



## Importance of Innovations in Schools and Colleges

Ralph W. Tyler

Today, education is of central importance in the maintenance and development of our nation. Most of the goals we seek as a people require education as a means of reaching them. Because of its significance in the fulfillment of our aspirations, we must develop and adopt the most effective educational programs and means of learning. But, constructive innovation is not only essential to do better the educational job with which we have long been concerned; it is imperative to enable us to accomplish the new tasks which we now confront. Four of these new tasks can be readily recognized.

### *The Need for Innovation*

With the increasing use of technology in agriculture, industry, defense, and the health services, the demand for unskilled labor has sharply diminished and is continuing to drop. At present, the unskilled

comprise only about 10% of our labor force. Yet in the United States, and in other advanced nations, something over 20% of the population have not acquired sufficient skill and general literacy to qualify for skilled or higher levels of employment. The fact that about 80% of our children have achieved an educational level above the minimum requirements for modern literacy and employment is a tribute to the determination of our people and the efforts of our schools. But this is not enough. As of today, at least 90% of our children must be effectively reached by our educational efforts and this percentage is increasing. We know how to stimulate and guide the learning of children who come from homes where education is valued and where the basis for it has been laid in the home experiences. We do not have widely accepted means for reaching children whose background has given them little or no basis for school work. To

reach all or nearly all of these children is a new educational task of our schools.

A second new task is also partly a result of modern technology. As automation has sharply reduced the demand for unskilled labor, the occupations in which there is increasing demand are those requiring a fairly high level of education. These are in engineering, science, the health services, education, the social services, the recreational fields, accounting, and administration. Hence, to provide employment opportunities for all our people and to keep our economy fully productive require a much larger proportion of our youth to complete high school and many more than in the past to gain professional, semi-professional, or technical competence. To provide these educational opportunities and to ensure effective learning for youth from varied backgrounds of training, experience, and

outlook is another new and important educational task which we now face. Neither we, nor any other country, has previously attempted it.

Technological change is producing a third new task, the re-education of those whose jobs have been eliminated by automation or have been greatly changed by the development of new techniques, materials, or devices. Until very recently, technological change moved slowly enough so that the members of each new generation took new jobs and acquired the new knowledge and skills while the members of the older generation were able to stay in the old jobs until their work careers were ended. Thus, although the coal miner's children are not in the mines, most of the coal miners of the 20's finished out their working years without moving into a new occupation. This is no longer possible in most fields. Many people now are, and will be, changing occupations during their working career, and many of these changes require education and training to obtain the necessary understanding and skills for the new jobs. This is another educational task for which we have meager experience and no tested doctrine to guide us.

Because these three tasks—educating the children who have not heretofore been reached, affording effective post-high school education for many youth with limited educational backgrounds, and providing for the re-education of adults—have come to attention as a result of occupational changes, we are in danger of thinking of these tasks as devoted solely to occupational education. This would be a mistake. The requirements for effective functioning as citizen, neighbor, and family member also demand more adequate education. Even the use by the individual of the many avenues for his self-realization can be greatly enhanced by learning.

Without spelling this out in detail, it is obvious that the political, economic, and social problems we confront today are not adequately understood by the citizen whose education is limited either by amount or by concentration on occupational preparation. Hence, these new tasks must include the elements of a comprehensive educational program.

Finally, mention should be made of a fourth new task faced by our schools and colleges, the attainment of certain new ends or objectives. One of these is to teach students how to learn. With the rapid acquisition of new knowledge, it is no longer possible to give the student in school an adequate command of the facts in each major subject which will serve him throughout the balance of his life. The school can only start him on a life-long career of continued learning. Hence, an important aim today is to teach students to learn and to develop in them a strong interest in continued study together with the skills required to keep on with their learning after graduation. This objective has not generally been accepted by schools and colleges in the past, although some teachers here and there have given it major attention.

Another new educational aim has arisen from the recent involvement of outstanding scholars in the development of courses and curricula. In each of the major fields of learning, the scholars are emphasizing the contribution that can be made by learning to use the intellectual apparatus of the field as well as becoming familiar with the results of scholarship. In mathematics, for example, the new courses teach the student to think in mathematical terms so that he can deal with new mathematical ideas and problems, as well as learn the techniques of arithmetic, algebra, geometry, trigonometry, and the like. In history, as another ex-

ample, the new courses teach the student to think in historical terms about the development of cultural, economic, and political institutions, as well as learn some of the significant facts and interpretations of previous historical work. This attempt to help the student acquire and use the important intellectual tools is a new educational aim which has not been widely attempted in the past. It is another illustration of the fact that one of the new tasks of our schools and colleges is to aim at certain new objectives.

The imperative need for educational innovations at this time arises not only from the importance of doing the traditional educational jobs more effectively and efficiently with a greatly increased population but also from the new tasks for which we have no extended experience and no adequately tested doctrine to guide us.

### *Kinds of Innovation Required*

The innovations required are not limited to minor adjustments in teaching procedures. In some cases, we need to devise new institutions and new institutional arrangements. For example, in attacking the problem of helping children from limited home backgrounds, several new forms of learning centers are now in operation. Some are extensions of the public schools, some are laboratory centers under the direction of university departments, some are cooperative agencies of community or neighborhood groups, some are projects of churches, some are new non-profit corporations, and there are several other forms of institutions. Not all of these are likely to be successful, but the encouragement of innovations in institutions and institutional arrangements increases the likelihood of getting more varied ideas tried, of involving a wider range of people who might contribute to the program, and of escaping

some of the restrictions which commonly develop in older institutions because of the rigidity of traditional attitudes and practices. The new Elementary and Secondary Education Act authorizes federal assistance in the support of supplementary education centers; this should make a constructive contribution to developing new and needed institutional arrangements.

Innovations in curricula and educational programs should also be encouraged. During the past six years, many new ideas and materials have been emerging in most of the academic fields at the high school level. New courses are being constructed and tried out in mathematics, science, foreign languages, English, and some of the social sciences. We should extend these innovative efforts to other fields and more adequately to the college and to the elementary school.

Innovations in the way in which student learning is stimulated, guided, encouraged, and evaluated are also greatly needed. The age-old traditions of the teacher-student relationship; the rigid methodology of lecture, recitation, laboratory work, and the term paper; and the narrow conception of human learning as specific conditioning need to be modified or superseded by many vigorous efforts to devise a wider range of means of getting effective student learning.

A fourth area for innovative attention is in working out effective ways for utilizing a greater variety of people in the educational process. The effectiveness and efficiency of our health services have been greatly improved by the development of procedures by which doctors, nurses, practical nurses, technicians, social workers, clerks, and volunteers can contribute constructively to the healing process, using the special competence each has developed. To a limited extent, educational innova-

tions in this area are under way through the exploration of team teaching, the use of part-time service in correcting English papers, the tutorial work done by college students with children from slum areas, and the adult education discussion groups conducted by trained volunteer leaders. However, the possibilities here have barely been touched in spite of the growing demands for education and the increasing number of educated adults who are genuinely interested in part-time service.

A fifth area in which innovations are emerging is in the use of modern technology for educational purposes. This quickly brings to mind educational television, motion pictures, tape recordings, teaching machines, programmed materials, and computer-assisted instruction. There is high current interest in these developments. At the present time, however, the yield from the innovative efforts has been small. Too many of the projects undertaken have been guided by those whose training and competence are in the technology; they have not been wholly familiar with the educational tasks, the aims sought, the conditions of learning to be maintained, and the like. However, today some experiments have been started by persons who have the educational competence as well as knowledge of the technology being used. We need many more efforts of this sort in order to gain the possible values of technology for the benefit of education.

#### ***How Innovations Can Be Extended***

Recent legislation furnishes a very important aid to educational innovation. In 1963, the United States Office of Education was given authority and initial funds to support centers for educational research and development. A center brings together research people and educa-

tional practitioners to attack a problem area like that of educating children from limited backgrounds or that of providing for individualized educational needs. Research is conducted on these problems to obtain better understanding of them, and the knowledge thus gained is translated into teaching procedures and instructional materials which are then made available to the schools.

This year, the new Elementary and Secondary Education Act authorizes support of regional laboratories to bring together resources from schools and colleges to aid the schools in the region to develop and to use innovations which offer promise of greater educational effectiveness and efficiency. Support for these laboratories will provide a significant stimulus to innovation based upon study, experimentation, and demonstration.

But these research and development centers and regional laboratories cannot do the total task of getting into actual operation the innovations we greatly need. In addition, each of us—teacher, administrator, board member, legislator, and lay citizen—has a responsible part to play. Innovations require constructive ideas, the testing of these ideas in practice, and the application of tested ideas in the schools and colleges. These steps involve us all, not simply the research people and the professional educators.

Teachers and administrators are in a position to see the need for improvements and to suggest better ways. Board members and legislators are in direct touch with some of the different educational problems and can often suggest possibilities for exploration. Although the lay citizen is not directly involved in the operation of educational institutions, his experience as student, parent, employer, or in other areas of society frequently yields suggestions for innovations in institutions, programs,

and procedures and for the better use of people who are interested in education. Were all of us to devote some of our time and thought to educational innovations, we could greatly extend the supply of promising ideas worthy of trial.

### **The Role of Research in Innovation**

Promising ideas must be obtained from many persons, including those devoting their full time to education and also those whose experience in other fields provides a different perspective from which novel suggestions about education may sometimes arise. But many promising ideas require careful testing to ascertain their values in practice and also to understand the basic principles on which they operate. In this way, constructive suggestions can be distinguished from those that fail to produce educational improvements. By gaining an understanding through research of the more basic principles that explain the operation and success of those ideas that work, it becomes possible to use them more widely, adapting them to new conditions and shaping them into more productive practices, equipment, materials, and guiding policies.

Too often in the practice of education, ideas are followed for a time enthusiastically and then discarded for new ones, without the kind of research from which we could have learned much more about how the practice worked, in what way it was effective or ineffective, and what were the basic principles that would account for its effects. We can no longer afford to use our energies and efforts on programs from which we learn little or nothing. The crying need for innovation requires consistent, comprehensive educational research, so that we can learn how to meet the great tasks that confront us.

**Gideonse**—*continued from page 19*  
tween person and person and was generally mediated by books or at least the printed word has already become only one model of many and will increasingly assume a smaller and smaller part of the whole. The impact of technology, by highlighting and differentiating different aspects of the educational process, may force us to define anew the very questions we ask about that process and thereby lead us in new directions. In the case of focussing attention on the transmission of information and knowledge, communications research may well lead us to ask much more searching questions about the socialization and moral training function of the schools in addition to creating undreamed of opportunities for "accessing" knowledge stores previously unavailable to pupils, students, and scholars.

These few examples are sufficient to demonstrate that educational research and development has not been a static concept and is susceptible to change. I have tried to give an example of an area newly embraced by educational research, an example of a further extension of that area which might come under consideration, an instance of how an area of higher education which might normally be considered planning could be included in the research sphere, and finally an example of an entire area of research (communications technology) which might be considered "in the fold" because of the extent of its implications for education. These examples are not isolated, I would submit, and constitute unmistakable evidence of the importance of a continuing reconsideration of the definition of the parameters of educational research and development.

\*This article was written by the author in his private capacity. No official support or endorsement by the U.S. Office of Education is intended or should be inferred.

**Stiles**—*continued from page 10*  
might well be thought of as the third time around. The chances that now, at long last, a research component for schools of education will become firmly established seem promising. Thinking about education has matured to the point that professors of education no longer feel they have to take sides on the question of whether education is a science in order to agree that it is possible to study education scientifically. Such growing unanimity of views regarding the potentialities of educational research argues well for a sustained emphasis in this field. The key to the advancement of the current educational research movement in schools of education, however, lies in the support available.

At present, only relatively few schools of education have substantial and continuing financial support for educational research. Federal appropriations have been too small to benefit all institutions. Philanthropic foundations tend to support pioneering ventures only in selected institutions. Also, normal sources of support for schools of education—state appropriations, endowment funds, tuition and other gifts and grants—have yet to be heavily committed for educational research. One might conclude, therefore, that schools of education are only beginning to move to establish research components. How well they succeed in this objective undoubtedly will be a key criterion for evaluating the quality of schools of education in the future.

<sup>1</sup>Behavioral Disabilities Center; Instructional Materials Center; Center for Family Finance; Instructional Research Laboratories—Adult Education Curriculum Laboratory, Research in Basic Skills Laboratory, and Synnoetics Laboratory; Motor Analysis and Development Laboratory; Motor Learning Laboratory; Multimedia Instructional Laboratory; Research and Development Center—Learning and Re-education; Scientific Literacy Center; and Special Education Instructional Materials Center.

## Excerpt from a Handout for Students in a Course on Educational Research Methods

Although research is a matter of asking questions, numerous educational questions are not researchable in the sense that factual evidence can be obtained. Many are questions of value, and their solutions are not subject to empirical investigation. Facts will not provide estimates of the probable truth or falsity of a statement related to values.

True, many questions involve factual information (i.e., empirically verifiable observations) which can be readily confirmed. And some answerable questions require facts that can be obtained but only by ingenious methods and with a good deal of "teasing out" of evidence from a mass or interacting and confounded facts.

Different kinds of *answers*, and hence by extension the different kinds of *questions*, can be categorized as follows:

1. Answers related to directly observable facts (or derived from such facts) and the truth or falsity of which is not doubted.

"Individual A scored 20 points higher than B on test X."

"John Locke influenced British psychological and educational thinking over a century before Herbert Spencer."

2. Answers based on facts *indirectly* observable and arrived at by development of hypotheses, measurement, analysis, and experimental confirmation. These answers, for samples of data, are open to further confirmation or modification.

"Light travels at the rate of 186,300 miles per second."

"A child cannot learn to comprehend simple printed phrases until his discrimination perception has developed to the point at which he can distinguish specified symbols."

3. Answers based on facts indirectly observable and arrived at by elaborate probative methods leading to conclusions of a substantially lower probability, especially when applied to individuals, than those in category 2.
- "Learning is more effective when reinforced by condition X than by condition Y."

"The educational writings of X were influential in leading to practice Y in the schools of country A."

4. Answers based on information supplied by less rigorous methods of observation and analysis but which appear to fit a theoretical context.

"Repressed aggression is a source of neuroses."

"Direction in life space is dependent upon cognitive structure."

5. Answers of an axiomatic nature.
- "Things equal to the same thing are equal to one another."

"If all men are honest, no men are dishonest."

6. Answers independent of observable data and based on highly individual opinions, attitudes, presuppositions, and values.

"Every person has the right to financial support sufficient for basic needs for food, clothing, and shelter."

"Pupils are basically good and try to cooperate with the school."

7. Answers independent of observable data and based on conclusions shared by many persons in a given culture.

"Schools should emphasize man's brotherhood and the development of democratic behavior."

"Taxes should be levied according to ability to pay."

8. Answers based on religious value judgments and independent of objectively observable data.

"God is omnipresent."

"The empirical ego survives the death of the body."

Some of the statements above are straightforward factual propositions, and the criteria of their validity are commonly accepted definitions or the common experience of observing individuals. Others, however, are statements of value and their acceptability often involves personal inclination, disposition, temperament, special interests, or habits of thinking growing out of prior experience. Statements in the first three categories, and sometimes in the fourth, are researchable, and the evidence can be intersubjectively tested. Statements in category 5 are factual, but they are not generally thought of as researchable because of their axiomatic nature. The value statements in categories 6, 7, and 8 are not objectively researchable because they depend upon personal inclinations and partisan interests.