DOCUMENT RESUME

ED 077 423   HE 004 240

AUTHOR   Sefein, Naim A.
TITLE   A Systems Approach for Increasing Research
              Productivity Among College Educators.
PUB DATE   26 Feb 73
NOTE   17p.; Paper presented at the annual meeting of the
              American Educational Research Association, New
              Orleans, February 26, 1973

EDRS PRICE   MF-$0.65 HC-$3.29
DESCRIPTORS   College Faculty; *Educational Research; *Hi . er
              Education; *Noninstructional Responsibility;
              Professors; *Researchers; *Teacher Education; Teacher
              Role
IDENTIFIERS   Consortium on Research and Development; CORE

ABSTRACT
              The thesis of this paper is that education is badly
in need of manpower to focus on solving its persistent social
problems; that basic researchers in various universities are not in a
position to meet the need nor is changing their role desirable, for
it means a loss to basic research, and that training new researchers
in graduate school as an inadequate solution for it merely increases
the number of basic researchers and leaves the gap between teachers
and researchers wide open. What is needed is a change in the role of
teacher-educators in colleges and universities. Modifying the job of
college teachers in education to one which involves teaching and
research should not be construed, however, as an easy matter. It
requires changing the philosophy of the colleges, revising their
policies and procedures and training their faculty to conduct
research. This paper presents a model for introducing the needed
changes. The model is a revision of one originally developed and
implemented in a Consortium on Research Development (CORD).
(Author/HS)

A SYSTEMS APPROACH FOR INCREASING RESEARCH

PRODUCTIVITY AMONG COLLEGE EDUCATORS

NAIM A. SEFEIN

State University of New York
Fredonia, New York

The thesis of this paper is that education is badly in need of manpower to focus on solving its persistent social problems; that basic researchers in various universities are not in a position to meet the need nor changing their role is desirable, for it means a loss to basic research; and that training new researchers in graduate school is an inadequate solution for it merely increases the number of basic researchers and leaves the gap between teachers and researchers wide open. What is needed, is a change in the role of teacher-educators in colleges and universities.

The involvement of college and university teachers in research is considered desirable and necessary for several reasons. First, they are typically concerned with educational practices. What they need is the skill to cast their "innovative" practices in the format that permits the empirical evaluation of their effects. Second, they are usually in close contact with the schools and/or capable of communicating with the school in a "jargon fair" mode. Thus they are capable of soliciting the cooperation of school personnel. Third, their involvement in research leads to bridging the gap that exists between research and teaching. Finally, as they combine the skills of research with those of teaching, these educators are in a unique position to develop the teacher-theorist concept (Colodarci, 1954) among their own students.

Modifying the job of college teachers in education to one which involves teaching and research should not be construed, however, as an easy matter. It requires changing the philosophy of the colleges, revising their policies and procedures and training their faculty to conduct research. This paper presents a model for introducing the needed changes. The model is a revision of one originally developed and implemented in a Consortium on Research Development (CORD) funded by the U.S. Office of Education (Sefein, 1970). To explain the rationale behind the development of the revised model, the following presentation will first summarize the Research Development Model used in the Consortium. Later it will explain the reasons for the revision, and finally it presents the revised model.

The Research Development Model

The analysis that led to the conceptualization of the Research Development model followed an adaptation of the format for systems solutions discussed by Quade (1964), and outlined in Diagram 1. Because of the complexity of the changes required in the program, the model is divided into two major components or subsystems: a faculty subsystem and an administrator's subsystem. The faculty subsystem focuses on the desired changes in faculty behavior. Likewise the administrator's subsystem deals with the desired changes in administrator's procedures. Naturally, the two dimensions of change are interdependent. In higher education, institution management procedures are unlike those in industry. The lines of separation are less defined since many policies are established by faculty-administrators' committees. Thus, the separation of the two

Problem

1. **Problem Formulation**

Issues   Assumptions
Input   Constraints
Objectives

2. **The Search for Relevant Information**

Data   Alternatives
Relationships Costs
Approximations

3. **Solution Development & Testing**

Model   Effectiveness
Comparisons   Sensitivities

4. **Interpretations & Decisions**

Omitted factors
Non-quantifiable data
Uncertainties
Contingencies
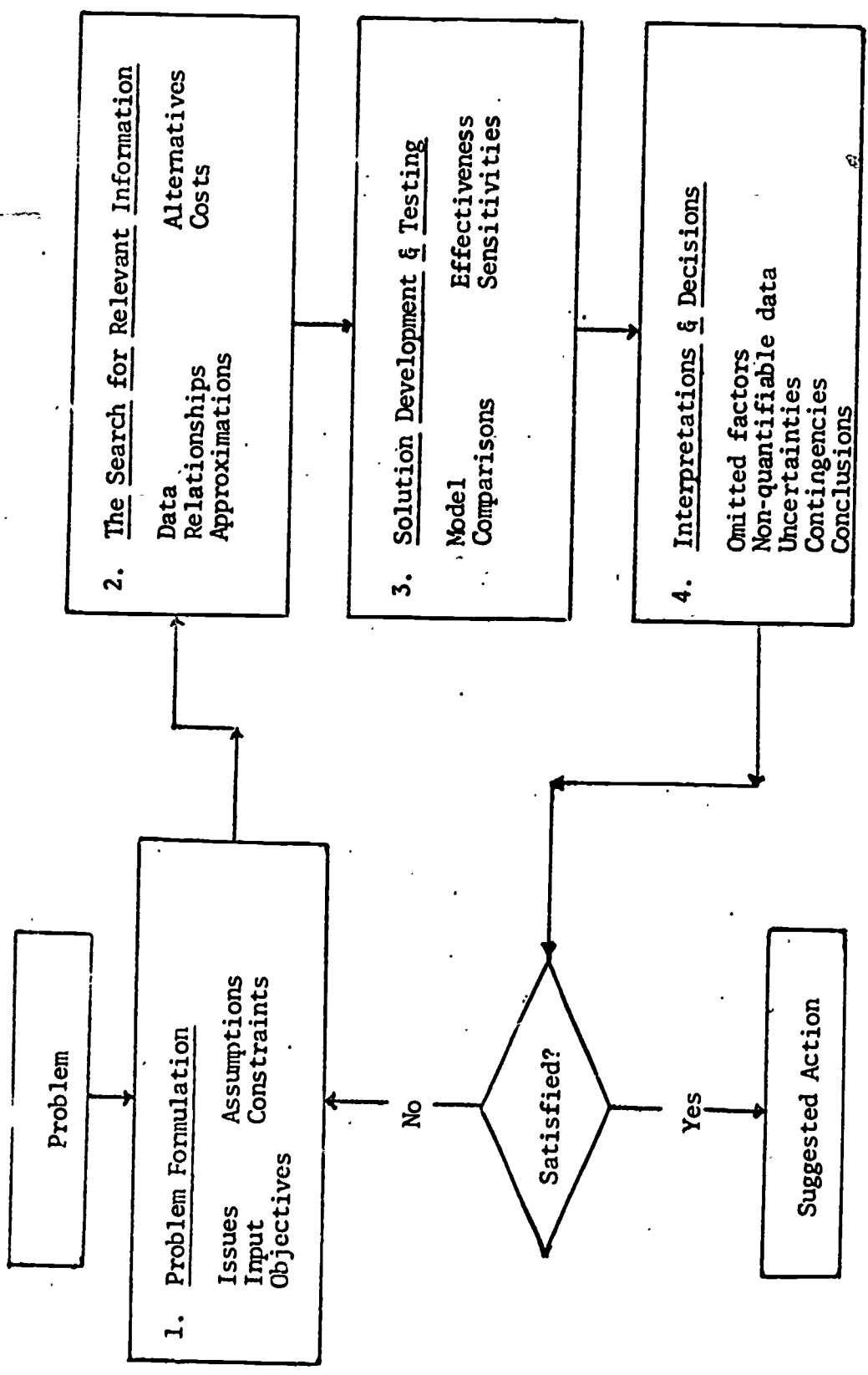Conclusions

Satisfied?

No

Yes

Suggested Action

Figure 1: The relationship between dimensions of systems analysis procedures. Modified
from Quade, E. S.   Methods and Procedures in E. S. Quade (Ed.) Analysis for
Military Decisions. Rand Corporation, 1964, p. 158.

subsystems in this presentation should not be construed as indicating that we are dealing with two independent populations, or that one subsystem can be implemented without the other.

A. Faculty Subsystem

1. The Problem

Defined in terms of the system output, the problem involved a change in the role of the teacher-educator in colleges to that of a teacher-researcher. While the above discussion advanced the thesis that college educators are in a unique position to engage in applied research and bridge the gap between the products of basic research and practice, it did intend to convey that the output of the system must be restricted to the development of applied researchers. All types of research efforts are important, and research is broadly defined as any systematic effort directed toward generating novel solutions. Typically the research effort is theory-oriented, and involves the quantification of variables and the testing of hypotheses. Thus, horatory writing, and "faith"-oriented innovations, were not considered research efforts and were not parts of the desired output of the system.

The input of the system was seen as involving educators who are interested in teaching and who had most of their graduate training while holding full-time teaching jobs. Their training favored the breadth of orientation, rather than specialization, and other than the minimum requirements for graduation it lacked preparation in research methods.

In general these educators tend to be learner-interested and are warm in their relationship with their students. They tend to be value-oriented. They express their convictions as if they are describing factual materials, and convey an image of confidence and expertise in their knowledge. As such, they lack the element of skepticism and inquisitiveness which researchers must have. They also tend to see the process of evaluation as a vehicle for questioning their expertise rather than a means of verifying predictions. They speak of proving rather than assessing the probability that a hypothesis is acceptable. They speak of "research" in reference to library readings. They tend to equate empirical research with experimentation on laboratory animals, hence they consider it difficult, wasteful or inhumane to use in schools. Finally they tend to express learning variables in the form of global traits. Operational definitions and behavior indices are usually rejected since they focus on elements of behavior rather than the whole trait.

Contrasting this input with the desired output, the problem of the Research Development Program was defined as one of finding the procedures to modify the systems input to the desired output. In considering avenues of modification an assumption was made that faculty members are not against research. Their misconceptions about

research are by-products of the limited training they have. Their attitudes relative to the separation of research and teaching are not unique. They are congruent with the traditional roles of colleges as compared with universities. Also, their apparent negativism about the utility of research in education is a by-product of the gap that exists between basic research and real life problems.

Some constraints were also imposed in considering the problem solution. One of these constraints relates to the kind of motivational procedures to be used. No criticism, explicit or implied, about the lack of involvement of faculty in research should be used as a means of urging faculty to participate in research. Faculty members have not been negligent in their professional duties. In the past, research was not expected; hence the research requirements in graduate school were lax. Now that we recognize the need, colleges must retool to meet the demand. The second constraint relates to academic freedom. Academic freedom is the heart of creativity and must be preserved. Faculty members should not be forced to adhere to one pattern of thought. They should be encouraged to explore novel solutions, test these solutions and adapt their thinking as a result of the experience they gain. Finally, research should not be advocated as if it is the first measure of faculty productivity. It is a means of finding reliable solutions for educational problems; and since effective teaching implies giving the learner the proper preparation for his job, research involvement is a means of improving both the process and the product of education.

2. The Search for Relevant Information

Since the problem is essentially that of the training of researchers, the educational literature was examined in search of answers to the following questions:

    a. What content should be included in the training program?

    b. What instructional procedures are likely to succeed in producing the expected change in the learner's behavior?

    c. What learning environment need be maintained in the process of training?

The search for information on the content of various programs for training researchers was disappointing. Programtic studies were lacking, and most of the information available was in the form of course requirements expected of graduate students trained on university campuses, obviously a situation different from that involved in training faculty members in colleges. However, observations made in the literature by experienced researchers (Culbertson and Hencley, 1963; Selye, 1964; and Guba and Elam, 1965) provided clues as to the basic thinking skills involved in research. The models for evaluative research provided by Suchman (1967) seemed particularly applicable for the training of applied researchers. Combining these with an analysis of the guidelines for submitting proposals to the U.S. Office of Education, analysis of manuals for writing proposals such as that written by Krathwohl (1965), and an examination of a sample of research proposals, produced a set of basic skills to be included in the training.

The literature on instructional procedures was abundant, although as expected, it included a diversity of recommendations. The paradigm for training (Glaser, 1963), the concept of advanced organizers (Ausabel, 1963), and the concepts of behavior modification (Bandura and Walters, 1963) seemed particularly suitable for planning the instruction. Essentially the mode of instruction adopted involved: (a) measuring the entering behavior; (b) introducing the objectives of instruction as a means of creating the appropriate mental set for learning; (c) presenting the sequence of skills in the context of research problems; (d) providing exercises for practice and feed-back; and (d) finally, measuring the outcome of learning.

The search for information relative to the appropriate learning environment produced limited information. Essentially it emphasized the importance of informality and of flexibility to allow for maxi--mum interaction among the participants. Thus, the model presented by Patton (1962) was adopted in the program.

3. The Solution

Combining the various elements delineated in the search of the literature, a multidimensional program was developed. The program consisted of four components: (a) Local Faculty Seminars; (b) Intensive Research Training Seminars; (c) Individual Consultation; and (d) Pilot Studies. The relationship among these components is diagramed in Figure 2.

a. Local Faculty Seminars - These faculty seminars were seen to serve as a vehicle for creating an awareness of the research needs among the faculty. They were informal and open to all faculty members of the college. The seminar met once a week in a central location on campus, and the program included a diversity of topics ranging from the discussion of theoretical models for dealing with educational and social issues, to the presentation of research activities done or planned by the participants, and to a discussion of the various resources needed on campus for research.

In addition to creating in the participants a general awareness of the needed research and of possible avenues for involvement, the seminar provided some sort of organization with which the beginning researcher could identify himself and receive the support of peers. What is more, opening attendance to all faculty provided a means of interaction among representatives of various academic disciplines and the opportunity for the emergence of interdisciplinary research.

b. Intensive Research Training Seminars (Workshops) - These seminars were planned to provide the participants with training in the basic research skills identified from the analysis of the literature. In the Research Development Program seven sets of skills were identified and
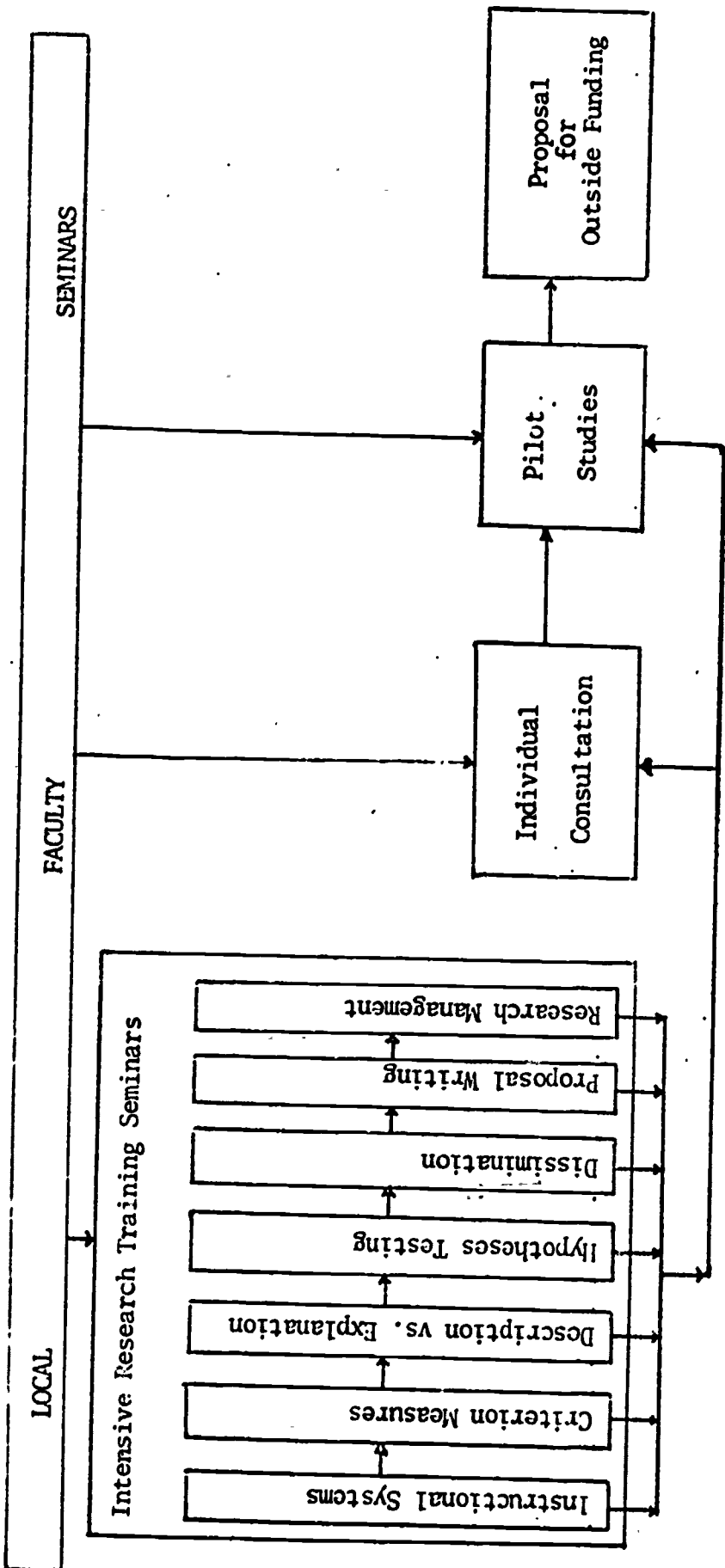
Figure 2 : The various components involved in the faculty subsystem of the Research Development Program.

each was translated into a group of instructional objectives (Sefein, 1967, 1970). Thus, the program of the Consortium contained seven two-day training workshops. As a means of approximating the model on instruction identified, á set of guidelines were developed for each workshop which included the workshop objectives, expected instructional procedures and a brief description of the level of preparation of the participants. Instructional consultants were then selected from among experienced researchers. After the consultants for each workshop had time to prepare the instructional materials, they met with the project director to insure some consensus on the details and to plan whatever was required in instructional aids.

The instructional setting typically involved meeting at a resort hotel with conference facilities. All the participants and consultants were expected to remain for the whole period on the conference site; and in order to provide for maximum informal interaction among the participants and the consultants, group social activities were also planned.

c. Individual Consultation - Despite Herrick's (1963) reservation on the advisability of designating one individual as a coordinator of research, it was felt that in the developmental stage of the research program a provision must be made to render guidance for the beginning researchers when needed. Thus, an individual faculty member with some experience in research was identified for such function. His role, however, was seen as a facilitator. He could provide the needed help, or identify the appropriate agency where the researcher could receive the help he needed.

d. Pilot Studies - This component was seen to provide interested faculty members with the opportunity of testing their ideas in research with the minimum amount of red tape. It also provided the chance for practice and learning. Thus as soon as a faculty member expressed interest in testing an idea, the strong points in his idea were praised and he was allocated a limited fund (about $100.00). When that money was spent and he sought more funds, he was again reinforced, and was asked to submit a brief outline of his research plan and an estimate of the funds needed. For practical purposes, a ceiling of $500.00 was imposed on any one study. At that stage, when funds were allocated, the faculty member was given a brief outline of the purchasing procedures approved by the institution and was encouraged to keep an account of his expenditures. If a faculty member initially presented a well-organized idea for local support, he was usually given some financial support and at the same time was assisted to seek outside funds.

B. Administrator's Subsystem

Argyris (1965, p. 3) asserts that for an organization to be successful in introducing innovations "changes in interpersonal relationships, values, and norms must begin at the top... Few subordinates will alter their behavior until they have clear evidence that they will be rewarded for doing so."

Since involvement in research represents a change in the values long held by colleges, it was deemed necessary that the administrators of the college must understand the role they had to play to bring about the desired change.

1. The Problem

Academic productivity in research requires more than a verbal expression of interest on the part of the administrators. It requires the revision of college policies and procedures in such a way as to create an environment with consistent policies for attracting, conserving, and encouraging creative researchers. Defined in terms of systems output the outcomes of the program include:

a. In the area of personnel policies academic responsibilities would be defined in terms of both teaching and research. Research preparation and experience would be required of new faculty members. Evaluation of faculty productivity should include an evaluation of their research efforts and be based on an explicit formula indicating the relative merits of teaching, research, horatory writing and community service. Finally, teaching schedules should reflect the demands of research.

b. In defining the purpose of the academic programs of the college, emphasis should be given to the methods of research. Course outlines would reflect these expectations from students in such matters as their use of primary sources and their participation in research.

c. In the area of resource allocation, the expectations of research should be reflected in terms of increased secretarial help, student assistants, and funds for travel to professional meetings. Provisions would be made for faculty members to have access to the computer during work hours. Also, the college library should include most research journals and must have an efficient interlibrary loan service.

d. In terms of administrative procedures, the institution should reflect its research commitment by establishing a program of institutional research to deal with matters of assessing the efficiency of the college's registration and advisement procedures, faculty morale and the like.

e. In the area of information processing, the commitment to research should be reflected by including a section in the faculty handbook giving explicit information on matters such as where a faculty member could receive assistance in locating sources of research funds, what procedures he should follow in routing proposals, and what degree of merit is associated with various types of nonteaching activities.

The input of the administrator's subsystem shares several common features with that of the faculty members. Most college administrators were originally faculty members in the same college or similar colleges. Hence, they tend to lack experience in research and often share with their faculty the same perception about the relationship between research and teaching. Some of them may even feel awkward advocating to others what they themselves have not done. Furthermore, since the funds they receive for running the college are typically tied to a formula of instructional demands they feel that their latitude of freedom is limited. Some even fear that introducing some adjustment in the size of classes might offend students and reduce enrollment which means loss of funds.

In terms of administrative policies and procedures the input may be described as:

a. Personnel policies define faculty workload in terms of teaching hours. Research experience is not one of the criteria used for recruitment. Research involvement is not opposed but, it is not rewarded. Even when nonteaching activities are recognized, little differentiation is made between these activities, based on type or quality.

b. Academic programs are defined in terms of course credits even at the graduate level. Preparation of students in research is not emphasized.

c. Resources are basically allocated for teaching demands, which means limited clerical help. Graduate assistants are usually not available or not considered desirable since the philosophy of small colleges calls for maximum interaction between faculty and students. Library holdings also reflect the philosophy of teaching and thus lack primary sources of educational literature.

d. Program evaluations are rarely carried. Even when an office of institutional research exists, its function is often limited to collecting census type data.

2. The Search for Relevant Information

The concern in searching for information to incorporate in the research development program focused on several questions:

What role should college administrators play in encouraging faculty involvement in research?

What conflicts in interpersonal relations are likely to be encountered in the process of change?

If college funds are fixed by some existing budgetary regulations, what avenues might be available for financing the needed resources for research?

The search of the literature produced little more than some observations made by university researchers. Among these observations, the following seemed particularly relevant:

a. Administrators must lead the change before they expect faculty behavior to change (Argyris, 1965; Herrick, 1963).

b. Administrators must encourage diversity of experiences and philosophical orientations among their faculty to encourage academic dialogues. They must also protect the right of young researchers to work independently (Herrick, 1963). Team effort should be encouraged (Travers, 1964). But the relationship involved must be that of colleagues working together rather than of a subordinate superordinate structure (Herrick, 1963).

c. Creating separate organizations for research is undesirable (Guba, 1963). Separation of functions among teachers and researchers must be discouraged. Research should be expected of all faculty. The concept of "released" or reduced teaching load is misleading and improper. If research is expected of every faculty member, then the time required by research is part of the workload (Herrick, 1963).

d. Paying extra compensation for research is undesirable and likely to produce discontent among the teaching faculty (Herrick, 1963).

e. Explicit priorities must be established for rewarding nonteaching efforts such as research, writing, and community service (Evans, 1960).

f. Provisions must be made for helping faculty with computer programming, statistical analysis, locating research funds, writing proposals, and especially budget making (Herrick, 1963). Purchasing procedures should allow researchers acquire the resources they need with a minimum of red tape (Frederickson, 1966).

3. The Solution

Having had no experience in research or in the administration of researchers, administrators needed a program of study which would orient them with the issues, the various alternatives available to them, and allow them to make the necessary decisions. The program should consist of a series of open-ended problems and suggest some references for study.

Resource persons should also be brought from campuses where research
is flourishing to provide some advice on the merits of various courses
of action the administrators are considering.

Ideally, this program should, at least in part, precede the
faculty program. But, as is typical in situations involving federal
funding, some restrictions were imposed on the deadline for submitting
applications, the nature of activities ⁀ ʰ   ⎽ded, and the schedule
to be followed. Hence, in the Consor᎓   n ⎽⎽search Development,
only an approximation of the desired procedure was possible. Essentially
the approximation involved a tentative acceptance of the principle
of total faculty involvement in research. The administrators involved
accepted to make an explicit announcement of the research objective
to all their faculty, once the Consortium was funded. They also
accepted to participate in a program for the study of the administra-
tive actions involved in effecting research productivity.

With such an understanding the program of the Consortium included
a series of seminars for the administrators to be conducted simultaneously
with the faculty training program. The topics of the seminars included
the following:

a. The merits of creating specialized offices for research
    as compared with the concept of total faculty ·involvement
    in research.

b. The merits of reducing teaching loads so that faculty
    members could engage in research as compared with making
    the adjustment in teaching schedules contingent on the
    development of a research plan by faculty member.

c. The merits of establishing a local committee to review
    planned proposals and eliminate those they perceive as
    "weak" as compared with submitting every proposal.

d. The merits of establishing an explicit hierarchical order
    of merit for various categories of nonteaching activities
    such as research, writing, and community service; as com-
    pared with giving them equal treatment.

e. The merits of recruiting young faculty members who are
    prepared in research as compared with some senior faculty
    members with some known reputation for productivity in
    research.

f. The merits of recruiting faculty members with diversity
    of preparation and philosophical inclinations. and en-
    couraging a free environment for continuous dialogue among
    them as compared with having a homogeneous group of
    faculty.

g. The merits of reinforcing successive approximations on
    the part of inexperienced researchers and merely ex-
    tinguishing pseudo-research efforts as compared with the
    use of coercion and punishment.

h. Models of organizational policies and procedures used by
    institutions active in research

In addition to the above seminars for the administrators, provisions
were made for training the administrative staffs in implementing the
changes adopted by the administrators.

Revision of the Model

In the Consortium, for reasons partly explained above, the administrator's
program was planned to take place simultaneously with the faculty program.
This meant that the administrators did not have a chance to come to an
understanding of the issues involved, or establish a tentative strategy
for influencing the change required before initiating the program. Some
of the administrators involved even had made some plans for establishing
independent research organizations and later felt some difficulty in re-
vising their plans. The absence of a clear strategy for change on the part
of the administration probably precipitated some doubt on the part of the
faculty as to the commitment of the college to the expressed objective.
What is more, faculty members who responded early to the change met some
disappointment as they found administrative machinary not ready to meet
their expectations.

These problems are real and must not be construed as ones which have
been precipitated by the unwillingness of the administrators or the faculty
to change. They were mostly effected by the improper sequencing of the
events.

In fact, the colleges which participated in the Consortium are still
active in research. What is being proposed here is proper sequencing of
the components of change to increase the efficiency of effort and to maximize
research productivity.

The revision also takes into consideration some of the problems pre-
cipitated by another requirement in the federal guidelines for the Research
Development Program, namely that of establishing consortia. Presumably
by requiring the formation of consortia among colleges, the program would
be conducted economically. But that requirement imposed some elements
of formality and complexity in accommodating the expectations of several
campuses. Research Development is as the term implies, a developmental
process. It involves gradual change. And while outside resources were
helpful, the Consortium arrangement meant ignoring the rate of development
among the participating institutions.

In view of the above consideration, the suggested model is seen to be
one that would be implemented in individual institutions. As is shown in
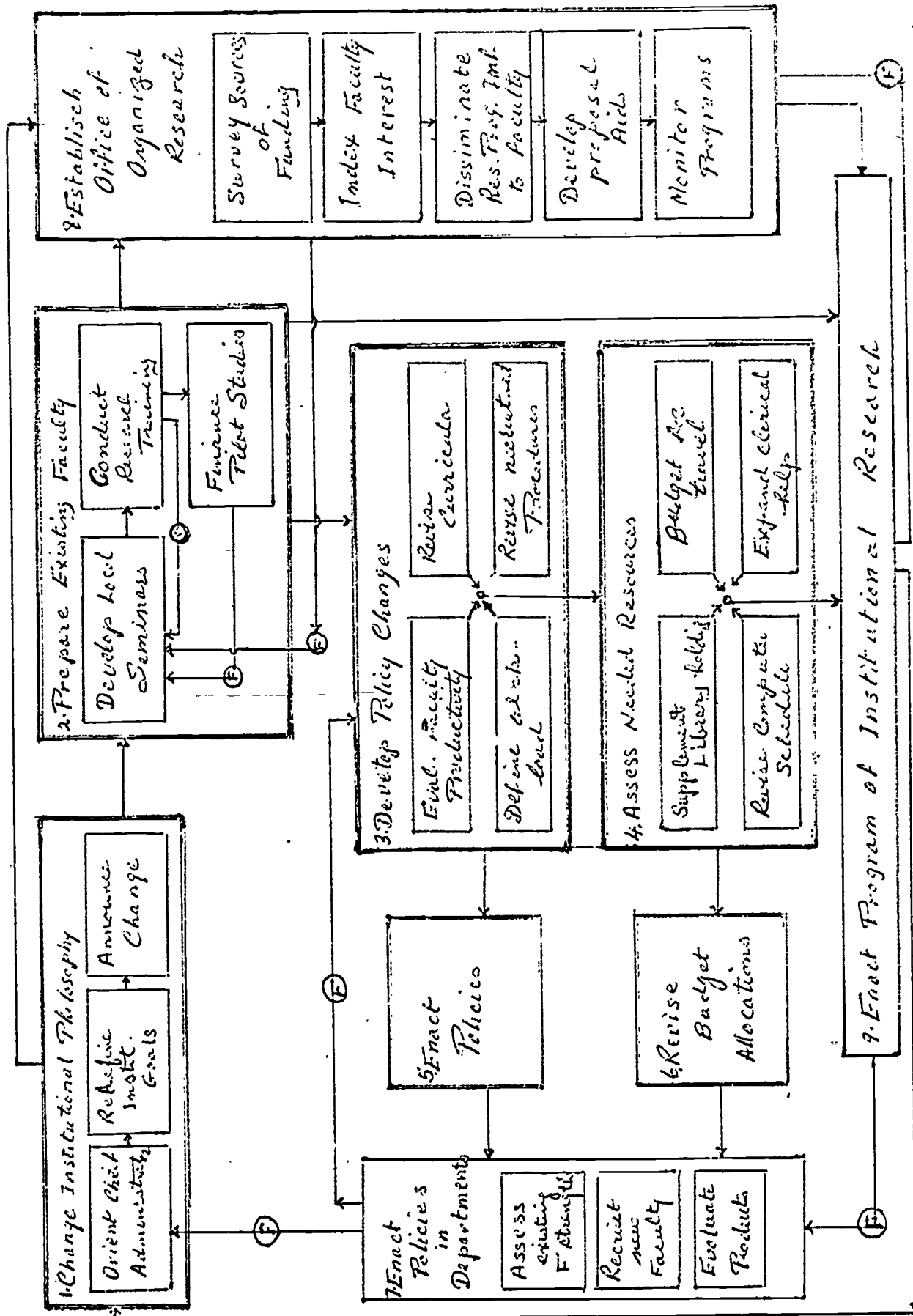Figure 3, it consists of the following elements:

Figure 3: Revised Systems Model for Research Development in Colleges.

1. The administrators of the colleges must first study
    the various models of institutional change related to
    research. They should draw on the experiences of
    institutions who had bureaus for research to under-
    stand the problems involved in that model and to
    understand the expectations of research. If they accept
    the concept of total faculty involvement in research,
    they must plan the strategy for change. It is desirable
    that they include some faculty leaders in the process
    of making the decision. They must, however, be willing
    to participate with their faculty in the various activities
    that follow the decision. Their modeling behavior is
    crucial to the success of the program.

2. A faculty seminar or seminars be established during the
    work hours. If possible, the teaching schedule should
    be planned in such a way as to free the majority of
    faculty members in several departments to meet. Visitors
    from surrounding school systems would be invited to the
    seminar to discuss some of their programs and problems.
    Programs identified as of national priorities would also
    be scheduled for study and faculty members would be invited
    to the seminar to present conceptual schemes for their in-
    vestigation. These seminars are seen to continue indefinitely
    but faculty attendance must be encouraged, rather than re-
    quired.

3. As the need emerges, workshops for training the faculty in
    "writing proposals" would be planned. The basic research
    skill identified for the Intensive research training seminars
    of the Consortium may be used as a model. The logic of
    asking questions and of identifying quantification indices
    for variables rather than the format of the proposal should
    be the focus of training.

4. In addition to the seminars, committees should be established
    to develop policy recommendations regarding the procedures
    for faculty recruitment, the definition of workloads, and
    the criteria for evaluation of faculty productivity. The
    recommendations would then be enacted into policies using
    the appropriate machinery. Concomitantly, committees should
    also be established to develop the resources required for
    research.

5. A facilitative organization should be developed (Office of
    Research) on campus to provide faculty with aids in locating
    funds for research, and in writing proposals. The same or-
    ganization may also monitor research funds.

6. Systematic evaluation of the program should be carried
    (possibly with the aid of the office of institutional research)
    to provide the feedback process necessary for adjusting
    the system to the growing research efforts.

REFERENCES

Argyris, C. (1965) Organization and Innovation. Homewood, Illinois: Richard
     D. Irwin, Inc. and the Dorsey Press.

Ausabel, D.P. (1963) The Psychology of Meaningful Verbal Learning. New York:
     Grune and Straton.

Bandura, A. and Walters, R.H. (1963) Social Learning and Personality Development.
     New York: Holt, Rinehart and Winston.

Coladarci, A.P. (1956) The Relevancy of Educational Psychology, Educational
     Leadership, 13 (8): 489-492.

Culbertson, J.A. and Hencley, S., eds. (1963) Educational Research: New
     Perspectives. Danville, Illinois: Interstate Printers and Publishers.

Fredericksen, N.O. (1966) The administration of an educational research program,
     in Organization for Research and Development in Education, Proceedings of
     the Conference sponsored by the American Educational Research Association
     and Phi Delta Kappa.

Glaser, R. (1963) Psychology and Instructional Technology, in Glaser, R. ed.,
     Training Research and Education. Pittsburgh: University of Pittsburgh Press.

Guba, E. (1963) Guide for the writing of proposals in Educational Research:
     New Prespectives. Culbertson, J.A. & Hencley, S., eds., Danville, Illinois:
     Interstate Printers and Publishers, Inc.

Guba, E. and Elam, S. eds. (1965) The Training and Nurture of Educational
     Researchers. Sixth Annual Phi Delta Kappa Symposium. Bloomington, Indiana:
     Phi Delta Kappa.

Herrick, V. (1963) Guides for facilitating research in universities in Educational
     Research: New Perspectives. J.A. Culbertson and S.P. Hencley (eds),
     Danville, Illinois: The Interstate Printers and Publishers, Inc.

Krathwohl, D. (1965) How to Prepare a Research Proposal. Syracuse: Syracuse
     University Bookstore.

Patton, E.D. (1962) Training Public School Instructional Personnel in Research
     Methods. Unpublished Doctoral Dissertation, University of Illinois.

Quade, E.S. (1964) Methods and procedures, in Quade- E.S. ed. Analysis for
     Military Decisions. Rand Corporation.

Sefein, N.A. (1967) Behavioral Analysis of Applied Research, Mimeographed,
     State University College at Fredonia, New York.

Sefein, N.A. (1970) Consortium on Research Development for the State University Colleges at Buffalo and at Fredonia, New York, and Gannon College at Erie, Pennsylvania. Final Report, U.S. Office of Education, Project No. 7-1015.

Selye, Hans (1964) From Dream to Discovery: On Being a Scientist, New York: McGraw-Hill.

Suchman, E.A. (1967) Evaluative Research. New York: Russel Sage Foundation.

Travers, R. (1964) An Introduction to Educational Research (2nd ed.). New York: MacMillan.