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By-Guba, Egon G.

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A series of 17 generalizations describes the educational research enterprise in the United States under four headings: Organizational patterns, training programs, dissemination techniques, and the relationship of research to practice. Eight summary statements outline the primary implications of these generalizations and define educational research in the United States as loosely organized, university based, individually directed, theory oriented, committed to experimentalism, in a psychostatistical tradition, a part-time pursuit, and Federally funded. Related problems include low utilization of research by practitioners, inadequate mechanisms linking the worlds of the researcher and the practitioner, inadequate programs for training educational researchers, and a lack of tools and strategies for the adoption of educational improvements based upon research. Alternatives for a redevelopment of educational research include the development of new research structures to complement existing structures, the building of effective linking mechanisms between the research and practitioner communities, and the development of new training programs. (JK)

THE PLACE OF EDUCATIONAL RESEARCH IN EDUCATIONAL CHANGE

Egon G. Guba

An Address to the Canadian
Council for Research in Education
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The National Institute for the Study of Educational Change
825 EAST EIGHTH STREET • BLOOMINGTON, INDIANA 47401 • A.C. 812 337-9624

If I sense the matter correctly I believe that Canada, like the United States, stands at the beginning of a decade of massive educational improvement. Educational change is everywhere in the air, and the clamor for improvement is deafening. The educational research community seems to feel a special responsibility to take the leadership in this movement, at least to the extent of making sure that whatever educational changes may be instituted are firmly grounded in valid research.

For the past several months I have been working on a paper that attempts to describe the status of the research enterprise in the United States and its relationship to educational change. The paper was commissioned by the UNESCO Institute for Education in Hamburg. This Institute is sponsoring a conference in July during which this paper and a number of counterparts from other countries will be assembled into book form. It seemed to me, as I thought about what I might say here tonight, that a summary of the points contained in that paper together with some commentary about how they relate to educational change would be most appropriate because I believe that much of what can be said about the United States will also prove to be true of Canada.

I should say at once that the UNESCO paper was built upon the contributions of a good many colleagues. Henry M. Brickell, Thomas D. Clemens, N. L. Gage, John E. Hopkins, John J. Horvat, and Sam D. Sieber wrote sections in areas in which they were especially expert. Thus I am indebted to them for many of the remarks I am about to make, although of course I absolve them from any responsibility for my possible misinterpretations of their intentions.

The Status of Educational Research in the United States

Let me begin with a series of generalizations--possibly over-generalizations--about the organization of research in the United States:

1. The organizational settings in which research takes place are very diverse. Thus we find research being conducted in a variety of university settings, (including the newly formed research and development centers), in the new regional educational laboratories, in state departments of education, in local school systems, and in many private organizations, both profit and non-profit, such as Systems Development Corporation and Educational Testing Service.

2. Within any given setting, e.g., a university research bureau, there is almost as much diversity as there is between settings. So for example, a university research bureau may be a holding company for many individual projects or it may have a programmatic focus; it may be concerned with bookkeeping research and field service, or it may focus on relatively basic inquiry; it may consist of educationists alone or of persons with varied disciplinary backgrounds; it may have many university connections or very few.

3. Most educational research is supported directly or indirectly by federal money. Some $70 million is currently being budgeted annually by the federal government for the direct support of research, and an unknown but goodly proportion of the approximately $1 billion spent under the Elementary and Secondary Education Act of 1965 is also supporting research or research-related activity. By contrast, the mean per pupil expenditure for research in 71 school districts surveyed by Sieber was $2.50.

4. Most research is conducted by individuals, rather than through formal research units. Bargar found from his analysis of the data contained in the National Register of Educational Researchers that less than ten per cent of the researchers listed there were based in a formal research bureau, institute, or other similar organization.

5. Almost all formal research units are troubled with the same basic problems. Gage finds, for example, that the four major problems confronting research units are these: (a) the extent to which research workers are free to initiate research rather than to conform to an organized program of research; (b) the balance between pure and applied research; (c) the relationship of research institutions to universities, teacher training establishments, etc.; and (d) the extent to which inter-disciplinary research can be carried out.

When attention is turned to the training of research workers, the following generalizations seem appropriate:

1. The training of educational researchers is reserved almost exclusively to the universities. Some 107 graduate schools of education train the approximately 150 educational researchers turned out each year. 60 per cent of these graduates are produced by eight universities. Almost no training is carried on in other settings; certainly no degree work is possible except in the universities.

2. Training is centered very heavily on methodology. Hopkins points out that the major distinctions in courses taken by research trainees depend upon the student's desire to create new methodology, teach methodology to others, or use methodology competently.

3. Training is very uniform in content regardless of where it is received. Over half the courses in educational research methods taught in the United States use one of three basic textbooks. Four statistics textbooks corner the market as does one text on experimental design.

4. Research trainees receive little direct experience with research except through the dissertation. Roughly one-half of all training institutions have no requirement for direct experience. In those institutions having such a requirement, the common method of fulfilling it is to attach the student to ongoing projects or programs of research, where their chief function seems to be that of providing a cheap labor supply. This is true despite the fact that most responsible thinkers rank research experience far above course work in its value for producing researchers.

5. Most research training is now afforded under federally funded training programs. Undergraduate, graduate, and post-doctoral students may receive stipends under the provisions of Title IV, ESEA. Over seventy programs have been funded to date.

6. Training programs are not producing researchers fast enough, nor are they producing the new types of research personnel that are needed. As indicated earlier, only about 150 researchers are being produced annually. New research related personnel--developers, evaluators, demonstrators, and the like--are being produced hardly at all. Yet Hopkins indicates that over 45,000 full time equivalent personnel, including both researchers and research related personnel, will be needed by 1972, just to man federally and foundation funded programs that will be in existence by that time.

Still other generalizations are possible as we think about how the products of research are disseminated:

1. There are a number of very different audiences that need to know about research. These include the research community itself, practitioners at various levels, the general lay public, the producers and disseminators of educational materials, and legislators.

2. Only a few mechanisms exist whereby this dissemination can take place. The main mechanisms are: professional associations and organizations, primarily through their journals; the universities, primarily through their instructional programs; various government agencies such as the Clearinghouse for Federal Scientific and Technical Information or the Educational Research Information Center (ERIC); and the mass media, which carry primarily interpretive summaries.

3. As a result of the limitations on the available dissemination mechanisms, the only audience that is reasonably well served is the research community itself. Practitioners, the general lay public, etc., must usually choose between wading through technical reports which they are ill equipped to understand or summaries which are likely to be too general to be useful.

Finally, we are able to make several generalizations about the impact of research upon practice:

1. Current educational practice is not based upon research. As my colleague Henry M. Brickell puts it, "While this is not to say that research has no influence on school practice . . . , it is to say that as of the year 1967, school practice in this nation cannot be understood as

based primarily upon research." Virtually none of the presently predominant practices, e.g., the length of the school day, the nature of the curriculum, the training patterns of teachers, the grading practices, etc., have any foundation in research findings.

2. Research is in any event an insufficient source on which to base practice. The variety of information which is required to produce an innovation is so great that only a small portion of it can reasonably be expected to come from research. Precedent, expert judgment, experience, prevailing practice, values, politics, and economics all pose considerations to which attention must be given.

3. Research seems most useful in abetting an idea whose time has come. In those instances in which research seems to have played an important role, the innovation in question seems to have been of sufficient importance that it would have been developed in any event. Examples are the new science materials that emerged on the heels of the Russian Sputnik, or the decision to desegregate the schools of the South because segregation, as research showed, was inherently unequal.

Implications

I have asked you to accept all of these generalizations about the organization, training methods, dissemination, and utilization of research without evidence because my concern tonight is not with the generalizations themselves but with certain implications that can be drawn from them. If you should doubt their validity I invite you to read the longer paper on which they are based, and which will be available in another month or so.

On the basis of this sketch of the research enterprise, I believe that the following summary statements may be made about educational research in the United States:

1. It is loosely organized. A wide variety of agencies and individuals conduct educational research. There is no central organization nor central coordination of research efforts.

2. It is university-based. Most educational research is conducted by university personnel, rather than by persons employed by other educational units such as local school systems.

3. It is individually directed. Topics for research are chosen very predominantly on the basis of the interests of individual researchers.

4. It is theory oriented. Much educational research is conducted by persons from related social and behavioral disciplines such as psychology and sociology. The research thus tends to relate to the theories of those disciplines (for the testing of which the schools serve as an ideal "natural laboratory") rather than to the solutions of practical educational problems.

5. It is committed to experimentalism. The experiment is viewed almost universally as the proper format for scientific inquiry. Non-experimental approaches are viewed as inferior or misleading.

6. It is conducted primarily by persons trained in a psycho-statistical tradition. The training of many practicing researchers is heavily based in educational psychology, statistics, and measurement theory. Most current training programs continue to emphasize this same tradition.

7. It is a part-time pursuit. Most educational research is conducted by persons who have other demanding duties, primarily teaching. Very few researchers are able to devote as much as one-third of their time to research.

8. It is federally funded. Most educational research is funded by the federal government. Expenditures by foundations, by other levels of government, or by local school systems, while substantial, are small by comparison.

These eight characteristics are subject to wide interpretation in terms of desirability, depending upon the values of the interpreter. Each of these characteristics lends both strengths and weaknesses to the system. If it were proposed that a new research structure should be developed, as might be the case in Canada, the developer would need to decide whether, in his situation, the virtues connected with the characteristic are sufficiently important to over-ride the concomitant defects which will inevitably accrue. These eight characteristics will be considered in some detail so that virtues and defects of each are made apparent. Let us look at each in turn.

1. Loose organization. The most obvious advantages of loose organization are flexibility and simplicity. The research community is able to make a quick and effective response to research needs as these become apparent. There is no bureaucracy to dictate the "right" or "wrong" directions for research to take, and there are no long and involved channels through which approvals must be sought.

But there are also disadvantages inherent in this loose organization. The most obvious is the lack of overall coordination. It is difficult to enlist and combine the efforts of a number of persons or agencies in the pursuit of a common research objective. Resources cannot be allocated in the most efficient manner. Communication is difficult to maintain. There are likely to be overlaps in the programs of competing agencies that cannot be justified as scientifically warrantable replications. Similarly, many important gaps may develop to which no one attends.

2. University base. The university is the traditional seat of research, and for good reason. It has available a pool of talented manpower resources. The university-based educational researcher can easily communicate with a variety of experts in other disciplines who can bring their special insights to bear on his problem. The university's posture of detachment makes possible the high risk taking and sanctioned freedom to fail that are so necessary for the psychological support of the researcher. The reward system is geared to the advantage of the productive researcher.

On the other hand, the interest in the production of new knowledge which characterizes the university research setting militates against the more "practical" research required by the practitioner. In the United States the institution of the land grant school made possible high payoff research in the agricultural and mechanical arts when these areas were not found sufficiently "pure" by the traditional university community, but no such arrangements in support of education exist.

3. Individual direction. While research efforts in many other areas (e.g., space, atomic energy, cancer and other medical problems) have managed to utilize research teams in a most effective way, research in education has not utilized the team approach to any significant extent. Educational research remains almost entirely an individual effort, even when conducted in the setting of a research bureau or institute.

The individual approach has the advantage that researchers are free to pursue that which concerns them most deeply and to which they are most committed. Further, the programmatic constraints which inevitably

impinge upon the members of a research team cannot act to stifle the creativity of the individual researcher.

A nearly complete reliance on individualistic research does have some serious weaknesses, however. The most severe of these is that the individual is often unable to meet the challenges that confront him because of their sheer size and complexity. Individualistic, uncoordinated attacks on such major problems are usually both inefficient and ineffective. Moreover a series of individual efforts, even if they lie in a similar area, is not likely to cumulate to anything more than the sum of the parts because of the lack of coordination.

4. Theory orientation. Many of the sciences on which the applied discipline of education is based are capable of high level theory development. These theories must be tested and the schools provide a convenient "natural laboratory" for this purpose. Accordingly much so-called educational research (apparently so labelled simply because it uses schools or school children as subjects) actually is concerned with the testing of basic theoretical propositions derived from a "pure" discipline area or field.

There is of course great utility in this approach. Most obviously, the purposes of the related disciplines are well served. The researcher is not oriented to practical problems and can thus pursue truth wherever it leads him. The objective of the development of new knowledge is diligently pursued.

On the other hand, such a theoretical approach usually has little payoff for the practice of education as it exists. Practice is not

sufficiently advanced to take advantage of many of the data that do accrue. Since the foci of these efforts relate to other disciplines, little basic description or definition of the educational enterprise takes place. Thus, educational decisions continue to be essentially uninformed by the insights of research.

5. Experimentalism. For a variety of reasons the experiment has become firmly entrenched as the form of scientific inquiry to be used in education. Obviously the experimental approach has resulted in many advances in the physical sciences, and any method which is so successful has a great deal to recommend it. The rationale and assumptions underlying experimental design have been well explicated, and a wide variety of research tools based on this rationale are available.

There are, however, some major disadvantages to the single-minded use of this technique. First, not all questions are amenable to answer by this method, particularly questions requiring essentially descriptive responses. Second, there is a real question about the generalizability of experimental results to anything other than further experimental situations. The interventions of the experimenter invariably introduce a kind of laboratory bias that make dubious the applicability of results in non-context free situations such as the real world of education. Finally, and perhaps most importantly, the assumptions underlying the application of experimental design simply do not fit the educational milieu. Requirements such as random selection of samples, essential invariance in treatment, screening out of all possible confounding effects (e.g., the introduction of a second innovation while a first is being

evaluated), and stability throughout the experimental period are almost impossible of fulfillment in the school situation, and indeed, it may be undesirable to attempt to do so.

6. Psycho-statistical tradition. Most of the active educational researchers in the United States have been trained in a psycho-statistical tradition that places emphasis on educational psychology, measurement theory, and statistics. The large majority of training programs currently being funded under Title IV of the Elementary and Secondary Education Act of 1965 are cast in this same tradition.

This uniformity leads to ease of communication within the research community since most of the members have comparable backgrounds and interest and all understand the jargon and the methods used by their fellow researchers. It is relatively easy to reproduce new members having the same experimental and theoretical orientations as their mentors. In general, research is afforded a cohesiveness and focus by this means that would be hard to achieve in other ways.

On the other hand, the general agreement upon one tradition obviously serves to exclude other possible traditions. Problem areas and methods that do not fit into the prevailing orientation receive little serious attention. Skills appropriate to these other areas will neither be developed nor transmitted. New research roles will not be developed.

7. Part-time nature. Very few educational researchers are able to devote a substantial portion of their time to research efforts. A proportion of active research time as high as one-third is rare. Since most researchers are university-based, they are required to devote much of their time to other university business, primarily teaching.

There is much to be said for this approach. Some of the leading universities in the United States have, as a matter of policy, endeavored to maintain a one-third time commitment to research as the standard. The reasons usually cited are these: students benefit greatly from being exposed to the thinking of "cutting edge" researchers; the researcher benefits from the necessity for organizing his thinking into teachable form; a one-third time commitment to research is about all that any professional can comfortably handle; researchers need time away from their research efforts in order to rejuvenate themselves and to permit unconscious conceptualization, often called incubation, to occur which will move them to their next breakthrough idea.

But the part-time system also has some obvious weaknesses. It is very difficult for researchers to maintain conceptual continuity and sustained effort under conditions of continuous distraction. Often researchers come to view research as an avocation, opting for teaching as the major function; or they may see research as the major function and teaching as an unnecessary imposition. Obviously neither of these views is maximally supportive of either research or teaching.

8. Federal funding. Most of the funds supporting educational research in the United States are supplied by the federal government.

Federal funding is desirable for a number of reasons. In the first place, most educational problems are found throughout the nation. It would not make sense for every educational sub-unit to study these problems independently, each with its own resources. The available tax base is hardly broad enough to permit such a drain. The federal government can

assess the total educational system and allocate resources accordingly to achieve maximum efficiency. Finally, the problem of the local researcher seeking funds in support of his work is vastly eased if the major source of help is single and nationally visible.

There are also obvious problems. Chief among these is the ever-present specter of federal control. Because of the great concern held by many American educators about this possibility, benefits that could be provided by a strong, centralized agency are not provided by the system. Coordinated funding of research does not occur frequently, and as a consequence, much of the federal contribution to research is used ineffectively and inefficiently.

Some Consequences for Educational Change

The research enterprise in the United States has developed, whether by intent or accident, along the lines described above: it is a loosely organized, university based, individually directed, theory oriented, experimentally committed, psycho-statistical, part-time, and federally funded activity. There is much to be said for this particular pattern; American educational research is certainly in the vanguard in terms of scope, creativity, flexibility, rigor, excitement, and support. But when the question is raised whether an optimal contribution from research to practice exists, it is apparent that the pattern of American educational research poses particular problems that have prevented research from being a viable partner in the task of planned educational improvement. Specifically, the following four situations give some cause for concern:

1. There is little utilization of research by practitioners. There seem to be several reasons for this low utilization rate.

First, research has not been cumulative to any marked degree. Topics which are selected for study in an uncoordinated way by individual researchers are not likely to build upon one another. Thus the practitioner who would like to turn to research for help is likely to confront either a paucity of data in the area of interest to him, or to find competing or conflicting data which leave him in an equivocal position.

Second, research has not been programmatically oriented, so that major problem areas have not been systematically explored. Because of the existing funding patterns, the individual direction, and the part-time endeavor aspect, it has been difficult to achieve any other pattern than ad hoc project research. This approach forces the development of proposals which are easily manageable, which are capable of achievement in a short time with a relatively small staff, and which are simple enough so that a definite product can be described and delivery promised. Project research militates heavily against the conduct of longitudinal studies, general descriptive ventures, or inquiries of broad scope. Great gaps in existing knowledge are the result.

Third, the research currently being produced has been quite unresponsive to practical problems. Researchers tend to focus on problems with a theoretical orientation, amenable to experimental methods, and consistent with the psycho-statistical tradition with which they have been imbued. Researchers publish for other researchers. Their contributions are typically not understandable to the practitioner who is, by contrast,

a layman. There are no formal feedback loops through which practical problems can be brought to the attention of researchers. For these reasons the practitioner is quickly convinced that research products are simply not applicable to the real world as he knows it.

2. <u>There are no adequate mechanisms to link the worlds of the researcher and the practitioner</u>. Until a few years ago it was commonly assumed by practitioners that the development function was within the purview of the researcher, while the researcher felt that it was up to the practitioner to make practical applications from research. The concept that whole new specializations, both individuals and agencies, are required to carry out development efforts is of very recent origin indeed.

Experience gleaned by industry indicates that at least five times as much investment is required to develop a practical application from a basic research finding than was necessary to produce the basic idea in the first place. Highly specialized personnel (engineers) are needed to carry out the necessary steps. Moreover, development depends not only upon the availability of relevant basic research but upon a host of other factors as well: the availability of resources, institutional support, experiential lore, political factors, analysis of the nature of the ultimate consumer, and others. Hence research data provide <u>only</u> one of several critical inputs in developmental activity, and the practical blending of all of these inputs requires more specialized skill than either researchers or practitioners commonly possess.

It is interesting to conjecture why specialization has not occurred among researchers to fulfill some of these development functions. In part

we may account for this fact by pointing to the generally low status enjoyed by any practically oriented activity in education. The university location, theoretical orientation, experimental commitment, and part-time character of the research community have also militated against such a tendency. And, of course, the short supply of both personnel and funds has dictated a policy of emphasis upon central rather than peripheral matters. Clearly the researcher regards the production of new knowledge as more central than the development of practical applications.

3. Patterns for training educational researchers or for producing needed new middlemen (linkers) are inadequate or non-existent. The psycho-statistical tradition of educational research militates heavily against the development of researchers in any other mold, and particularly militates against the training of new middlemen role incumbents.

Typical training programs in research have many gaps. Well over 90 per cent of the training programs for researchers currently being supported under Title IV of ESEA conform to traditional patterns. The trainee with an interest in practical problems or with a non-statistical or non-experimental orientation has little hope of finding a program suited to him.

Training for the new middleman linking roles--educational developers, engineers, evaluators, diffusers, demonstrators, and the like--is almost non-existent. While the demand for such personnel is sharply on the rise, present training institutions continue to be unresponsive to the need. To some extent this failure can be charged to the fact that not enough is known about the role requirements to project a training program for them.

But it is obviously also true that response has been slow because these new roles do not conform to the traditional research image nor to the interests of the universities in which much of the training will have to take place.

4. Adequate tools and strategies for carrying out school improvement activities are lacking. The practical problems related to school improvement have not received the full attention of researchers because of their predilection for theory and experiment, because of the training to which they have been subjected, and because of the general lack of interest within universities toward such problems. As a result the needed tools and strategies for investigating, and otherwise coping with, these problems remain at a primitive level.

We may illustrate this point with two examples. First, as has been pointed out, the major methodological research tools are firmly based in the theory of experimental design, but this theory is largely inappropriate to education because educational activities cannot be caused to conform to the assumptions underlying the experimental method. The typical reaction of the research community has been to decry this fact, citing the impossibility of doing rigorous research in field settings because of the apparent lack of cooperation of school and other educational personnel. But it is obviously equally possible to decry the unwillingness of the researcher to turn his attention to the development of new, non-experimental designs which rest upon assumptions more suited to education in the field. Such new designs are lacking, and adequate research in the real world of education awaits their development.

Second, we may turn to the problem of adoption of educational improvements. Adequate adoption strategies must obviously be based upon data about the educational setting: the training factors, the organizational factors, the physical factors (plant, etc.) that play a major role in determining whether an adopted practice becomes institutionalized or not. Such data are largely lacking now because of the disinterest of the research community in studying these factors in any systematic way. Strategies must therefore be developed largely on the basis of practitioner experience and expert judgment. While such strategies are likely to be reasonably successful, one can only wonder how much more effective they might be if they were adequately informed by educational research.

Some Alternative Avenues for Redevelopment

If there are certain conditions which prevent research from influencing practice in an optimal way, it is appropriate to inquire what might be done to eliminate or alleviate these conditions. Several alternatives will be commented upon briefly.

1. Redesign the existing research structure. Obviously one way to improve the situation would be to redesign the existing research structure, i.e., to make some other pattern of choices along the eight or more characteristic dimensions which would result in a different overall structure. This is probably not a very feasible general strategy, either in the United States or Canada. For example, it seems unlikely that research could be successfully moved out of the university into some other setting; indeed, the advantages that accrue to research as a result of

being university based are so great that such a move would probably be unwarranted. It is also unlikely that a strong central organization for research could emerge unless the federal government played a most active role, but the frequently expressed fears of federal control probably contraindicate such a move.

At the same time it is clear that certain of the dimensions could be re-examined and possibly altered in some aspects. It is probably true that either-or decisions need not be made for most characteristics; thus research need not be entirely theory oriented or practice oriented, or entirely experimental or non-experimental; intermediate positions are possible. Universities and other existing research agencies could very profitably engage in some examination of their positions on these continua, making adjustments as may seem warranted to retain as many of the present advantages while ameliorating as many as possible of the disadvantages.

2. Develop new research structures to complement existing structures. This is the strategy being followed by the U. S. Office of Education as it develops new research and development centers, regional educational laboratories, and certain Title III activities. In these ventures the characteristic loose organization is somewhat tightened, some research is contemplated in non-university settings, programmatic team efforts tend to replace individual direction, effect on practice is made one of the major criteria for judging the success of the research, and personnel are assigned to research on a full-time basis. These programs are too new, as yet, to make it possible to judge their success in overcoming noted deficiencies, but the strategy seems reasonable on its

face. Unfortunately, the expectations for research from these new agencies is fairly limited except in the case of the research and development centers, which approximate the traditional patterns most closely. Early experience with these agencies indicates, as one might expect, that their major problems have to do with the selection of a programmatic focus, gaining commitment from staff to make significant contributions to the agency selected program, getting researchers to work on teams, and opening contacts with the practitioner community.

3. Build linking mechanisms to relate the research community to the practitioner community. This strategy is also being vigorously pursued in the establishment of the new research and development centers, the regional laboratories, and Title III programs. The ideal that is often held up (although by no means achieved in practice) is that the research and development centers shall engage in more practically oriented research than has been the case, that the regional educational laboratories shall convert this research into developed and tested applications, and that the Title III centers shall demonstrate these applications, disseminate information about them, and perhaps even assist other schools to adopt them. Since these three programs are not coordinated, however, there is some doubt whether such a division of functions will in fact emerge. In many cases the personnel attached to each of these three programs seem unconvinced of the wisdom of such a division and for seemingly valid reasons.

Another development related to this linking strategy is the establishment of the ERIC program (Educational Research Information Centers),

which is intended to make possible instantaneous retrieval of research findings for practical application. To date the program seems to have functioned mainly to make information about research accessible to other researchers; little attention has been given to the special information requirements of the practitioner or developer. Presumably accumulated experience will make the necessary further refinements possible.

4. Build new training programs. The greatest potential for moving research into new directions may well result from an investment in new training programs. These programs could contain many elements not found in existing training situations. They could also, and perhaps most importantly, work to develop new attitudinal factors, e.g., according respectability to practical research efforts, recognizing the legitimacy and utility of non-theoretical studies, etc.

A step in this direction appeared to be taken with the establishment, under Title IV of ESEA, of undergraduate programs in research, of pre- and post-doctoral research fellowships and institutes, and of program development activities. Unfortunately, the program has not been supported at the level initially projected. For all practical purposes the undergraduate programs have been entirely eliminated and the remaining programs have been maintained only at their first year levels. Those programs which have, in fact, been supported have tended to follow traditional research training patterns so that the hoped-for breakthroughs have not had a chance to occur. Clearly the goals which the program was intended to achieve have not been realized, nor will they be unless program administration policies are sharply altered.

Conclusion

You will be happy to know that I am almost finished. Let me take just a moment to recapitulate briefly the points I have tried to make. I have leaned heavily upon a description and interpretation of the research enterprise in the United States because I believe the parallels between our system and yours are close enough to make it likely that you can profit from our experience and mistakes.

I began by making a series of generalizations about organizational patterns, training programs, dissemination techniques, and the relationship of research to practice in the U. S. From this very sketchy description I characterized the educational research enterprise along eight dimensions. These dimensions, I asserted, inevitably carried with them both advantages and disadvantages, both of which I attempted to describe. It is my assertion that conscious choices can be made along these dimensions depending on which virtues one wishes to emphasize and which defects one wishes to eliminate. If one were working in a completely new milieu such choices could be made very deliberately.

In the United States, as well as in Canada, complete freedom of choice is not possible. For better or for worse we are already committed to certain alternatives. Hence the problem becomes one of devising strategies to overcome defects while retaining strengths. Certain such strategies are now being tried in the U. S., and you may wish to try some of them here as well. It is difficult to say whether they will in fact be successful; only time will tell. But in the business of inventing better research strategies, as in the business of mountain climbing, half of the excitement is in the trying.