. Of this total $4,112,500 will be required for materials, $694,000 for equipment, $5,402,500 for key personnel and $2,279,00 for supportive personnel. One row provides a breakdown for fiscal year 1975. For example, during this year it is estimated that the total cost for materials will be $342,000; however program costs are estimated at $209,500. Therefore, an additional $132,500 will be required for materials. Another row provides a breakdown for fiscal year 1976. For example, during this year it is estimated that the total cost is $1,415,000, which includes only the cost for the first year of sustained operation of the specialist phase. As previously defined these costs are for operation. Therefore, no project funds will be needed.

Estimated Costs for Facilities for Development and Operation

The following tables present the estimated total costs for facilities. The cost estimates reported here are based on the estimated rent that would be paid for facilities in the new College of Education buildings on the campus of the University of Georgia (Ayers, 1969).

Estimated costs for facilities for development and operation by fiscal year. Table 32 presents the estimated total cost for facilities for each fiscal year 1971 through 1976. Table 32 is read as follows: the total estimated cost for facilities is $881,000. Of this amount $233,000 will be required in fiscal year 1971, $346,000 in 1972, etc.

Estimated costs by stages. Table 33 presents the estimated costs for facilities by stage and phase. The costs for facilities for the preparation and overall management stages have been combined on a prorated basis with the various stages of each phase of the program. Table 29 is read as follows: the total estimated cost for facilities is $881,000. Of this amount $233,000 will be required for the development stage of the preprofessional phase, $28,000 for the development stage of the professional phase, etc.

Table 6

Estimated Total Costs for Fiscal Years 1971 through 1976 for the Development and Operation of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	127,000	23,000	95,000	40,500	285,500
B. Candidate Selection	27,500	5,000	64,500	36,500	133,500
C. Instruction, Education	830,000	199,000	1,604,000	608,000	3,241,000
1. Proficiency Modules	(761,000)	(183,000)	(902,000)	(492,000)	(2,338,000)
2. Practicum	(35,000)	(14,000)	(417,000)	(79,000)	(545,000)
3. Internship	(34,000)	(2,000)	(285,000)	(37,000)	(358,000)
D. Instruction, Arts & Sciences	2,475,000	258,000	1,764,000	1,021,000	5,518,000
E. Evaluation	689,000	41,000	4,305,500	1,869,000	6,904.500
1. Student	(646,000)	(40,000)	(4,101,000)	(1,628,000)	(6,415,000)
2. Program	(43,000)	(1,000)	(204,500)	(241,000)	(489,500)
F. Training of University Staff	17,500	3,000	31,000	15,000	66,500
G. Management	571,000	267,500	883,000	499,500	2,221,000
Totals	4,737,000	796,500	8,746,000	4,089,500	18,370,000

Table 7

Estimated Costs During Fiscal Year 1971 for the Development and Operation of the Georgia Education Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	115,000	21,000	85,000	36,000	257,000
B. Candidate Selection	8,000	2,000	9,000	4,000	23,000
C. Instruction, Education	4,000	12,000	41,000	19,000	76,000
1. Proficiency Modules	(3,000)	(12,000)	(39,000)	(18,000)	(72,000)
2. Practicum	(1,000)	(--)	(2,000)	(1,000)	(4,000)
3. Internship	(--)	(--)	(--)	(--)	(--)
D. Instruction, Arts & Sciences	3,000	12,000	75,000	30,000	120,000
E. Evaluation	5,000	39,000	13,000	19,000	76,000
1. Student	(1,000)	(39,000)	(10,000)	(17,000)	(67,000)
2. Program	(4,000)	(--)	(3,000)	(2,000)	(9,000)
F. Training of University Staff	11,000	3,000	19,000	9,000	42,000
G. Management	23,500	12,000	34,000	19,500	89,000
Totals	169,500	101,000	276,000	136,500	683,000

Table 8

Estimated Costs During Fiscal Year 1972 for the Development and Operation of the Georgia Education Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	12,000	2,000	10,000	4,500	28,500
B. Candidate Selection	8,500	2,000	11,000	5,000	26,500
C. Instruction, Education	289,000	73,000	141,000	82,000	585,000
1. Proficiency Modules	(284,000)	(60,000)	(133,000)	(79,000)	(556,000)
2. Practicum	(4,000)	(13,000)	(6,000)	(2,000)	(25,000)
3. Internship	(1,000)	(--)	(2,000)	(1,000)	(4,000)
D. Instruction, Arts & Sciences	1,064,000	120,000	258,000	112,000	1,554,000
E. Evaluation	17,000	2,000	133,000	93,000	245,000
1. Student	(13,000)	(1,000)	(120,000)	(82,000)	(216,000)
2. Program	(4,000)	(1,000)	(13,000)	(11,000)	(29,000)
F. Training of University Staff	2,000	--	3,000	1,500	6,500
G. Management	34,500	16,500	54,000	31,000	136,000
Totals	1,427,000	215,500	610,000	329,000	2,581,500

Table 9

Estimated Costs During Fiscal Year 1973 for the Development and Operation of the Georgia Education Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	--	--	--	--	--
B. Candidate Selection	5,500	1,000	13,500	7,500	27,500
C. Instruction, Education	449,000	104,000	358,000	176,000	1,087,000
1. Proficiency Modules	(444,000)	(101,000)	(302,000)	(164,000)	(1,011,000)
2. Practicum	(4,000)	(1,000)	(37,000)	(8,000)	(50,000)
3. Internship	(1,000)	(2,000)	(19,000)	(4,000)	(26,000)
D. Instruction, Arts & Sciences	1,355,000	111,000	510,000	(272,000)	2,248,000
E. Evaluation	198,000	--	570,500	297,000	1,065,500
1. Student	(188,000)	(--)	(533,000)	(255,000)	(975,000)
2. Program	(10,000)	(--)	(37,500)	(42,000)	(80,500)
F. Training of University Staff	1,500	--	3,000	1,500	6,000
G. Management	95,000	47,000	141,000	72,500	355,500
Totals	2,104,000	263,000	1,597,000	826,500	4,790,500

Table 10

Estimated Costs During Fiscal Year 1974 for the Development and Operation of the Georgia Education Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	--	--	--	--	--
B. Candidate Selection	2,500	--	16,000	11,000	29,500
C. Instruction, Education	51,000	10,000	573,000	170,000	304,000
1. Proficiency Modules	(21,000)	(10,000)	(241,000)	(117,000)	(389,000)
2. Practicum	(14,000)	(--)	(200,000)	(37,000)	(251,000)
3. Internship	(16,000)	(--)	(132,000)	(16,000)	(164,000)
D. Instruction, Arts & Sciences	46,000	15,000	562,000	300,000	923,000
E. Evaluation	269,000	--	1,968,000	509,000	2,746,000
1. Student	(255,000)	(--)	(1,908,000)	(439,000)	(2,602,000)
2. Program	(14,000)	(--)	(60,000)	(70,000)	(144,000)
F. Training of University Staff	1,500	--	3,000	1,500	6,000
G. Management	181,000	77,500	281,500	157,500	697,500
Totals	551,000	102,500	3,403,500	1,149,000	5,206,000

Table 11

Estimated Costs During Fiscal Year 1975 for the Development and Operation of the Georgia Education Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	--	--	--	--	--
B. Candidate Selection	2,000	--	11,000	7,000	20,000
C. Instruction, Education	34,000	--	427,000	120,000	581,000
1. Proficiency Modules	(6,000)	(--)	(123,000)	(73,000)	(202,000)
2. Practicum	(12,000)	(--)	(172,000)	(31,000)	(215,000)
3. Internship	(16,000)	(--)	(132,000)	(16,000)	(164,000)
D. Instruction, Arts & Sciences	4,000	--	268,000	215,000	487,000
E. Evaluation	145,000	--	1,157,000	676,000	1,978,000
1. Student	(137,000)	(--)	(1,085,000)	(604,000)	(1,826,000)
2. Program	(8,000)	(--)	(72,000)	(72,000)	(152,000)
F. Training of University Staff	1,000	--	2,000	1,000	4,000
G. Management	156,000	75,500	245,000	146,000	623,500
Totals	342,000	75,500	2,111,000	1,165,000	3,693,500

Table 12

Estimated Costs During Fiscal Year 1976 for the Development and Operation of the Georgia Education Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	--	--	--	--	--
B. Candidate Selection	1,000	--	4,000	2,000	7,000
C. Instruction, Education	3,000	--	64,000	41,000	108,000
1. Proficiency Modules	(3,000)	(--)	(64,000)	(41,000)	(108,000)
2. Practicum	(--)	(--)	(--)	(--)	(--)
3. Internship	(--)	(--)	(--)	(--)	(--)
D. Instruction, Arts & Sciences	3,000	--	91,000	92,000	186,000
E. Evaluation	55,000	--	463,000	275,000	793,000
1. Student	(52,000)	(--)	(445,000)	(231,000)	(728,000)
2. Program	(3,000)	(--)	(18,000)	(44,000)	(65,000)
F. Training of University Staff	500	--	1,000	500	2,000
G. Management	81,000	39,000	126,500	73,000	319,500
Totals	143,500	39,000	749,500	483,500	1,415,000

Table 13

Estimated Costs for Fiscal Years 1971 through 1974 for the Development and Operation of the Preprofessional Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	60,000	10,000	41,000	16,000	127,000
B. Candidate Selection	10,500	2,000	25,000	15,000	52,500
C. Instruction, Education	386,000	82,000	196,000	179,000	843,000
1. Proficiency Modules	(377,000)	(69,000)	(135,000)	(166,000)	(747,000)
2. Practicum	(9,000)	(13,000)	(61,000)	(13,000)	(96,000)
3. Internship	(--)	(--)	(--)	(--)	(--)
D. Instruction, Arts & Sciences	1,253,000	128,000	360,000	243,000	1,984,000
E. Evaluation	266,000	39,000	985,000	561,000	1,851,000
1. Student	(250,000)	(39,000)	(949,000)	(523,000)	(1,761,000)
2. Program	(16,000)	(--)	(36,000)	(38,000)	(90,000)
F. Training of University Staff	5,500	2,000	14,000	8,000	29,500
G. Management	113,000	58,500	165,000	94,000	430,500
Totals	2,094,000	321,500	1,786,000	1,116,000	5,317,500

Table 14

Estimated Costs for Fiscal Year 1971 for the Development and Operation of the Preprofessional Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	60,000	10,000	41,000	16,000	127,000
B. Candidate Selection	8,000	2,000	9,000	4,000	23,000
C. Instruction, Education	4,000	12,000	41,000	19,000	76,000
1. Proficiency Modules	(3,000)	(12,000)	(39,000)	(18,000)	(72,000)
2. Practicum	(1,000)	(--)	(2,000)	(1,000)	(4,000)
3. Internship	(--)	(--)	(--)	(--)	(--)
D. Instruction, Arts & Sciences	3,000	12,000	75,000	30,000	120,000
E. Evaluation	5,000	39,000	13,000	19,000	76,000
1. Student	(1,000)	(39,000)	(10,000)	(17,000)	(67,000)
2. Program	(4,000)	(--)	(3,000)	(2,000)	(9,000)
F. Training of University Staff	4,000	2,000	11,000	6,500	23,500
G. Management	15,000	8,000	21,000	12,000	56,000
Totals	99,000	85,000	211,000	106,500	501,500

Table 15

Estimated Costs for Fiscal Year 1972 for the Development and Operation of the Preprofessional Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	--	--	--	--	--
B. Candidate Selection	500	--	2,000	1,000	3,500
C. Instruction, Education	280,000	70,000	45,000	54,000	449,000
1. Proficiency Modules	(277,000)	(57,000)	(42,000)	(53,000)	(429,000)
2. Practicum	(3,000)	(13,000)	(3,000)	(1,000)	(20,000)
3. Internship	(--)	(--)	(--)	(--)	(--)
D. Instruction, Arts & Sciences	1,056,000	116,000	123,000	53,000	1,348,000
E. Evaluation	7,000	--	100,000	41,000	148,000
1. Student	(6,000)	--	(95,000)	(35,000)	(136,000)
2. Program	(1,000)	--	(5,000)	(6,000)	(12,000)
F. Training of University Staff	500	--	1,000	500	2,000
G. Management	17,500	8,500	25,000	15,000	66,000
Totals	1,361,500	194,500	296,000	164,500	2,016,500

Table 16

Estimated Costs for Fiscal Year 1973 for the Development and Operation of the Preprofessional Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	--	--	--	--	--
B. Candidate Selection	1,000	--	7,000	5,000	13,000
C. Instruction, Education	96,000	--	59,000	68,000	223,000
1. Proficiency Modules	(93,000)	--	(31,000)	(63,000)	(187,000)
2. Practicum	(3,000)	--	(28,000)	(5,000)	(36,000)
3. Internship	(--)	(--)	(--)	(--)	(--)
D. Instruction, Arts & Sciences	189,000	--	83,000	102,000	374,000
E. Evaluation	176,000	--	362,000	198,000	736,000
1. Student	(170,000)	(--)	(347,000)	(183,000)	(700,000)
2. Program	(6,000)	(--)	(15,000)	(15,000)	(36,000)
F. Training of University Staff	500	--	1,000	500	2,000
G. Management	58,500	30,000	88,000	50,000	226,500
Totals	521,000	30,000	600,000	423,500	1,574,500

Table 17

Estimated Costs for Fiscal Year 1974 for the Development and Operation of the Preprofessional Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	--	--	--	--	--
B. Candidate Selection	1,000	--	7,000	5,000	13,000
C. Instruction, Education	6,000	--	51,000	38,000	95,000
1. Proficiency Modules	(4,000)	(--)	(23,000)	(32,000)	(59,000)
2. Practicum	(2,000)	(--)	(28,000)	(6,000)	(36,000)
3. Internship	(--)	(--)	(--)	(--)	(--)
D. Instruction, Arts & Sciences	5,000	--	79,000	58,000	142,000
E. Evaluation	78,000	--	510,000	303,000	891,000
1. Student	(73,000)	(--)	(497,000)	(288,000)	(858,000)
2. Program	(5,000)	(--)	(13,000)	(15,000)	(33,000)
F. Training of University Staff	500	--	1,000	500	2,000
G. Management	22,000	12,000	31,000	17,000	82,000
Totals	112,500	12,000	679,000	421,500	1,225,000

Table 18

Estimated Costs for Fiscal Years 1971 through 1975 for the Development and Operation of the Professional Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	42,000	7,000	32,000	15,000	96,000
B. Candidate Selection	10,500	2,000	25,000	15,000	52,500
C. Instruction, Education	411,000	85,000	961,000	279,000	1,736,000
1. Proficiency Modules	(351,000)	(82,000)	(320,000)	(176,000)	(929,000)
2. Practicum	(26,000)	(1,000)	(356,000)	(66,000)	(449,000)
3. Internship	(34,000)	(2,000)	(285,000)	(37,000)	(358,000)
D. Instruction, Arts & Sciences	1,173,000	95,000	746,000	496,000	2,460,000
E. Evaluation	284,000	2,000	2,143,000	614,000	3,043,000
1. Student	(268,000)	(1,000)	(2,056,000)	(516,000)	(2,841,000)
2. Program	(16,000)	(1,000)	(87,000)	(98,000)	(202,000)
F. Training of University Staff	8,000	1,000	9,000	3,500	21,500
G. Management	201,000	96,500	309,000	174,000	780,500
Totals	2,129,500	288,500	4,225,000	1,546,500	8,189,500

Table 19

Estimated Costs for Fiscal Year 1971 for the Development and Operation of the Professional Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	42,000	7,000	32,000	15,000	96,000
B. Candidate Selection	--	--	--	--	--
C. Instruction, Education	--	--	--	--	--
1. Proficiency Modules	(--)	(--)	(--)	(--)	(--)
2. Practicum	(--)	(--)	(--)	(--)	(--)
3. Internship	(--)	(--)	(--)	(--)	(--)
D. Instruction, Arts & Sciences	--	--	--	--	--
E. Evaluation	--	--	--	--	--
1. Student	(--)	(--)	(--)	(--)	(--)
2. Program	(--)	(--)	(--)	(--)	(--)
F. Training of University Staff	6,000	1,000	5,000	1,500	13,500
G. Management	6,500	3,000	10,000	6,000	25,500
Totals	54,500	11,000	47,000	22,500	135,000

Table 20

Estimated Costs for Fiscal Year 1972 for the Development and Operation of the Professional Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	--	--	--	--	--
B. Candidate Selection	8,000	2,000	9,000	4,000	23,000
C. Instruction, Education	9,000	3,000	96,000	28,000	136,000
1. Proficiency Modules	(7,000)	(3,000)	(91,000)	(26,000)	(127,000)
2. Practicum	(1,000)	(--)	(3,000)	(1,000)	(5,000)
3. Internship	(1,000)	(--)	(2,000)	(1,000)	(4,000)
D. Instruction, Arts & Sciences	8,000	4,000	135,000	59,000	206,000
E. Evaluation	10,000	2,000	33,000	52,000	97,000
1. Student	(7,000)	(1,000)	(25,000)	(47,000)	(80,000)
2. Program	(3,000)	(1,000)	(8,000)	(5,000)	(17,000)
F. Training of University Staff	500	(--)	1,000	500	2,000
G. Management	15,000	7,000	26,000	14,000	62,000
Totals	50,500	18,000	300,000	157,500	526,000

Table 21

Estimated Costs for Fiscal Year 1973 for the Development and Operation of the Professional Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	--	--	--	--	--
B. Candidate Selection	500	--	2,000	1,000	3,500
C. Instruction, Education	343,000	82,000	177,000	83,000	685,000
1. Proficiency Modules	(341,000)	(79,000)	(149,000)	(76,000)	(645,000)
2. Practicum	(1,000)	(1,000)	(9,000)	(3,000)	(14,000)
3. Internship	(1,000)	(2,000)	(19,000)	(4,000)	(26,000)
D. Instruction, Arts & Sciences	1,152,000	91,000	245,000	124,000	1,612,000
E. Evaluation	14,000	--	169,000	30,000	213,000
1. Student	(13,000)	(--)	(156,000)	(15,000)	(184,000)
2. Program	(1,000)	(--)	(13,000)	(15,000)	(29,000)
F. Training of University Staff	500	--	1,000	500	2,000
G. Management	17,000	8,000	26,000	15,000	66,000
Totals	1,527,000	181,000	620,000	253,500	2,581,500

Table 22

Estimated Costs for Fiscal Year 1974 for the Development and Operation of the Professional Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	--	--	--	--	--
B. Candidate Selection	1,000	--	7,000	5,000	13,000
C. Instruction, Education	29,000	--	359,000	97,000	485,000
1. Proficiency Modules	(1,000)	(--)	(55,000)	(50,000)	(106,000)
2. Practicum	(12,000)	(--)	(172,000)	(31,000)	(215,000)
3. Internship	(16,000)	(--)	(132,000)	(16,000)	(164,000)
D. Instruction, Arts & Sciences	12,000	--	235,000	158,000	405,000
E. Evaluation	170,000	--	1,232,000	140,000	1,542,000
1. Student	(163,000)	(--)	(1,200,000)	(102,000)	(1,465,000)
2. Program	(7,000)	(--)	(32,000)	(38,000)	(77,000)
F. Training of University Staff	500	--	1,000	500	2,000
G. Management	112,500	54,000	172,000	97,000	435,500
Totals	325,000	54,000	2,006,000	497,500	2,882,500

Table 23

Estimated Costs for Fiscal Year 1975 for the Development and Operation of the Professional Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	--	--	--	--	--
B. Candidate Selection	1,000	--	7,000	5,000	13,000
C. Instruction, Education	30,000	--	329,000	71,000	439,000
1. Proficiency Modules	(2,000)	(--)	(25,000)	(24,000)	(51,000)
2. Practicum	(12,000)	(--)	(172,000)	(31,000)	(215,000)
3. Internship	(15,000)	(--)	(132,000)	(16,000)	(164,000)
D. Instruction, Arts & Sciences	1,000	--	131,000	105,000	237,000
E. Evaluation	90,000	--	709,000	392,000	1,191,000
1. Student	(85,000)	(--)	(675,000)	(352,000)	(1,112,000)
2. Program	(5,000)	(--)	(34,000)	(40,000)	(79,000)
F. Training of University Staff	500	--	1,000	500	2,000
G. Management	50,000	24,500	75,000	42,000	191,500
Totals	172,500	24,500	1,252,000	615,500	2,064,500

Table 24

Estimated Costs for Fiscal Year 1971 through 1976 for the Development and Operation of the Specialist Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	25,000	6,000	22,000	9,500	62,500
B. Candidate Selection	6,500	1,000	14,500	6,500	28,500
C. Instruction, Education	33,000	32,000	447,000	150,000	662,000
1. Proficiency Modules	(33,000)	(32,000)	(447,000)	(150,000)	(662,000)
2. Practicum	(--)	(--)	(--)	(--)	(--)
3. Internship	(--)	(--)	(--)	(--)	(--)
D. Instruction, Arts & Sciences	49,000	35,000	658,000	332,000	1,074,000
E. Evaluation	139,000	--	1,177,500	694,000	2,010,500
1. Student	(128,000)	(--)	(1,096,000)	(589,000)	(1,813,000)
2. Program	(11,000)	(--)	(81,500)	(105,000)	(197,500)
F. Training of University Staff	4,000	--	8,000	3,500	15,500
G. Management	257,000	112,500	409,000	231,500	1,010,000
Totals	513,500	186,500	2,735,500	1,427,000	4,863,000

Table 25

Estimated Costs for Fiscal Year 1971 for the Development and Operation of the Specialist Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	13,000	4,000	12,000	5,000	34,000
B. Candidate Selection	--	--	--	--	--
C. Instruction, Education	--	--	--	--	--
1. Proficiency Modules	(--)	(--)	(--)	(--)	(--)
2. Practicum	(--)	(--)	(--)	(--)	(--)
3. Internship	(--)	(--)	(--)	(--)	(--)
D. Instruction, Arts & Sciences	--	--	--	--	--
E. Evaluation	--	--	--	--	--
1. Student	(--)	(--)	(--)	(--)	(--)
2. Program	(--)	(--)	(--)	(--)	(--)
F. Training of University Staff	1,000	--	3,000	1,000	5,000
G. Management	2,000	1,000	3,000	1,500	7,500
Totals	16,000	5,000	18,000	7,500	46,500

Table 26

Estimated Costs for Fiscal Year 1972 for the Development and Operation of the Specialist Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	12,000	2,000	10,000	4,500	28,500
B. Candidate Selection	--	--	--	--	--
C. Instruction, Education	--	--	--	--	--
1. Proficiency Modules	(--)	(--)	(--)	(--)	(--)
2. Practicum	(--)	(--)	(--)	(--)	(--)
3. Internship	(--)	(--)	(--)	(--)	(--)
D. Instruction, Arts & Sciences	--	--	--	--	--
E. Evaluation	--	--	--	--	--
1. Student	(--)	(--)	(--)	(--)	(--)
2. Program	(--)	(--)	(--)	(--)	(--)
F. Training of University Staff	1,000	--	1,000	500	2,500
G. Management	2,000	1,000	3,000	2,000	8,000
Totals	15,000	3,000	14,000	7,000	39,000

Table 27

Estimated Costs for Fiscal Year 1973 for the Development and Operation of the Specialist Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	--	--	--	--	--
B. Candidate Selection	4,000	1,000	4,500	1,500	11,000
C. Instruction, Education	10,000	22,000	122,000	25,000	179,000
1. Proficiency Modules	(10,000)	(22,000)	(122,000)	(25,000)	(179,000)
2. Practicum	(--)	(--)	(--)	(--)	(--)
3. Internship	(--)	(--)	(--)	(--)	(--)
D. Instruction, Arts & Sciences	14,000	20,000	182,000	46,000	
E. Evaluation	8,000	--	40,500	69,000	117,500
1. Student	(5,000)	(--)	(30,000)	(57,000)	(92,000)
2. Program	(3,000)	(--)	(10,500)	(12,000)	(25,500)
F. Training of University Staff	500	--	1,000	500	2,000
G. Management	19,500	9,000	27,000	7,500	63,000
Totals	56,000	52,000	377,000	149,500	634,500

Table 28

Estimated Costs for Fiscal Year 1974 for the Development and Operation of the Specialist Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	--	--	--	--	--
B. Candidate Selection	500	--	2,000	1,000	3,500
C. Instruction, Education	16,000	10,000	163,000	35,000	224,000
1. Proficiency Modules	(16,000)	(10,000)	(163,000)	(35,000)	(224,000)
2. Practicum	(--)	(--)	(--)	(--)	(--)
3. Internship	(--)	(--)	(--)	(--)	(--)
D. Instruction, Arts & Sciences	29,000	15,000	248,000	84,000	376,000
E. Evaluation	21,000	--	226,000	66,000	313,000
1. Student	(19,000)	(--)	(211,000)	(49,000)	(279,000)
2. Program	(2,000)	(--)	(15,000)	(17,000)	(34,000)
F. Training of University Staff	500	--	1,000	500	2,000
G. Management	46,500	11,500	78,500	43,500	180,000
Totals	113,500	36,500	718,500	230,000	1,098,500

Table 29

Estimated Costs for Fiscal Year 1975 for the Development and Operation of the Specialist Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	--	--	--	--	--
B. Candidate Selection	1,000	--	4,000	2,000	7,000
C. Instruction, Education	4,000	--	98,000	49,000	151,000
1. Proficiency Modules	(4,000)	(--)	(98,000)	(49,000)	(151,000)
2. Practicum	(--)	(--)	(--)	(--)	(--)
3. Internship	(--)	(--)	(--)	(--)	(--)
D. Instruction, Arts & Sciences	3,000	--	137,000	110,000	250,000
E. Evaluation	55,000	--	448,000	284,000	787,000
1. Student	(52,000)	(--)	(410,000)	(252,000)	(714,000)
2. Program	(3,000)	(--)	(38,000)	(32,000)	(73,000)
F. Training of University Staff	500	--	1,000	500	2,000
G. Management	106,000	51,000	171,000	104,000	432,000
Totals	169,500	51,000	859,000	549,500	1,629,000

Table 30

Estimated Costs for Fiscal Year 1976 for the Development and Operation of the Specialist Phases of the Georgia Educational Model for the Preparation of Elementary School Teachers

Components	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
A. Initial Planning	--	--	--	--	--
B. Candidate Selection	1,000	--	4,000	2,000	7,000
C. Instruction, Education	3,000	--	64,000	41,000	108,000
1. Proficiency Modules	(3,000)	(--)	(64,000)	(41,000)	(108,000)
2. Practicum	(--)	(--)	(--)	(--)	(--)
3. Internship	(--)	(--)	(--)	(--)	(--)
D. Instruction, Arts & Sciences	3,000	--	91,000	92,000	186,000
E. Evaluation	55,000	--	463,000	275,000	793,000
1. Student	(52,000)	(--)	(445,000)	(231,000)	(728,000)
2. Program	(3,000)	(--)	(18,000)	(44,000)	(65,000)
F. Training of University Staff	500	--	1,000	500	2,000
G. Management	81,000	39,000	126,500	73,000	319,500
Totals	143,500	39,000	749,500	483,500	1,415,500

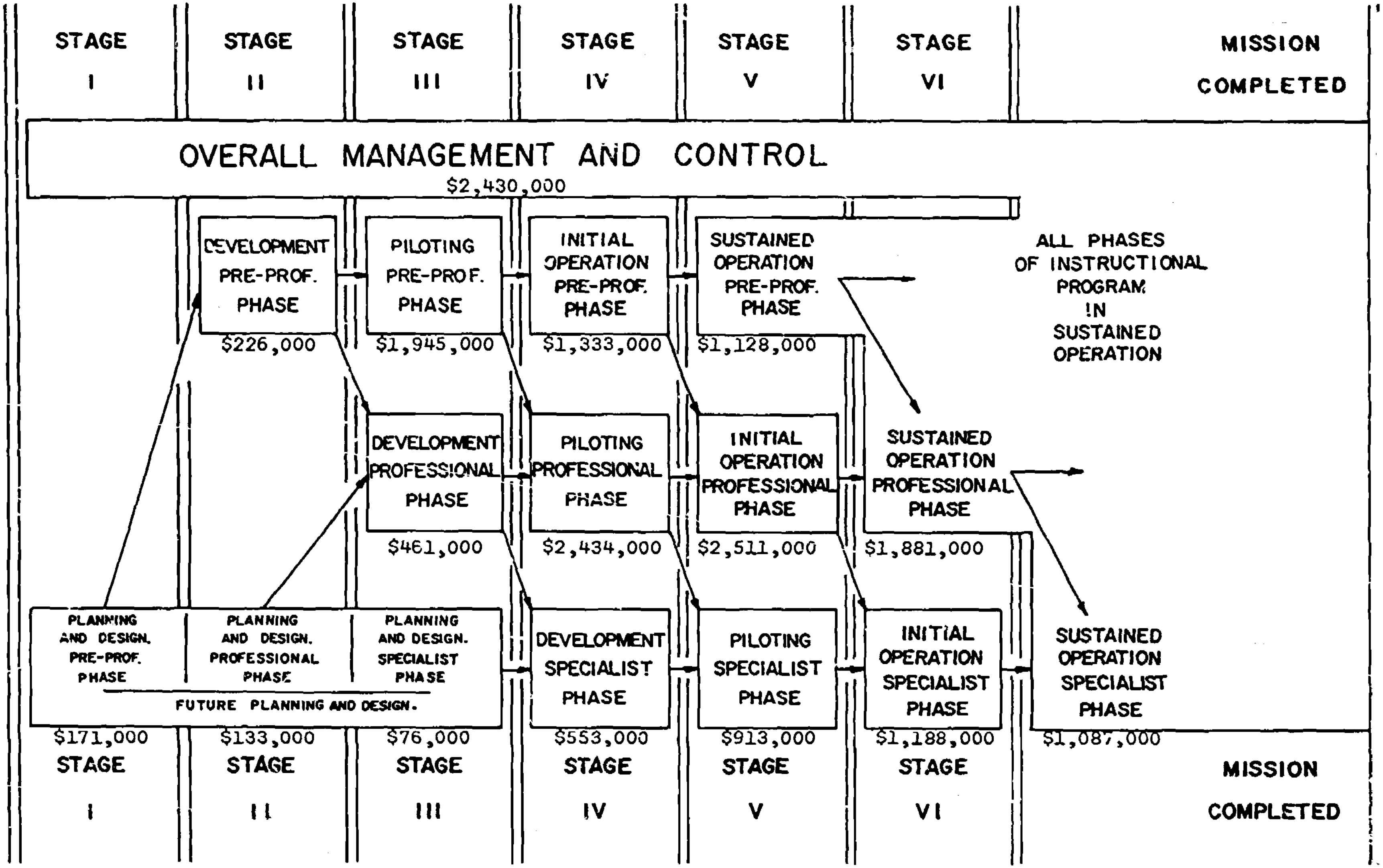

Fig. 44. Estimated costs by stages.

Table 31

Estimated Project Costs for Fiscal Years 1971 through 1976 for Development of the Georgia Educational Model for the Preparation of Elementary Teachers

Fiscal Year	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
1971					
Total Costs	169,500	101,000	276,000	136,500	683,000
Program Costs	---	---	---	---	---
Project Costs	169,500	101,000	276,000	136,500	683,000
1972					
Total Costs	1,427,000	215,500	610,000	329,000	2,581,500
Program Costs	---	---	---	---	---
Project Costs	1,427,000	215,500	610,000	329,000	2,581,500
1973					
Total Costs	2,104,000	263,000	1,597,000	826,500	4,790,500
Program Costs	101,000	6,000	117,000	82,000	306,000
Project Costs	2,003,000	257,000	1,482,000	744,500	4,484,500
1974					
Total Costs	551,000	102,500	3,403,500	1,149,000	5,206,000
Program Costs	170,500	22,000	1,038,000	510,500	1,741,000
Project Costs	380,500	80,500	2,365,500	638,500	3,465,00

Table 31

(con't)

Fiscal Year	Estimated Costs				
	Materials	Equipment	Key Personnel	Supporting Personnel	Totals
1975					
Total Costs	342,000	75,500	2,111,000	1,165,000	3,693,500
Program Costs	209,500	35,500	1,439,000	734,500	2,418,500
Project Costs	132,500	40,000	672,000	430,500	1,275,000
1976					
Total Costs	143,500	39,000	749,500	483,500	1,415,000
Program Costs	143,500	39,000	749,500	483,500	1,415,000
Project Costs	—	—	—	—	—
1971-1976					
Total Costs	4,737,000	796,500	8,746,000	4,089,500	18,370,000
Program Costs	624,500	102,500	3,343,500	1,810,500	5,880,500
Project Costs	4,112,500	694,000	5,402,500	2,279,00	12,499,500

Table 32

Estimated Total Cost for Facilities Needed to Develop and Operate the Georgia Educational Model for the Preparation of Elementary Teachers (by Fiscal Years)

Fiscal Year	Estimated Costs
1971	.233,000
1972	346,000
1973	114,000
1974	115,000
1975	55,000
1976	18,000
Totals	881,000

Table 33

Estimated Total Cost for Facilities Needed to Develop and Operate the Georgia Educational Model for the Preparation of Elementary Teachers (by Stages)

Stages	Estimated Costs			
	Preprofessional	Professional	Specialist	Totals
Development	233,000	28,000	27,000	288,000
Piloting	318,000	36,000	43,000	397,000
Initial Operation	26,000	66,000	17,000	109,000
Sustained Operation	31,000	38,000	18,000	87,000
Totals	608,000	168,000	105,000	881,000

Estimated Costs for Development, Operation and Facilities

Figure 45 presents a graph showing the relationship between cost for development, operation and facilities for each fiscal year 1971 through 1976.

Per student cost during sustained operation. The per student cost during sustained operation is dependent upon the number of students enrolled in the program. As the number of students enrolled in the program increases, the per student cost will decrease to some extent as certain costs are fixed regardless of the number of students enrolled in the program.

Table 34 presents a summary of the per student cost per month during the first year of sustained operation for each of the three phases of the model program.

Table 34

Summary of Sustained Operation Costs for the Preprofessional, Professional and Specialist Levels

Phase	Fiscal Year	Total Costs	N	Per Student Cost Per Month
Preprofessional	1974	$1,225,000	480	$213
Professional	1975	$2,064,500	480	$358
Specialist	1976	$1,415,500	240	$491

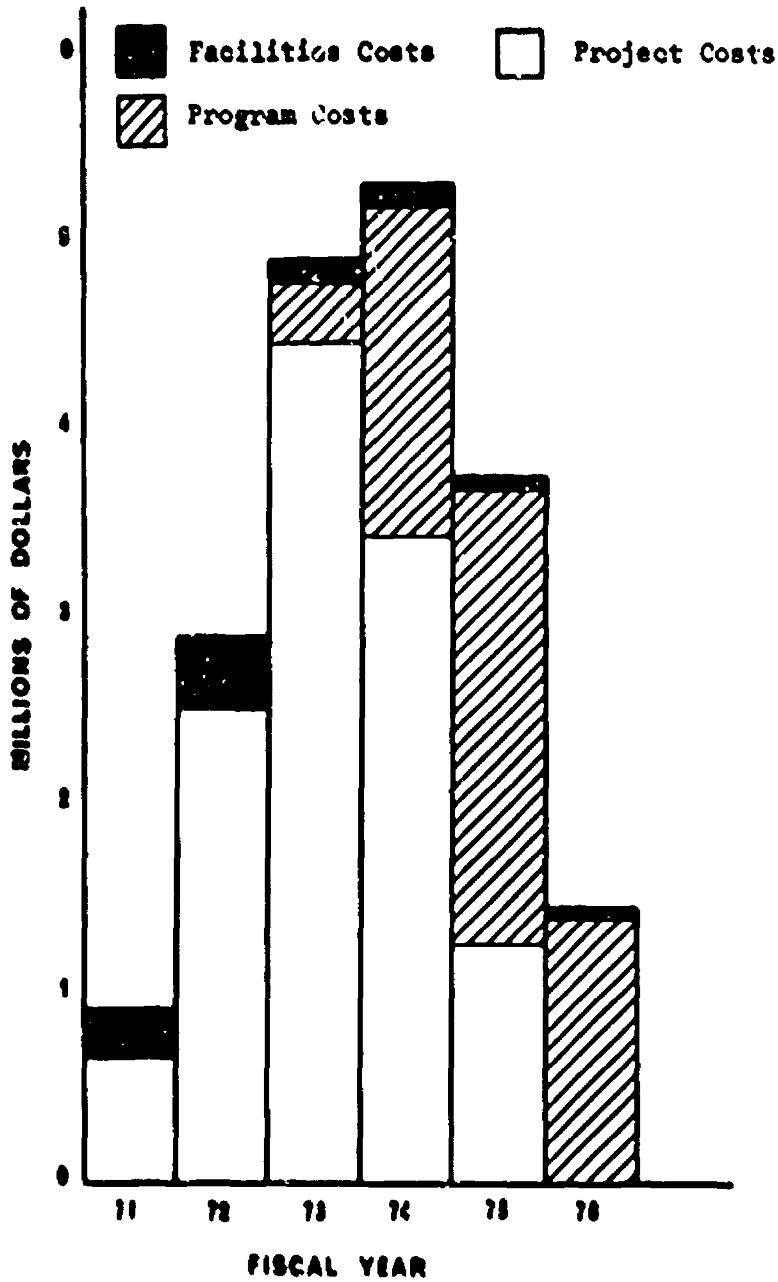

Fig. 45. Estimated total costs for project, program and facilities compared.

Economic Feasibility for Development and Operation

The costs for development and operation of the model instructional program presented in the preceding tables and figures are provided as a foundation for decision-making. They provide data which may be used in answering the question: Should any institution of higher learning consider developing and implementing the Georgia model program for the preparation of elementary school teachers, what would be the estimated costs? Estimated costs for such action at the University of Georgia are given, and these costs with adjustments can be applied to any institution which graduates over 100 general elementary teachers each year and maintains a two-year graduate program. However, the costs are only objective data. It is then necessary to decide whether or not to take such action. Fundamental to this decision is the availability of funds both for the five to six year development program and for the indefinite period of sustained operation which follows.

If an institution has unlimited funds available, there is no question but that insofar as costs are concerned the development and operation of the model is feasible. However, it is not likely that any institution of higher learning is in so fortunate a position that unlimited funds are available. Thus, institutions considering undertaking the project must ask themselves, "Under what economic conditions would it be feasible to undertake the development and subsequent operation of the model program?"

Of first concern in answering this question is the cost of sustained operation. It would be uneconomical to develop any program if there were not sufficient funds to maintain it. The most direct means of determining the feasibility of maintaining the model program is to find the difference between the per student cost for the model program in sustained operation and the per student cost for the present program. If this difference favors (is less) the model program there is no question of the feasibility of maintaining it. On the other hand, if the difference disfavors (is more) the model program, then the decision must be made on the basis of the difference, the availability of operational funds to care for the difference, and the extent to which the difference provides a more worthwhile product.

If cost to sustain the model program is the same or less than for the present program or if, after consideration, additional costs to maintain the model program are deemed reasonable and funds are found, then the next concern is for development costs. Here again, the most direct answer is found through per student costs. To determine a per student cost for development it is necessary to establish an assumed period of sustained operation, and to estimate the number of students who would complete the program during that period. The total cost for development divided by the number of students benefiting from the program yields the per student cost for development.

All estimated per student costs are reported on the base of average cost for one month of instruction. This is necessitated because the model program is individualized and specifies that the facilities will be in operation 12 calendar months of the year. Since semesters, quarters, and credit hours could not be used for computations, estimations of per student costs for the presently operative instructional program were made on the assumption that one academic year is the equivalent of 9 calendar months.

Per Student Cost During Sustained Operation

Estimated cost data reveal the projected per student cost during sustained operation of the model program for the fiscal period 1974 through 1976 to be $213 per month for the preprofessional program, $358 for the professional program and $491 for the specialist program. These figures are based on the assumption that the enrollment in the preprofessional and professional phase is 480 each, and in the specialist phase is 240.

Findings of an investigation into current per student costs for elementary education students at the University of Georgia during 1967-68 (Ayers and Finnegan, 1969) yielded a per student cost of $223 per month for lower division students (freshmen and sophomores, or the equivalent of students in the preprofessional phase) and $283 per month for the upper division students (juniors and seniors, or the equivalent of students in the professional program). These estimates of monthly costs were based on a total average lower division enrollment of 375 and a total average upper division enrollment of 585. Applying a correction of 3% for inflation these estimated per student monthly costs for the fiscal year 1974 become $274 per month per lower division student and $339 per month per upper division student.

Because of the small number of students in the graduate program and the lack of reliable cost data no estimate could be made which would be comparable for the specialist students costs.

It should be noted that the projected per student cost per month in sustained operation for the preprofessional phase in the model program ($213) is at least the same or less than that projected for the same year for the present program ($274). The projected per student cost per month in sustained operation for the professional phase of the model program is $358, and under the present system is $339. However, the per student cost per month under the present system was computed on an assumed enrollment of 585 whereas the model program cost was computed on an assumed enrollment of 480. If it is assumed that as the number of students enrolling in the program increases, the student cost decreases, and if it is assumed that the decrease is approximately 6% for the first 100 enrolled students over the 480 base, then the estimated per student cost per month for students enrolled in the professional phase is $339 or the same as the per monthly cost for students enrolled in the current program.

That the per student cost for both the preprofessional phase and the professional phase of the model program are not found to be in excess of the per student cost for maintaining the present instructional program is attributed to the application of improved management techniques and the use of modern technology. The model program with its many innovations and extended opportunities for learning would undoubtedly be more costly than the present instructional program were it not for the applications of these improvements in organization and planning.

Per Student Cost for Development

To determine a per student cost for development it was assumed that the period of sustained operation following development would be at least 20 years. Twenty years may, to some, seem on first consideration to be a rather lengthy period for a model program to be in operation. However, this model program has a built-in self-improvement or regenerative feature which operates through long-range evaluation, feedback, and revision activities. Thus, when properly implemented the instructional program will be in a constant state of change in keeping with changing conditions of society. One might well expect that the model program in a period of twenty years might in some respects have been modified through systematic revision to the extent that many of the core behaviors, much of the subject matter, and many of the learning activities would have been radically changed from their original forms.

As regards the number of students to be affected by the program in that 20 year period, it is likely that the University of Georgia itself will graduate approximately 12,000 students prepared to teach in elementary schools (Ayers, 1969). The investigating staff estimates that when this program is developed it will eventually be implemented into operation in at least 25 institutions of higher learning, each graduating an average of 250 students a year for a period of at least 20 years. Those affected at the University of Georgia plus those affected at collaborating institutions will thus total 137,000. Since the estimated cost for development is $12,499,500, then insofar as the preparation of elementary school teachers is concerned the per student development cost over a period of 20 years would be $91 for the total three phase instructional program (60 months for the average qualified student) or $1.50 per month of instruction. Thus, the per student cost for program development is estimated at $1.50 per month of instruction. Should the model be applied to other fields (Ayers and Finnegan, 1969) or become the basis for the revision of all higher education, the per student cost for development would be drastically reduced.

<u>Economic Feasibility for Development and Operation at the University of Georgia</u>

Insofar as the University of Georgia is concerned, developing and maintaining the model program in its entirety is feasible provided special funds for development can be obtained. Once the program is implemented the cost for sustained operation can be handled completely within the anticipated university budget.

Costs for Alternate Plan Based on Limited Available Funds

All estimated costs presented in the preceding tables have assumed that when the model is developed and implemented the entire program including all subsystems, components and phases would be undertaken and the final product would be a high quality six-year equivalent teacher education program which provides certification and degrees at three critical points on a career ladder: assistant teacher, general elementary teacher, and specialist. Ideally, this should be the case. However, alternate plans based on limited available funds must be considered in the light of practical conditions.

In considering alternates the basic structure of the Georgia model must be maintained. Certain essential characteristics must be evident at all times or the product could not be regarded as reflective of the model. For example: the core of the program from which learning content, methods and activities are drawn must be performance behaviors; individualized instruction must be maintained; evaluation must be based on mastery criteria; the regenerative feature associated with continuous program evaluation, feedback and revision must be ever present; wide professional collaboration must be evident; and systems technology must be the basis for all planning and other functions of management. These essential characteristics demand others which even more clearly distinguish the Georgia model from other models. They include: provision for a career sequence, PMs, a continuous seminar, learning laboratories, extensive field experiences, a personalized guidance program, alternate learning activities, year-round educational opportunities, and staggered registration.

Insistence upon maintaining the essential and distinguishing characteristics of the model prohibits extracting isolated components (such as the components for student selection, instructional materials, or staff inservice training and orientation) and treating their development as alternate plans for the development and implementation of the Georgia model. To do so under certain circumstances could prove profitable, but should be regarded as incorporating an innovation feature of the Georgia model into an existing program.

The determination to maintain the essential and distinguishing characteristics of the Georgia model in selecting alternate plans based on limited available funds considerably restricts the number of alternates which may be considered. In exploring possibilities the staff gave special attention to the observation that each of the three phases of the model, if drawn from the total system, could be regarded as a model reflective of the total. That is, each phase of the instructional program apart from the others reflects all of the essential and distinguishing characteristics of the Georgia model. From this observation three alternate plans were considered: (a) development and operation of the preprofessional and professional phases combined without provision for the specialist or inservice phase, (b) development and operation of the professional and specialist phase combined without provision for the preprofessional phase, and (c) development of any one of the phases without provision for the other two.

Two other alternate plans were regarded as feasible in that they did not disturb the basic characteristics of the model. These were (a) the development and operation of all, two or only one of the phases with a reduction in the number of alternate learning activities provided in the PMs, and (b) the development of the model program over an extended period of time utilizing volunteer assistance from both staff and students. The extension of time factor to some extent disqualifies the last mentioned alternate as the provision of the contract which gave rise to this investigation specifies a five year development period.

Combined Preprofessional and Professional Phases Alternate

Combining the preprofessional and professional phases of the model program provides a practical alternate plan. Such an alternate would allow for the early recruitment of quality students and provide them early on-the-job field experiences. It would also cover the most crucial period of teacher preparation for the majority of the teachers, and provide a basis for planning, developing and implementing a specialist program at a later date.

Table 35 shows the estimated costs for developing and operating the combined preprofessional and professional phases program alternate. The total estimated project or development cost is $9, 395,500. This is the difference between the total development and operation cost of $13,507,000 and the program or operation cost of $4,111,500. It is a $3,104,000 reduction of estimated cost for the development of the complete program which is $12,499,500.

The estimated costs shown in Table 35 are based on adjustments of cost data previously reported. The development and operation costs of the preprofessional and professional phases are interdependent and not dependent upon the specialist phase. Therefore, the assumption has been made that the costs for development and operation of the preprofessional and professional phases will be the same as for development and operation of these two phases if they were developed as part of the total program.

Combined Professional and Specialist Phases Alternate

The advantages in combining the professional and specialist phases to provide an alternate center around the fact that professional (as contrasted with paraprofessional) development does not begin until the professional phase. That is, since this is regarded as a model teacher education program, project cost reductions should be such as to provide emphasis on those phases of the model program which give most direct attention to professional preparation. However, there are certain disadvantages. Such a program would not allow for early recruitment of quality students, early practical field experiences with children, or articulation between lower division curricula and the professional sequence of the model.

Table 36 shows the estimated costs for development and operation of the combined professional and specialist phases program alternate. The total estimated project or development cost is $8,840,000. This was determined by subtracting the program or operation cost of $4,478,500 from the total development and operation cost of $13,318,500. It is a $3,659,500 reduction from total development costs for the complete model program ($12,499,500).

Table 35

Estimated Costs for Development and Operation of the Preprofessional and Professional Phases of the Model Program Combined

	Development	Piloting	Initial Operation	Sustained Operation	Total
Preprofessional					
Total Costs	501,500	2,016,500	1,574,500	1,225,000	5,317,500
Program Costs	---	---	306,000	1,225,000	1,531,000
Project Costs	501,500	2,016,500	1,268,500	---	3,786,500
Professional					
Total Costs	661,000	2,581,500	2,882,500	2,064,500	8,189,500
Program Costs	---	---	516,000	2,064,500	2,580,500
Project Costs	661,000	2,581,500	2,366,500	---	5,609,000
Totals					
Total Costs	1,162,500	4,598,000	4,457,000	3,289,500	13,507,000
Program Costs	---	---	822,000	3,289,500	4,111,500
Project Costs	1,162,500	4,598,000	3,635,000	---	9,395,500

Table 36

Estimated Costs for Development and Operation of the Professional and Specialist Phases of the Model Program Combined

	Development	Piloting	Initial Operation	Sustained Operation	Total
Professional					
Totals Costs	696,000	2,651,500	2,872,500	2,064,500	8,284,500
Program Costs	---	---	516,000	2,064,500	2,580,500
Project Costs	696,000	2,651,500	2,356,500	---	4,704,000
Specialist					
Total Costs	752,000	1,168,500	1,699,000	1,415,000	5,034,500
Program Costs	---	---	483,500	1,415,000	1,898,500
Project Costs	752,000	1,168,500	1,215,500	---	3,136,000
Totals					
Total Costs	1,448,000	3,820,000	4,571,500	3,479,000	13,318,500
Program Costs	---	---	999,500	3,479,000	4,478,500
Project Costs	1,448,000	3,820,000	3,572,000	---	8,840,000

The estimated costs shown in Table 36 are based on adjustments of cost data previously reported. The costs for development and operation of the preprofessional phase of the total program include certain costs for materials and equipment that are used in the professional and specialist phases of the program. It was therefore necessary to adjust the total amount of material and equipment needed to develop only the professional and specialist phases of the program. It was estimated that an additional $500,000 would be required for materials for development of both the professional and specialist phases. It was also estimated that an additional $300,000 would be required for equipment for development of both phases. The estimated costs for operation remain the same.

One Phase Alternate

To develop one phase only of the three phase or total model program is regarded as a comparatively undesirable venture. However, in the face of extremely limited funds such a venture would provide an alternate which represents the basic characteristics of the Georgia model and a quality segment of a total educational program. Losses in effectiveness would be primarily the result of the lack of articulation, such as duplication of content and reduced teach-as-taught benefits. Of the three choices most institutions would elect to develop the professional phase in preference to the others. However, it is likely that some junior or senior colleges would elect to develop the preprofessional phase because of special concern for the preparation of aides and assistant teachers.

Table 37 shows the estimated costs for development and operation of the professional phase alternate. The total cost for development is $5,895,500. This is a cost reduction of $6,604,000 from the estimated total development cost of $12,499,500. Table 38 shows the estimated costs for development and operation of the preprofessional phase alternate. The total cost for development is $3,818,500. This is a cost reduction of $8,681,00 from the estimated cost for the development of the complete model program ($12,499,500).

The estimated costs shown in Tables 37 and 38 are based on adjustments of cost data previously reported.

Table 37

Estimated Costs for Development and Operation of the Professional Phase of the Model Program

	Development	Piloting	Initial Operation	Sustained Operation	Total
Total Costs	710,000	2,751,000	2,950,500	2,064,500	8,476,000
Program Costs	---	---	516,000	2,064,500	2,580,500
Project Costs	710,000	2,751,000	2,434,500	---	5,895,500

Table 38

Estimated Costs for Development and Operation of the Preprofessional Phase of the Model Program

	Development	Piloting	Initial Operation	Sustained Operation	Total
Total Costs	501,500	2,016,500	1,574,500	548,000	4,640,500
Program Costs	---	---	274,000	548,000	822,000
Project Costs	501,500	2,016,500	1,300,500	---	3,818,500

In Table 37 an additional $250,000 was added to provide for materials for development, and an additional $225,500 was added for equipment. This was necessitated because in the original cost estimates much of the equipment and a considerable amount of materials to be used in the professional program was assumed to be purchased during the preprofessional phase, which is non-existent in this alternate.

The preparation of Table 38 was based on the assumption that this alternate would most likely be selected by junior colleges. The cost of development remained unchanged as it was assumed that the total cost for development of the preprofessional phase in a junior college would be comparable to development costs in a senior college. Operation costs, however, were affected. As a result of a survey of junior colleges in the State of Georgia (Ayers, 1969) it was found that the average number of students listed as prospective elementary or early childhood teacher education majors was approximately 240. Because this was one-half of what was estimated for senior colleges, sustained operation estimates were adjusted accordingly.

Reduction of Learning Activities Alternate

The specifications of the model call for each PM to include at least three suggested alternate learning activities for each cluster of behaviors to be acquired. This is one means of providing for individual differences in the students' styles of learning and sensory sensitivity to learning media. However, it is a costly item because for each learning activity provision must be made for the materials, equipment and evaluative devices associated with that activity, and in the total program there are thousands of activities. To reduce the number of alternate activities from three to two for each cluster of behaviors could seriously affect the efficiency of the program. However, facing practical circumstances of limited funds such action might be necessary with a view toward readjusting the number to three over a period of time during sustained operation. Provision is already made in the model for the continual revision and updating of all PM learning activities.

Table 39 provides data on how a reduction in the number of PM alternate activities from three to two would affect program development and operation costs. Total

Table 39

Estimated Costs for Development and Operation of the Model Program With Reduction in Number of Alternate PM Learning Activities

	Development	Piloting	Initial Operation	Sustained Operation	Total
Preprofessional					
Total Costs	383,000	1,518,500	1,387,000	1,152,000	4,440,500
Program Costs	---	---	240,000	1,152,000	1,392,000
Project Costs	383,000	1,518,500	1,147,000	---	3,048,500
Professional					
Total Costs	503,500	1,947,500	2,638,000	1,930,000	7,019,000
Program Costs	---	---	804,000	1,930,000	2,734,000
Project Costs	503,500	1,947,500	1,834,000	---	4,235,000
Specialist					
Total Costs	542,000	824,500	1,417,000	1,257,000	4,040,500
Program Costs	---	---	628,500	1,257,000	1,885,500
Project Costs	542,000	824,500	788,500	---	2,155,000
Totals					
Total Costs	1,428,500	4,290,500	5,442,000	4,339,000	15,500,000
Program Costs	---	---	1,672,500	4,339,000	6,011,500
Project Costs	1,428,500	4,290,500	3,769,500	---	9,488,500

development costs for the model program with three alternate activities for each cluster of behaviors is estimated in preceding tables as $12,499,500. By reducing the number of activities to two the estimated cost for development shown in Table 39 is $9,488,500. This alternate plan would then reduce overall development costs by approximately $3,011,000.

The estimated costs shown in Table 39 are based on adjustments of cost data previously reported. It is assumed that reduction of the number of alternative activities from three to two for each PM will decrease the cost for development of PMs by 25%. With the reduction in the number of alternatives, it is assumed that the cost for operation of each phase of the model will be reduced by about 15%.

Extended Time Alternate

This alternate plan proposes the development of the model program over an extended period of time utilizing volunteer assistance from both staff and students. If carried out it would maintain the basic specifications and characteristics of the Georgia model. However, there is serious doubt that the motivation and energy of any staff could be sustained ten to 15 years in a volunteer situation to the extent that the goal could be reached. Table 40 presents a rough estimate of potential development or project costs if the extended time alternate were implemented. Dividing the total amount by 10 years the estimated cost would be $637,700 per year. Dividing by 15 years would yield an estimated cost of $425,133 per year.

Table 40

Estimated Costs Assuming Ten to Fifteen Years for Development

Cost Categories	Costs
Materials	2,196,000
Equipment	300,000
Key Personnel	2,400,000
Supporting	1,481,000
Total	6,377,000

Underlying the adjusted estimates in Table 40 is the assumption that the materials and equipment needed for development and operation can be purchased as needed by the developing institution for replacement of obsolete items. It is assumed that this will reduce the estimated costs for materials and equipment by at least 50%. Since the majority of the development of learning activities will be done in conjunction with course work it is estimated that the costs for personnel will be reduced by at least 50%. Therefore, the total cost for development of the three phases of the program will be reduced by at least one-half.

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Chapter VIII

Summary and Conclusions

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This is a report of an investigation which sought to determine the feasibility of developing and operating the Georgia model program for the preparation of elementary school teachers.

Objectives

The objectives of this study are: (a) to establish the feasibility of the teacher education program model in projected sustained operation, (b) to provide a strategy to implement the educational program model into sustained operation, and (c) to provide cost estimates for the development and operation of the instructional program with attention to alternate paths based on limited resources.

This investigation also provides a product which is likely to be of greater value to professional education than the findings of the study itself. It is a system, more efficient than any now in existence, designed to develop and maintain exemplary educational programs.

Procedure

The investigation began with the selection, orientation and training of new staff members for their work assignments. Next, a critical examination was made of the original instructional model as it reflected sustained operation to be certain that all details of the design were filled in and to identify those features which should be investigated for feasibility. When the design was completed investigation of the technical and socio-psychological feasibility of each component was undertaken and validated where necessary. In some instances this led to the modification and/or redesigning of the specifications for the sustained operation of the model. That is to say, in order to establish feasibility within reasonable limits of confidence, it was necessary to modify some of the original specifications. Any changes that were made in the specifications necessitated re-examination of the system to determine whether these changes demanded revision in other components of the design. If so, revision followed by additional re-examination occured.

When the investigators were satisfied that the model was theoretically, technically, and socio-psychologically feasible and that all systems appeared to be compatible and consistent with the basic intent of the operation, a PERT chart diagram of the systems network of the instructional program in sustained operation was designed. For each activity detailed time and cost requirements (personnel, facilities, materials, etc.) were attached. Utilizing IBM PMS/360 computer programs the data were fed and stored.

Investigation of cost feasibility for the model instructional program in sustained operation was then begun. The primary criterion for determining cost feasibility was that the per student cost for instruction in the model program should be reasonable for an institution to maintain without supplementary financial assistance. Finally, an exploration was made of the cost for various possible modifications (reductions of the instructional program in sustained operation in relation to limited available funds).

Concurrently with determining the feasibility of the model program in sustained operation the investigators designed a detailed and effective strategy which would implement the instructional program into sustained operation in a period of five years. This activity required the involvement of consultants and other specialists with expertise in designing strategies and engineering designs in such fields as industry, military operations, space technology and sociology. When the conceptual model for this strategy was completed, detailed activities were designed and a PERT chart diagram for the strategy was prepared. Next, time estimates were assigned to each activity and, again utilizing IBM PMS/360 computer programs, the time data were fed to determine the extent to which time estimates were such that the strategy could accomplish the mission within the five year period. Some adjustments were found necessary and were made.

When investigators were satisfied that the strategy was sound and the mission could be accomplished within the five year limit, cost estimates for personnel, facilities, equipment, travel, technology, materials, etc. were attached to each activity in the strategy and computer stored. Costs were then retrieved for purposes or reporting and an examination was made of the cost of developing and implementing the model program into operation. Finally various reasonable modifications (reductions) of the model based on limited available funds were considered.

Strategy for Development and Implementation

The specifications for the development strategy require the application of research and development procedural principles providing for flexibility in management of time. However, this flexibility is within a framework of defined limits. For example, the starting date for the project is assumed to be July 1, 1970. The period of funding by a contractor is limited to five years. Because of these limitations the strategy is designed so that all components of all phases of the instructional program have been developed and piloted by July 1, 1975.

The concept of sequential induction of instructional phases was fundamental to the strategy for the development of the model program. This concept requires that the instructional program be built and implemented from the point of initial student entry and that the learning activities be developed sequentially through to the highest level of proficiency required by the specifications of teacher performance. This means that attention is first given to the development of the preprofessional phase, next to the professional phase and finally to the specialist phase. Furthermore, it means that when sustained operation occurs it will occur first with a preprofessional phase, followed next with the professional and finally with the specialist phase. Thus, the attainment of the condition where all phases of the instructional program are in sustained operation is not complete until the specialist phase leaves its final stage of development.

There are six stages for development leading from preparation and planning of the preprofessional phase to sustained operation. Stage 1 provides for preliminary planning with special attention being given to the preprofessional phase of the instructional program. Stage 2 begins and ends the development of the preprofessional phase and provides for the planning and designing of the professional phase. During stage 3 the preprofessional phase is piloted, the professional phase is developed and the planning and designing of the specialist phase is completed. During stage 4 the preprofessional phase is tested in initial full-scale operation. At this same time the professional program is piloted and the specialist phase is developed. In stage 5 the preprofessional program begins sustained operation while the professional phase is being tested in initial operation and the specialist phase is piloted. During stage 6 the professional phase joins the preprofessional phase in sustained operation and the specialist phase engages in initial operation. At the end of stage 6 all three phases of the instructional program are in sustained operation and the mission is thus completed.

Application of the principle of sequential induction combined with specifications related to individualized instruction and accompanied by the feature of staggered registration creates particular scheduling concerns which cause all stages to overlap.

Estimated Costs

The overall cost for the fiscal years beginning July 1, 1970, and extending through June 30, 1976 for both development and operation of the Georgia educational model for the preparation of elementary school teachers is estimated at $18,370,000, not inclusive of facilities. Of this total $12,499,500 is required for program development (project activities) and $5,880,500 is required for sustained operation (maintaining instructional program activities). During the first fiscal year the development costs are relatively low ($683,000), during the second and third years they rise sharply ($2,581,500 and $4,484,500 respectively), and in the remaining two years they gradually diminish. ($3,465,000 and $1,275,000 respectively). In general the highest costs for development are for key personnel to develop and pilot the instructional materials (PMs) and to prepare the evaluation instruments.

In 1976, when all phases of the instructional program have been developed, piloted and passed through the initial period of operation, it is estimated that the cost per year for sustained operation will be $4,841,500. Assuming a total population of 1200 students distributed throughout the three phases of the instructional program the average per student cost per year may be estimated as $4,035, yielding a per student cost per month of $336.

Since the student population varies from phase to phase and year to year, and since the cost for instruction is greatest at the graduate level and declines in the direction of first year students, a special investigation was made to estimate the per student cost per month during each phase of sustained operation of the model program. These costs were then compared with what the estimated cost of the current program at the University of Georgia would be at the same time. In 1974 the per student cost per month for students in the preprofessional phase of the model program is estimated to be $213, whereas the student cost per month of the current program at the University of Georgia if extended to that date would be $274 (this includes a 3% per year increase for inflation). In 1975 the per student cost per month for students in the professional phase of the model program is estimated to be $339. At that same time the per student cost per month for the current program at the University of Georgia if extended to that date would be $339. In 1976 the per student cost per month for students in the specialist or inservice phase of the model program is estimated to be $491. Because of the dearth of data on the 5th and 6th year elementary education programs no sound estimate of the per student cost per month for graduate students could be obtained. Thus, no comparative figures for this category are available.

Estimating per student cost per month for development is dependent upon the assumed period of sustained operation during which students would be affected by the model program and upon the number of students which would be affected. Because of the self-improvement or regenerative nature of the model it was estimated that the life of the program would be at least 20 years, and because of provisions for coalitions and dissemination it was estimated that over the 20 year period approximately 137,000 students would be affected. Calculations based on these assumptions yielded an estimated development cost of $1.50 per student per month.

The total cost for facilities for the fiscal years beginning July 1, 1970, and extending through June 30, 1976, for both development and operation of the educational model is $881,000. This total includes all required facilities (classrooms, lecture halls, libraries, tables, desks, laboratories, television facilities, etc.). The activities associated with development and piloting phases account for approximately $685,000 of the total cost for facilities during sustained operation and approximately $87,000 for 1975 or approximately the same as cost would be were the present program continued.

Conclusions Regarding Feasibility

The following conclusions, drawn from this investigation, are presented as generalized findings which summarize the highlights of the study as regards to the feasibility of developing and implementing the Georgia model for the preparation of elementary school teachers. These generalizations are classified and reported under the same headings used to describe the subsystems of the model program in sustained operation and are taken primarily from Chapters IV through VII of this report.

The reader must keep in mind that these conclusions are based on an investigation made primarily on conditions and facilities peculiar to the State of Georgia on the assumption that similar conditions and facilities are available or can be acquired in other localities.

Development

Underlying the specifications for the educational model is an assumption that in a period of approximately five years, it is feasible to develop and to implement an instructional program representative of the model and that once implemented it can be maintained in sustained operation. This study presents such a strategy for which, on the basis of the judgment of specialists in systems design and management, is regarded as feasible provided necessary funds are made available.

Instruction

1. Teacher performance behaviors can be so classified and organized as to serve as a core or basic source for the development and operation of a model teacher education program.

2. Students learn more effectively and efficiently through the use of PMs than through more conventional means of organizing, sequencing and presenting learning activities.

3. Students enthusiastically endorse the instructional program of the model in all its various aspects.

4. The management and scheduling of the instructional activities of the model program can be achieved through the use of currently available computer equipment. Also, computer programs can be designed to meet these scheduling needs.

5. Equipment for computer assisted instruction (CAI) is available, but there is a dearth of appropriate instructional programs available to warrant large scale use of CAI in the initial stages of the operation of the model program.

6. PMs are so designed that they provide for the use of available CAI instructional programs and can be easily adjusted to accommodate more such programs when they become available.

7. Learning activities for PMs can be so designed that students acquire target skills and attitudes as well as the intended subject matter.

8. Provision can be made for learning laboratories which contain the majority of the tools and materials needed for undertaking the PM activities in selected areas of learning.

9. A large number of staff members in all affected colleges and departments of the University endorse the principle of individualized instruction through the use of PMs, are willing to receive in-service

training to prepare themselves for the task, and are capable and willing to proceed with the task provided working conditions are reasonable and that they work in teams.

10. Specifications for extended student practicuum experiences can be accommodated. Also, there are school districts which have exemplary elementary school programs willing and able to serve as portal schools.

Evaluation

1. The teacher performance behaviors which form the core of the model program can be evaluated and the competency levels of the teachers in relation to these specified behaviors can be determined.

2. The specifications of the evaluation program which provide for student self-evaluation accompanied by immediate verification can be implemented and will facilitate effective learning and conserve learning time.

3. The evaluation procedures of the model program which delineate and specify particular levels of attainment for teacher performance are strongly supported as desirable by students in teacher education.

4. There are qualified personnel, computers, and computer programs available to conduct the data processing procedures specified for the model program.

5. Student selection and performance evaluation devices are available to satisfy the majority of the objectives of the evaluation subsystem. Devices for the evaluation of certain affective behaviors can be developed.

6. Evaluation specialists and supportive personnel can be oriented and trained so that they possess the special skills needed for the efficient and

effective functioning of the evaluative subsystem of the model program. Also, their performances can be evaluated.

7. Specifications which call for the constant evaluation, feedback and self-renewal processes designed to provide the regeneration necessary for maintaining the model program in dynamic existence may be met to a large extent with devices, techniques and resources currently available. Those not currently available can be developed.

8. There is a sufficient pool of persons eligible for consideration for admission to the model program that those selected will have high probability of success in completing at least the requirements of the professional phase of the program.

9. Student personnel services of the model program (i.e., orientation, periodic progress reviews, career advisement, clinical services, etc.) can be implemented and provide a supportive system for the instructional subsystem of the instructional program.

10. The evaluation subsystem has the capability of systematically assessing the management of all project operations. The computers, computer programs, other equipment and trained personnel can be made available to implement these procedures.

Management

1. The specifications of the model program which call for the extensive use of modern management technology in carrying out project operations can be implemented in institutions of higher learning with effectiveness.

2. Specifications which call for institutional changes in policies and practices (abolishment of grade point system, semester and quarter; institution of the calendar year for the academic year; substitution of individualized instruction for required class attendance; accrediation, etc.) can be satisfied.

3. Adequate provisions have been made in the designing of the program for students desiring to transfer into or out of the instructional sequence.

4. Existing computers will adequately care for the intricate scheduling and other management needs of all subsystems of the model program, and computer technology can produce programs which will accomplish the scheduling objectives.

5. The specifications which require that professional educational organizations participate cooperatively with institutions of higher learning in the development of the model program as well as in its operation were found to be reasonable and enthusiastically endorsed by all concerned.

6. The model program requires personnel with skills not normally required in program development and implementation in higher education. Personnel with some of the special abilities are already available and others can be trained.

7. Coalitions between developing institutions and public school districts required for successful operation of the model program can be arranged. The notion of such alliances is met with enthusiastic endorsement with implied commitment by both groups of educators.

Cost

1. The per student cost for maintaining the model program in sustained operation is the same or less than the per student cost for maintaining the present teacher education program for elementary school teachers.

2. Provided there are available funds for development, the per student cost for development of the entire three phase program is sufficiently low in comparison to the assumed cost benefits to be acquired to warrant undertaking the entire development project.

3. If only limited funds are available for program development there are other reasonable paths of action which would maintain the basic structures and specifications of the model but would require less cost. These include: (a) the development and operation of the preprofessional and professional phases without provision for the specialist or inservice phase, (b) the development of the professional and specialist phases without provision for the preprofessional, (c) the development and operation of either the preprofessional or the professional phases without provision for the other two, (d) the development and operation of all, two or only one of the phases of the program with a reduction in the number of alternative learning activities provided in the PMs, and (e) the development and operation of all three, two or only one of the phases of the program but over a longer period of time utilizing volunteer assistance of both staff and students.

A Closing Note

In interpreting these conclusions the reader must be fully aware that their validity is based on numerous assumptions. For examples; the total number of students accounted for by the computer model is 1,200, the assumed inflation rate for the next six years is estimated at 3% per year, the salaries for key and supportive personnel were estimated on the basis of a university level operation, and the facilities were estimated on the costs of facilities representative for a new structure. Any institution seriously considering developing and operating an instructional program representative of the Georgia model must adjust costs to local condition. This report and the reference volumes which accompany it provide a systematic procedure and cost data for undertaking such an adjustment.

Special attention in undertaking any feasibility project based on this one should be given to the fact that in general this study assumed that the operations, facilities, and policies of the university system of Georgia and especially the University of Georgia were reasonably typical of conditions in other localities.

The key note of feasibility is the extent to which institutions of higher learning are willing and able to change their policies and practices. Commitment such as that provided by the President of the University of Georgia in the preface of this report is the foundation for institutional change.

Appendix A

List of GEM Bulletins

The following is a list of bulletins which were prepared as working papers and are regarded as an integral part of the project's operations preparatory to the development of final report entitled, THE FEASIBILITY OF THE GEORGIA EDUCATIONAL MODEL FOR TEACHER PREPARATION-ELEMENTARY.

GEM Bulletin 69-1 — Johnson, C. E., and Shearron, G. F. Selected Teacher Performance Specifications Generally Applicable to Teacher Education Curricula, 1969.

GEM Bulletin 69-2 — Ayers, J. B. Selected Data on Teacher-Pupil Personnel for GEM Feasibility Study, 1969.

GEM Bulletin 69-3 — Ayers, J. B., Finnegan, R. J. Selected Cost Data on Elementary Education Students at the University of Georgia, 1969.

GEM Bulletin 69-4 — Ayers, J. B. Feasibility of Practical Laboratory Experiences, 1969.

GEM Bulletin 69-5 — Ayers, J. B. Specifications for New University of Georgia College of Education Facilities, 1969.

GEM Bulletin 69-6 — Ayers, J. B., Johnson, C. E., and Shearron, G. F. An Exemplary Program in Higher Education for Chemists, Engineers and Chemistry Teachers, 1969.

GEM Bulletin 69-7 — Payne, D. A. Estimating Costs for Development of Candidate Performance Evaluation Procedures, 1969.

GEM Bulletin 69-8 — Ricker, K. S. and Hawkins, M. L. Reactions of College Students to a Science Education Proficiency Module, 1969

GEM Bulletin 69-9 — Hawkins, M. L. Components of the Instructional Subsystem, 1969.

GEM Bulletin 69-10	Akenson, J. E. and Hawkins, M.L. Reactions of College Students to a Social Science Education Proficiency Module, 1969.
GEM Bulletin 69-11	Hawkins, M. L. Social Science Teacher Performance Specifications and Career Sequence, 1969.
GEM Bulletin 69-12	Ricker, K. S. and Hawkins, M. L. Testing a Science Education Proficiency Module with College Students, 1969.
GEM Bulletin 69-13	Bauch, J. P. PM Evaluation Guidelines, 1969.
GEM Bulletin 69-14	Duncan, G. E. and Bauch, J. P. The Use of Computers and Simulation in the Development and Management of GEM, 1969.
GEM Bulletin 69-15	Johnson, C. E. The Model Program from the Student's Viewpoint, 1969.
GEM Bulletin 69-16	Johnson, C. E. Techniques of Validating Technical and Socio-Psychological Feasibility of an Educational Program, 1969.
GEM Bulletin 69-17	Reed C. P. A Proposed Program for Scheduling, Project Management, Control and Instruction, 1969.
GEM Bulletin 69-18	Johnson, C. E. and Johnson, C. G. Theoretical Considerations for Project Costs, 1969.
GEM Bulletin 69-19	Shearron, G. F. and Johnson, C. E. Specification Worksheets for Language Arts Behaviors, 1969.
GEM Bulletin 69-20	Shearron, G. F. and Johnson, C. E. Specification Worksheets for Behaviors in the Arts and Sciences, 1969.

GEM Bulletin 69-21 Shearron, G. F. and Johnson, C. E. Specification Worksheets for Behaviors Drawn from Educational Principles, 1969.

GEM Bulletin 69-22 Shearron, G. F. and Johnson C. E. Specification Worksheets for Cognitive Processes and Affective Behaviors, 1969.

GEM Bulletin 69-23 Bauch, J.P. and Shearron, G. F. The Elementary School of the Late '70s, 1969.

GEM Bulletin 69-24 Johnson, C. E. Criteria for Validating the Feasibility of the Components of a Model Teacher Education Program, 1969.

GEM Bulletin 69-25 Johnson, C. E. and Duncan, G. Bibliography of Selected References Concerned with the Applications of Systems Technology in Education, 1969.

GEM Bulletin 69-26 Hawkins, M. L. Target Proficiency Modules in the Instructional Program, 1969.

GEM Bulletin 69-27 Rowe, P. J. and Bauch, J. P. Candidate Selection Criteria for a Model Teacher Education Program, 1969.

Appendix B

Definitions of Terms

The definitions which the authors regarded as most important for an understanding of the content of the basic report are listed on pages 6 through 9 of Chapter I. The following are definitions of other terms which may be needed for clarification of intended meanings:

Affective objectives. Objectives which express interests, attitudes, appreciations, and values with an emotional bias.

Area of learning. In a defined set of learnings may be a conventional elementary school subject or a classified collection of subject matter, processes, skills, and/or attitudes.

Behaviors. Statements which describe observable human activities. Sometimes called action patterns. May be used to describe learning or teaching patterns of action such as learning behaviors or teaching behaviors.

Benefit-cost ratio. The dollar estimate of benefits, advantages, or gains from a project divided by the dollar cost of the project. (Williams, p. TM-3).

Clinic. An organization designed to provide special help for students who have difficulties in pursuing particular learnings. Clinics may or may not be allocated special space and facilities. For example, a speech clinic may require space and technical equipment, whereas one in English composition would not.

Cognitive objectives. Objectives which require remembering facts, definitions, concepts or other elements of knowledge, as well as those which involve performing intellectual tasks such as analysis, synthesis, and problem solving. Cognitive objectives may vary from simple recall of knowledge to highly original and creative ways of combining knowledge in synthesizing new ideas and materials.

Control system. An administrative system that has as its primary function the collection and analysis of a feedback from a given set of functions for the purpose of controlling those functions. Control may be implemented by monitoring and/or systematically modifying parameters or policies used in those functions, or by preparing control reports that initiate useful action with respect to significant deviations and exceptions (Williams, p. TM-4).

Content. The definitions, facts, concepts, thought processes, motor skills, and attitudes to be acquired by the student through the instructional program. It is broadly inclusive of the elements which represent the cognitive, cycle-motor, and affective domains of educational objectives. Sometimes referred to as performance behaviors, learnings, or curriculum content.

Continuous instruction. Instruction based on the principle that for every area of learning there is at least one continuum which represents a progression from little or no acquaintance with the area of learning to a defined condition of possessing knowledge, skill and/or attitudes in that area of learning. It also reflects the notion that each point on that continuum represents readiness for the next defined point on the progression.

Critical path. That sequence of events and activities that has the greatest negative or lead positive slack, or the longest path through the network (Cook, 1966, p.89).

Data processing. Operations performed on, or with, facts or figures by manual or machine methods. In more restricted usage, may refer only to electronic data processing or to automatic or semi-automatic machine processing (Williams, p. TM-4).

Directed date. The date of a specific accomplishment formally directed by the contract authority (Moder & Phillips, 1964, p. 90).

Economic feasibility. The extent to which an occurrence or condition is regarded as desirable when the cost of obtaining it (development) and/or maintaining it (operation) is considered in relation to available funds.

Element. A short, relatively homogeneous portion of a work cycle that may be specifically described and identified. Usually suitable for convenient time and/or motion study (Williams, p. TM-5).

Elementary school. An institution which is concerned primarily with the education of children from 3 through 15 years of age.

Event. A specific, definable accomplishment in a program network which is recognizable at a particular instance in time. Events do not consume time or resources. They are usually represented on the network by circles (Cook, 1966, p. 90).

Feedback. Information (data) extracted from a process or situation and used in controlling (directly) or in planning or modifying immediate or future inputs (actions or decisions) into the process or situation (Williams, p. TM-5).

Flow diagram. A representation of the location of activities or operations and the flow of materials between activities on a pictorial layout of a process. Usually used with a flow process chart (Williams, p. TM-6).

Gantt chart. A graphical representation on a time scale of the current relationship between actual and planned performance (Williams, p. TM-6).

General education. Sometimes called liberal education. A composite of those learnings which prepare the student as an adult to better understand and adjust to his social and physical environment, and to meet his obligations as a member of society. It is assumed that this composite of learnings is basic to effective instruction in the elementary school.

General elementary teacher. A professionally prepared person regarded as competent to assume the responsibilities for the general instruction of children primarily within the age range of 3 years through 15 years, or any defined age group within this total chronological age range.

Goals. Far-reaching, abstract aspirations for education which have their origin in the hopes, values, social realities, philosophical orientation and historical reference of society.

Group instruction. The procedure of instructing two or more pupils in a group at the same time. May or may not be individualized.

Health education. Includes content traditionally assigned to such areas of learning as health, safety, recreation, and physical education.

Individual instruction. The procedure of instructing one pupil apart from a group of pupils.

Individualized instruction. Instruction based on the principle that all individuals differ from others in numerous characteristics related to learning, and that for effective learning these differences must be recognized and accounted for in all aspects of instruction. May be either individual instruction or group instruction.

Information retrieval. Selection, location and presentation in a form comprehensible to the human senses of stored information (Williams, p. TM-7).

Instruction. The act of attempting to change a learner's behavior in the direction of pre-selected objectives.

Internship. A comprehensive on the job practical laboratory experience for prospective teachers during which the prospective teacher not only continues to acquire professional characteristics but is expected to demonstrate his competency for full professional responsibilities.

Job. The combination of tasks, duties and responsibilities assigned to an individual employee and usually considered his normal or regular assignment (Williams, p. TM-7).

Learning laboratory. Facilities with sufficient space and appropriate materials and equipment to provide the tools for learning needed by students as they pursue particular modules of study.

Life--economic. That period of time after which a machine or facility should be discarded or replaced because of its excessive cost or reduced profitability (Williams, p. TM-8).

Life--service. The period of time that a machine or facility will satisfactorily perform its functions without major overhaul (Williams, p. TM-8).

Memory--computer. The medium and the reading and writ- hardware used to store data within a computer system. Usually refers only to general data storage accessible to the processor unit of the computer without human assistance or intervention (Williams, p. TM-9).

Model. A conceptual representation. May also mean exemplary.

Network. A flow diagram consisting of activities and events which must be accomplished to reach the program objectives. The flow diagram shows the planned sequences of accomplishments, interdependencies, and interrelationships of activities and events (Cook, 1966, p. 91).

Objectives--educational. Statements which interpret educational goals into the school setting.

Operations--research. A process of investigation which begins by observing and formulating the problem and then constructing a scientific model that abstracts the essence of the problem. It is then hypothesized that this abstract model is a sufficiently precise representation of the essential features of the problem, so that the conclusions obtained from the model are also valid for the real problem. This hypothesis is then modified and verified by experimentation (Hillier & Lieberman, 1967, p.5).

Practical laboratory. An educational setting in which instruction is being implemented with learners of a kind with which the prospective teacher intends to eventually work in a teaching-learning assignment.

Principle. A generalization which is used as a basis for taking action or making a judgment concerning an action.

Professional education. A composite of subject matter, thought processes, skills and attitudes which prepare the student with the competencies needed for teaching.

Proficiency module (PM). A published guide designed to direct individual student learning behavior in studying a particular subject, area of learning, or topic, or in undertaking particular learning activities in a laboratory.

Psychomotor objectives. Objectives which emphasize some muscular or motor skill, some manipulation of material and objects, or some act which requires neuromuscular coordination (Krathwohl, 1964, p.7).

Simulation. The process of conducting experiments on a model of a system in lieu of direct experimentation with a system itself, or direct analytical solution of some problem associated with the system (Mize & Cox, 1968, p. 1).

Slack. The difference between the latest allowable date and the earliest expected date for an event. It is also the difference between the latest completion date and the earliest completion date of an event (Cook, 1966, p.89).

Specialist elementary teacher. A professional worker who possesses all of the qualifications of a general elementary teacher but is also prepared with additional professional and supervisory competency.

Specification. A statement of a requirement to be satisfied as a significant aspect of the educational model.

Target age group. A limited age range for learners which is the focus of professional concern of a teacher.

Teacher's aide. A person who performs paraprofessional activities in the classroom so as to relieve the teacher to focus concern on the profession.

Teaching area of competency. A group of content (see definition of content) classified under a subject heading commonly used for the organization of learnings in the elementary school curriculum in which a general elementary teacher has more knowledge, understanding, and skill than others.

Teaching assistant. A person who has the competencies of a teacher's aide and in addition has completed the equivalent of an Associate of Art's degree, has a basic knowledge of human growth and development, and has met requirements for admission to the professional program for general elementary teachers.

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