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ABSTRACT

This bulletin contains six articles designed to assist teachers in understanding research and development activities so that they may have a more positive impact on educational practices in schools. The first article reviews significant issues in elementary education, focuses on problems that have prevented a successful implementation of past research findings, and identifies specific understandings elementary teachers must have to participate in research and development activities for improving classroom activities. The second article focuses on the consumer aspects of research and development and describes four major sources of information used by the teacher in making key decisions. The third article, which deals with the teacher as a producer of research, includes discussion on four main topics: a) teacher attitudes toward research, b) the teacher as an unconscious researcher, c) the teacher as conscious researcher, and d) guidelines for teachers to produce research and development products. The fourth article emphasizes the role of research activity as an essential element of instruction. The fifth article discusses a school organization pattern developed by the Wisconsin Research and Development Center for Cognitive Learning, designed to facilitate teachers' effective involvement in research and development both as consumers and producers. The sixth article identifies research and development resources available to classroom teachers. (This document previously announced as ED 039 182.) (Editor/PD)

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RESEARCH, DEVELOPMENT, AND THE CLASSROOM TEACHER PRODUCER / CONSUMER

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INTRODUCTION

M. VERE DEVAULT

THE ASSOCIATION FOR CHILDHOOD EDUCATION INTERNATIONAL has long been concerned with the teacher's role in the improvement of educational experiences provided the young child. Innovative practices in our schools have rapidly accelerated during the past two decades, and, as a result, the task of helping teachers understand the nature and role of these innovations in the improvement of school practice has become increasingly difficult. ACEI has identified this task as a significant responsibility the organization must assume if teachers are to implement new educational practices appropriate to the children they teach. Assistance has been provided in a variety of dimensions. CHILDHOOD EDUCATION has served as a source of ideas through its many articles and special departments which feature descriptions of outstanding theory and practice in early childhood education. ACEI's Information Service includes a wide variety of services. ACEI Central Headquarters staff, members of the Executive Board and other national and local branch leaders among ACEI members, have all provided teachers both inspiration and information.

Recently members of ACEI Executive Board have recognized that a larger responsibility in the area of research and development activities is now required. Establishment of the research column in CHILDHOOD EDUCATION is one expression of that interest; the encouragement of the development of the present bulletin is another.

If the national effort in research and development is to have a positive impact on educational practice in the schools, a major burden rests with classroom teachers, for in the research–development–dissemination–evaluation cycle the role of the teacher is indeed a crucial one. Because of the pressure of day-to-day instructional involvement, most teachers have had neither the time nor the resources to learn about research and development efforts under way through-

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out the country. Yet, if teachers are successfully to assume their responsibilities in the improvement of schools, not only must they understand research and development activities under way but they must be actively involved in these activities. Theirs is a unique contribution, without which improvement efforts are often either irrelevant, impractical, or both. The present bulletin is designed to assist teachers with their individual responsibilities in this larger world.

In the first chapter Professor Yee reviews significant issues in elementary education with focus upon the problems that prevented successful implementation of research findings in the years past. In the hope that a recognition of past inadequacies will result in a challenge for improved efforts in the decade ahead, he identifies specific understandings elementary teachers must have to participate in research and development activities designed to improve classroom practice.

Professors Howey and Kean focus attention on consumer aspects of research and development, and in a complementary chapter Margaret Ammons discusses the teacher as a producer of research.

Professor Tabachnick emphasizes the role of research activity as an essential element of instruction. He insists that research activity by children makes learning possible and leads them to rely upon the testimony of their own senses and the results of their own thinking.

If teachers are to become effectively involved, much assistance in the way of facilities and resources is required. The next two chapters are directed toward providing this needed assistance. Professor Klausmeier discusses a school organization pattern which has been designed to facilitate teachers' effective involvement in research and development both as consumer and producer. This organizational pattern has been developed at the University of Wisconsin Research and Development Center for Cognitive Learning and is now being implemented in schools in several states. Professors Czajkowski and Lange, in the concluding chapter, provide specific help by identifying research and development sources available to classroom teachers.

It is not expected that a reading of this bulletin will make a researcher of every teacher of young children. It is anticipated, however, that teachers who are interested in knowing more about the world of research and development in this country will find a great deal of useful information in these chapters. It is hoped that for many teachers this resource will serve to initiate further exploration in the implementation of research findings in their classrooms.

IMPROVING THE IMPACT OF RESEARCH AND DEVELOPMENT ON PRACTICES IN THE ELEMENTARY SCHOOL

ALBERT H. YEE

THE CHALLENGE OF BUILDING and maintaining school programs appropriate to the needs of our society is unending. A vast array of local, state, and national resources works to provide continually improved educational experiences for children. Many of these resources have been dedicated to research and development activities that have too seldom resulted in direct benefits to the schools. The impact of these research and development activities on classroom practice must be improved. If this impact is to be made, it will be made to a large extent through the efforts of the classroom teacher.

To help teachers understand some of the problems involved in this translation of research and development to classroom practice, this chapter focuses upon past and continuing problems in elementary schools to show why Research and Development lag in their ability to improve educational practice.

EDUCATIONAL RESEARCH AT THE TURN OF THE CENTURY

At a large meeting of the nation's educational leaders, Joseph Mayer Rice (11) after pointing out that "in some cities 10 minutes a day are devoted to spelling for 8 years, in others, 40," then asked: "Now how can we tell at the end of 8 years whether the children who have had 40 minutes are better spellers than those who have had only 10?" To his surprise, the question "threw consternation into the camp."

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> The first to respond was a very popular professor of psychology engaged in training teachers in the west. He said, in effect, that the question was one which could never be answered; and he gave me a rather severe drubbing for taking up the time for such an important body of educators in asking them silly questions. (Pp. 17-18)

Some came to Rice's rescue but most of the audience remained hostile. After an afternoon of much discussion, still no one attempted to answer his simple question. One well-known superintendent confessed to Rice, "We don't know anything."

The incident that Rice reported reminds us that educational practices that may be questionable can persist unless there is a strong, positive attitude toward critical evaluation. Concern for the teaching strategies and the learning tasks in which pupils are involved express one level of professionalism. Matching such concern with continual evaluation demonstrates a higher professional level.

Like many intellectuals of his day, Rice became more and more repelled by the rigidity and irrationality of school practices. Abandoning pediatrics temporarily, he went to Europe for two years to study the new "science of education."

After his return to the United States, Rice published several essays critical of American schools which attracted the attention of Walter Hines Page, editor of *Forum*, a popular, thinking-man's journal during the pre-radio, pre-television era. Page proposed that Rice make a nationwide survey of American public education and write a series of articles for *Forum*. Eagerly accepting the assignment, Rice spent six months visiting schools in 36 cities and wrote nine articles for *Forum*. The importance of Rice's writings can be seen in the dating by Lawrence Cremin (5) of the beginning of the Progressive Movement in American education with the publication of Rice's first article in 1892. Cremin reasoned that Rice was the first to identify the Movement.

Actually, although it was in 1897 that Rice wrote about the meeting he broke up, the same type of question and limited response is possible today. For example, does school integration help the achievement of disadvantaged pupils? Does integration retard advantaged pupils? What objectives does sex education have for elementary school pupils?

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Some of the practices Rice found in what he called "mechanical" versus "progressive" schools seem ridiculous now. For example, he found poor spellers in one classroom practicing difficult spelling words by sing-songing them aloud, and in another the teacher used dramatics as the principal method for all learning. In the latter situation a child called to recite would stand, strike a dramatic posture, and orate the answer with gestures and eye movements that haunted Rice afterward. The principal told him that classroom was known as the "eye room" and that her school was "celebrated for its reading" program. In another classroom of the same school, Rice observed fifty pupils grimacing, wagging their tongues, and making detailed head movements during "exercises" to help their reading. All in the name of progressivism, too!

In a no-bones-about-it "mechanical" school, he heard a Chicago teacher say, "Don't stop to think, but tell me what you know." In New York, Rice asked a principal if pupils were allowed to move their heads. The principal replied, "Why should they look behind them?" A teacher in Baltimore told Rice: "I formerly taught in the higher grades, but I had an attack of nervous prostration some time ago, and the doctor recommended rest. So I now teach in the primary, because teaching primary children does not tax the mind."

Conducting some of the first educational research in the United States, Rice found in a study of spelling that instructional time made no difference in achievement, even though he found the predominant value practiced by teachers to be "save the minutes." His results showed that the "same system of instruction (varied) as much as those obtained under different systems." (12, p. 80)

Rice's recommendations for education were simple. He called first for recognition of the fact that "the school is as the teacher, and consequently the advancement of the schools of any particular locality means practically the elevation of the standards of its teachers." (13, p. 159) Second, he called for "a scientific system of pedagogical management" (11, xv) which provided evaluation of results, facts instead of personal opinion, and curriculum development by those most qualified, i.e., the teachers and not those at the "top," far from and unfamiliar with the classroom.

Thus, Rice saw the beginning of progressive reforms to professionalize American education, which became victory for the intellectual community of America. When the Progressive Education Association was formed in 1919, its first president was Charles W. Eliot of Harvard.

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Slow to join the movement, school people directed vile criticism to Rice and others like him comparable to that which John Dewey was to receive some years later for ironically reverse conditions.

Today's National Assessment of Educational Progress

In Ann Arbor, Michigan, at a research center financed by the Carnegie Corporation and the Ford Foundation, the National Assessment of Educational Progress (NAEP), formerly called the Committee on Assessing the Progress of Education, or CAPE, is studying the simple question: "How much are students learning?"

Several years ago when ECAPE (E for exploratory, as it was then called) began exploring how an assessment might be conducted to answer the same question, many educators and some professional societies directed their criticism to the project, going on record against the research and advising educators and school districts not to participate. The greatest complaint was that the results would unjustly compare individual schools, cities, and states when many factors affecting school learning would not all be accounted for.

It was a valid point but ECAPE was already developing its research plans to counter that possibility. It chose several critical factors: learner's sex and age; socio-economic level; four geographic regions of the United States—NE, SE, Central and West; size of community—metropolitan, suburban, middlesized cities, and small towns. Thus, the sampling process would *not* allow evaluation of performances according to geographic area smaller than regional area.

Some have criticized the type of tests to be used. However, cognizant of the limitations of paper-and-pencil tests, NAEP has benefited from ample resources to obtain the expertise to properly conduct a model test program. The project has involved many educators and lay citizens in the development of the tests. Three objectives were established. The learnings must be those that: (1) subject matter scholars considered worthy, (2) the schools are currently seeking to attain, and (3) thoughtful laymen considered important for youth to learn. (Hightower, 10) There have been independent reviews of the tests by eleven different panels of educators and lay citizens working with staff personnel.

The project will assess ten areas of learning: literature, science, social studies, writing, citizenship, music, mathematics, reading, art and vocational education. Testing of three (science, citizenship, and writing) took place in 1969 with three or four more in 1970 and the remainder in 1971. Another three-year cycle is to begin in 1972.

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The American Institute for Research, Educational Testing Service, and Science Research Associates are under contract to complete the tests. Field trials of prototype tests have already been given across the country to help refine the tests. As a researcher, I do not know of a more carefully developed testing program. NAEP is attempting to evaluate more than rote learning; in their words, "Are students being taught to see and hear—to evaluate, to appreciate, to enjoy?" Here is one example for social studies: "Has a reasoned commitment to the values that sustain a free society." The objective is further broken down for age level:

Age 9: Respects the views and feelings of other people and can tell why this respect is desirable

Age 13: Upholds freedom of speech, the press, religion, and assembly and can give a reason why he does

Age 17: Believes in the role of law and can justify his belief

Adult: Believes in open opportunity for advancement and can justify his belief

Some have criticized the great waste of school time as students take the many tests, but the sampling process will randomly pick fewer than 100 pupils of any participating school and involve each youngster less than one hour.

Despite the painstaking manner in which NAEP is moving, the entire project remains under suspicion and receives hostile criticism, mainly, it seems, because there continues to be a strong tendency for many educators to resist evaluation and change. The initial uproar over ECAPE was fed by an almost total lack of reliable information and an overabundance of undue fear and negative attitudes toward empirical research. ECAPE itself was partly responsible for the lack of information, but as with all planning groups, there is little to report during the planning. However, now that more adequate information is available and respected researchers, educators, and lay citizens have been involved, the bans of professional societies have been lifted and suspicions in the minds of educators have begun to fade.

Troublesome "Elephants" of Education

Creativity

Yamamoto (18) wrote not long ago:

> Something people call an elephant is there—this much is sure. And all of us, blind men, have been touching it, feeling it, figuring it out and describing it to each other. On

some facts, we agree among ourselves; on others, we cannot even understand what each is trying to tell the other. But it is precisely this amorphousness which *is* the elephant—the elephant of creativity.

. . . the confused and out-of-focus picture of the elephant drawn by the blind men is a result not so much of the restricted nature of their exploratory activities as of the radically different expectations with which the explorations are initiated. Men might come to the same conclusion even if one touches the elephant's ears while another feels its tail—but not when the former started out with a clear intention of finding a rabbit and the latter a snake. (Pp. 428-29)

By 1965 Yamamoto could evaluate the elephant of creativity that grew in the 1950's and sputtered out by the mid-1960's. By then, there were ten published conference proceedings on creativity and many discursive and research articles that provided conflicting opinions and outcomes. For some, the concept was a glorification of all that was meaningful to elementary schools, a badge of professional comradeship when expressed in educational circles. For others, it was a confused construct that correlated with everything and could not be reduced to any significant independent behavior; but some kept trying. Reputations rose, and though some were tarnished in the research conflicts, time cures all. It is interesting to note that mention of the concept does not occur as often today, but when it does philosophical connotations beyond everyday usage are seldom intended.

The rise and demise of the concept of creativity more or less resemble what happened to other concepts and theories of the same sort. They passed away because they were mostly pseudophilosophical or pseudoscientific concepts, which aroused differing expectations for educators and could not be approached by research theory and methods. Because of the lack of supportive research and development, the differing expectations and distortions wore out the concepts and they were put away like yesterday's fashions.

NEUROLOGICAL DEVELOPMENT

Carl H. Delacato and Glenn Doman believe that the child's neurological development needs to follow a steady, evolutionary process of maturation because the phylogenetic development of the central nervous system reaches its highest expression in man and characterizes his superior powers. Delacato and Doman believe that unless the child proceeds properly through the growth stages he will exhibit

problems in speech and in reading, the latter being the "essence of the human nervous system." Thus, their therapy involves extensive crawling and other exercises to help nonreaders develop neurologically. They claim that 30 percent of brain-damaged children can "make it all the way into normality" with their methods.

Many educators have been swept up with the theory and many parents have sought reading remediation for their children even when costs average about $1,000 per youngster. Delacato's research, which would appear to support his theory, has been demolished by researchers writing in the *Journal of American Medical Association* (Freeman, 7; Robbins, 14) and *Reading Research Quarterly* (Glass and Robbins, 8). A recent review of Delacato's book (6) by Wepman (17), Professor of Psychology and Surgery and Director of the Speech and Language Clinic and Research Laboratory at the University of Chicago, described the Delacato research as follows:

> What the theory lacks in elegance and knowledge of neurology, and anthropology and psychology, it makes up in romance.
>
> The 'proof-of-the-pudding'—the research reported in the remainder of the book—implies that the empirical evidence for the theory is now at hand. Ten studies, all supporting the thesis, are reported. To the reader even moderately familiar with research design and adequate scientific inquiry these reports are a revelation. Many of the studies failed to include control subjects. Those that did showed most inadequate matching between control and experimental groups. Misapplication of statistical procedures and overinterpretation of results are common. (P. 592)

Although the Philadelphia Institute for the Achievement of Human Potential was established in 1957 by Delacato and Doman, it took a decade before their research was offered for public scrutiny and fully evaluated.

Vicarious Factors Influencing School Innovations

Richard Carlson, at the University of Oregon, found some revealing behavior patterns among 107 school superintendents and their teachers in the adoption and handling of educational innovations. Carlson (3) wrote:

> In a dramatic way, programmed instruction forces a school to stand face to face with the fact that students learn

> at widely varying rates. It is true that some of the most shop-worn cliches, such as "we teach children, not subjects" and "start the learning experience where the child is" reflect a concern for individual differences and suggest that educators are most anxious to tailor learning needs and speeds to individuals. However, when faced with programmed instruction which permits students to work at their own rates, the hollowness of the cliches was exposed by the emergence of a host of practices designed to keep students working at similar rates. (P. 76)

Carlson found teachers holding back the fast students by giving them enrichment work and less time at programmed materials, while the slower ones "caught up" with extra time and work. What seemed most important for teachers was to retain group control despite the expressed purpose of programmed instruction to further individualization.

Some interesting behavior patterns were found among school superintendents. By examining patterns of seeking advice and information on innovations among school superintendents, Carlson found that "advisees tend to seek advisors whose status is higher and whose rate of adoption is more rapid than the advisees' . . ." In other words, superintendents sought guidance from other superintendents who had high prestige and were more innovative.

Carlson asked if status or innovativeness had greater inhibiting influence on advisory patterns. His research found that *status* was a more powerful influence than innovativeness among superintendents. All of which seems to contradict the cliché about building a better mousetrap. Needless to say, we educators must become more adaptive in practice as well as principle. What good do we achieve for pupils if by adopting an innovation we structure it into the old teaching and administrative patterns and destroy and belittle the innovative features?

The Need To Improve Channels of Communication

William Gray (9) reported the following results from a study of reading practices:

> Thirty per cent of the teachers in 1948 were using methods based on principles and practices of 1900.
>
> . . . Forty per cent in 1948 were doing very little with silent reading, despite the fact that the decade 1910-1920 saw the great development of aims and methods in this area. (Pp. 1-6)

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Gray found that only half of the 40 percent were giving children reading experience in the content fields. 20 percent of all teachers seemed only 10 years behind, and only 5 percent seemed up to date.

Gray's survey of reading methods illustrates the tremendous lag in implementing proved educational practices. His survey indicated that 30 percent of the teachers were about 50 years behind the times and 95 percent were at least 10 years behind in using important reading methods. Other surveys show the same depressing results. The question is, how do research findings become developed into the classrooms? The answer: in a manner tortuously slow.

It may take several years to complete a research study, some time to write a report, from two to six months for journal editors to review it, and then, after acceptance, a lag of six to twelve months before it is published—possibly a year and a half to two years from the time the report was completed until its publication.

We have always had an inadequate system of in-school implementation of research findings. The most respected research journals are often necessarily esoteric and not directed to consumers. Such reports, which are tentative and segmented, require that time, reflection and retesting provide concrete recommendations to the schools. Journals are intermediary, interpretive organs for teachers, but the typical professional journal tends to overstate the association's activities and seemingly belittles the teacher's potential to learn from responsible articles that interpret and relate research findings.

To help American schools find the research and development information to improve education, federal funds and policies through the USOE have greatly influenced production of educational research, its dissemination, and implementation into schools. There are now nine Research and Development Centers, educational think-research-and-development tanks which conduct long-range studies of educational improvements. To foster grass roots development, twenty regional laboratories have been established across the country. So that research information could be gathered and disseminated more easily to all types of consumers, nineteen Educational Resources Information Centers (ERIC) were created.

Other federal programs give funds directly to schools and students. For example, the National Defense Education Act alone has provided almost $3 billion to better American education from kindergarten through graduate school. Thus, federal programs are beginning to affect schools.

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Yet the Space Program has consumed about $25 billion to successfully complete the Apollo 8 project; NASA spent about $6 billion in 1966 alone. The Atomic Energy Commission spends about $1.6 billion annually. The Defense budget in 1969 was about $78 billion. of which $28 billion supported the Vietnam War. For the same year, all federal funds for Health, Education and Welfare totaled about $41 billion with only about $140 million going directly to educational research. (15)

However, research is still not changing schools as much as other forces. In the early 1950's, many academic scholars, feeling that school curricula were shallow and often inaccurate, began to work in education. With Sputnik's impetus to the development of science and mathematics through public concern and federal funds, what is now called the New Curricula began within a very few years to influence classroom teaching. In other words, the importance of research was minimized, and the development of new curriculum classroom materials and instructional aids proliferated. Thus, textbooks, curricula and teaching aids have been developed by well-funded groups such as the American Institute of Biological Sciences Curriculum Study Committee, School Mathematics Study Group, Physical Sciences Study Committee, and the National Task Force on Economic Education.

Do Schools Really Make a Difference?

Perhaps our concern for educational lags and our strategies to minimize them mean little. Important research results indicate classroom methods and what teachers have done may not be very significant compared to other factors which schools have not dealt with traditionally. In 1966 a large team of researchers led by James Coleman (4) completed a report that must be considered the most important single contribution to research on education for socially disadvantaged youth. Its conclusions created a storm; the study continues to be controversial and has been attacked by a number of researchers (e.g., Bowles and Levin, 2) for technical reasons, even though Coleman himself is an outstanding research theorist. The most controversial conclusion of the Coleman Report was that

> schools bring little influence to bear on a child's achievement that is independent of his background and general social context; and that this very lack of an independent effect means that the inequalities imposed on children by their home, neighborhood, and peer environment are carried along to

become the inequalities with which they confront adult life at the end of school. (P. 325)

However, to maximize what effect schools could have on the disadvantaged, it was recommended that schools be integrated and "good" teachers be provided disadvantaged children. Because of their more fortunate background, advantaged pupils would not be hindered by such a policy.

As Coleman *et al.* put it:

> . . . children from a given family background, when put in schools of different social composition, will achieve at quite different levels. This effect is again less for white pupils than for any minority group other than Oriental. Thus . . . if a minority pupil from a home without much educational strength is put with schoolmates with strong educational background, his achievement is likely to increase. (P. 22)
>
> . . . the effect of good teachers is greatest upon the children who suffer most educational disadvantage in their background and that a given investment in up-grading teacher quality will have most effect on achievement in underprivileged areas. (P. 317)

Support for the conclusion that teachers and schools should expect only limited influence over children's achievement came from a life-long study of research findings in education by a Canadian, J. M. Stephens (15). His exhaustive study led him to develop what he calls the "Theory of Spontaneous Schooling," which starts from his long observation that research on school variables, including those concerning the teacher and methods, yielded mostly negative results. According to the theory, spontaneous and constant tendencies of the learner's growth and development and home and neighborhood background are so determining that schools may only influence 5 percent of the individual's growth. Therefore, according to Stephens' theory, all our concern for graded or ungraded classrooms, team teaching, homogeneous versus heterogeneous groups, Method A versus Method B and even Method C, buildings and facilities, audiovisual materials, textbooks and libraries, and cost expenditures does not make much difference.

If our influence is less than we have assumed, there is more reason to increase the effectiveness of our teaching. In doing so, we must become realistic about what factors we can manipulate and develop them as well as we possibly can. Also, since the effects of

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"spontaneous tendencies," as Stephens called them, are more greatly altered during the youngest years of life, elementary schooling should become identified as the most crucial element in our system of formal education.

A realistic regard of our maximum potential effect in schools is especially important for the disadvantaged. Preschool programs, such as Head Start, have proved their effectiveness and they should be expanded. Instead of treating elementary children casually as if their more important learnings will somehow take place in high school and college, elementary school teachers and administrators should boldly assume their proper educational role and develop the highest level of professionalism possible. (20, 21, 22, 23)

All this indicates a need for greater support of elementary schools through finances and research and development. The purpose is not to develop more knowledge faster, not to cram but to effect human behaviors that matter in individual and social quality, such as problem-solving and inquiry; the ability to work effectively with others; the ability to learn, to understand why and to care. To accomplish such purposes, elementary schools need to relate themselves much more with the home, neighborhood and community. But most of all, elementary schools must emphasize the key role their teachers fulfill for the society and compromise less in the professionalism of their training, work and salaries. Teachers should be able to implement research findings into their work much faster than they have in the past. Teachers should be more than consumers of research; the best should be competent researchers who can cooperate with career researchers from universities. Only such cooperation can bring about the needed revolution in elementary schooling!

Research Development and Teacher Education

We cannot revolutionize elementary schools without better trained teachers who are professionally committed and competent and administrative structures which better facilitate their individual competences and cooperative work. Schools of education must become far more effective in the screening and preparation of future teachers.

Expressing urgent need for improvements in student teaching, Andrews (1) wrote:

> Nowhere are the vast extremes between excellence and inadequacy in student teaching more striking and more shocking than in the dimension of quality. Some student teachers have

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> a skillfully guided growth experience which leads them to an artistic and professionally effective performance in directing learning, while others have a continuously frustrating, emotionally disturbing experience during which they receive little posit[illegible] direction or assistance, and may in fact learn unwise and [illegible]ssionally unsound procedures. . . . (P. 7)

What Andrews described in 1964 remains true today. Typical teacher education programs are poorly planned and operate without meaningful systems that connect specified outcome behavior with effective means to achieve them. Teacher education programs have ineffective evaluation procedures. Yet their problems are the same for almost all of higher education. To help overcome these problems, the elementary education faculty and other professors of the University of Wisconsin have been developing extensive plans for an innovative teacher education system. Other faculties are developing their own plans. With proper funding, such plans could be researched and developed so that in time teacher education will begin to approximate modern educational requirements we now express under medieval conditions. (19)

Modern research and development techniques and facilities should exert increasingly greater influence in schools. Computer advances, for instance, have allowed great progress in research technology. As a research tool, the computer will be to the social scientist what the electron microscope became for the research biologist. As an educational tool, the computer will be the most revolutionary teaching aid since the printing press.

SUMMARY

If elementary school educators are to utilize research and development to improve classroom practices, they must realize that:

1. Educational practices need to be continually challenged, evaluated, and redesigned. High-sounding clichés and slogans which cannot lead to testable hypotheses and inference systems represent a subprofessional level of development.

2. To effect progressive change, elementary schools need more systematic management and the ability to adapt meaningfully to proven innovative practices.

3. Their overall effect may be much less than they assume. They must maximize their influence through the development of modern administrative structures and the identification and development of those factors that are most relevant to pupil growth and success.

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4. The most crucial single factor is the competence of the teacher; little progress can be made until more professionally competent and committed teachers give priority to their roles as agents for change.

5. Research and development, to change elementary schooling for the better, must involve researchers, educators, and lay citizens working together to build a profession of education relevant to needs today and tomorrow.

6. Early childhood education in the home and elementary school is much more significant in the development of the individual's characteristics and achievement than later education.

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THE TEACHER AS A CONSUMER OF RESEARCH AND DEVELOPMENTAL PRODUCTS

KENNETH R. HOWEY and JOHN M. KEAN

THE QUANTITY AND QUALITY of decisions teachers have to make each day vary as the demands of their daily routines require. When one encloses 25 to 35 active youngsters in a space of less than 1000 square feet for the better part of the daylight hours, the number of decisions that the teacher—the one adult in the room—has to make is considerable. Jackson, as the result of his extensive classroom observations, estimated that verbal exchanges each day between a teacher and his students frequently exceeded a thousand.[1] Obviously, a teacher makes many decisions outside of this verbal context. He must decide, for example, what to do when it rains, what to outline on the blackboard, how to interest mothers in a field trip. One could compile an almost endless list of such routine decisions.

Most decisions that teachers make are considerably more important than those suggested here. What a child gains in basic skills and knowledge, how he feels, what he values, and how he behaves are all affected by decisions his teacher makes. What a child does in school, where he does it, the way he does it, with whom he does it and the evaluation of how he does it are just some of the key deci- 'he teacher must make that can greatly affect that child.

x does one make these decisions? He probably relies strongly own resources, the experience of other teachers, the opinions xperts, and sometimes on the findings of research. The latter is

1. Philip W. Jackson, *Life in Classrooms* (New York: Holt, Rinehart and Winston, Inc., 1968), p. 11.

the assigned topic of this paper, but it would be naive to propose here that any teacher should make most of his decisions on the basis of hard empirical data as reported in research articles. Quite the contrary, the teacher's decisions are made, indeed must be made, on the basis of his own background and experience as he assesses the fluid and dynamic directions his class might take. However, when he is not interacting with children and has more opportunity to evaluate his operation in the classroom and to consider directions his teaching might take, to whom or what does he turn? To put research into the context from which teachers draw the information on which they base their decisions, discussion here is directed toward establishing a rationale for the use of research by teachers.

Sources of Information[2]

Four major sources of information used in making these key decisions are: (1) the teacher himself; (2) group consensus; (3) authorities or experts; (4) research findings. The fourth source may well be indirectly alluded to or incorporated within the first three sources. What evidence has been gathered suggests, however, that the degree to which research findings are systematically utilized by the first three sources is minimal.

THE TEACHER AS A DECISION MAKER

When the teacher makes a decision in the interactive classroom situation, he himself is usually the primary referent in making that decision. In fact, even when making more long-range plans and decisions outside the classroom, when he can turn to other sources, he still uses his own backlog of knowledge. This is to say that he most often relies on his own experiential background and intuitive feeling rather than on a systematic inventory of available sources.

One major reason for this behavior style is readily identifiable. The demands and constraints of many elementary school operations often inhibit teachers from extensive and systematic exploration of a question or problem. First, teachers spend the great majority of their time with their children. The precious little time they have away from the demands of children in the classroom must be rationed for a number of tasks. Attending meetings, grading papers, writing reports,

2. As discussed here these sources are similar to but not the same as methods of knowing. For further discussion, see Fred N. Kerlinger, *Foundations of Behavioral Research* (New York: Holt, Rinehart and Winston, Inc., 1964), pp. 6-7.

monitoring halls, and gathering materials are just some of the demands on a teacher's time and energy outside the classroom.

Frequently, too, the teacher's own interests and capabilities dictate his approach to the problem at hand. Whereas he makes some decisions on the basis of [illegible] information that he has accumulated or experience that he has had, or both, he makes others on the basis of educated guesses. This instinctive approach where one "flies by the seat of his pants" may well be the most common for all types of decision making. In any case, the teacher is doing the job alone, making his own decisions without consultation, consensus, or approval. The professional teacher must make command decisions concerning his practice on the basis of his own expertise. His ability to do this is part of why he is a professional.

GROUP CONSENSUS IN DECISION MAKING

A second influence on teachers' instructional decision is group consensus. One often hears or says "But *everybody* knows," or "But *everybody* does it this way." General agreement or consensus in educational practice can be readily documented. There are a great many similarities in structure and operation from classroom to classroom and school to school. The sequence of the subject matter curriculum, the number of reading groups, the arrangements of desks, and the methods of grading are similar and in many cases identical in schools throughout the country.

Although the "authority" of the majority is real, the validity of that authority is not. The similarity in the demands upon teachers and the expectations many of them have may well account for a good share of the similarity in the way teachers behave. Many teachers may react the same because family and educational backgrounds are similar. Many of the educational practices common to the majority of classrooms may be the result of common demands just as much as common sense. The placement of thirty children with a teacher is a common practice emanating from similar economic demand and serves as an organizational facilitator rather than as an outgrowth of rational educational thought. Whereas the knowledge that many others are doing something the same way you are may well be comforting, it is not necessarily evidence of a rational practice. Many teachers are familiar with, and have utilized, unique methods that have proved highly successful. Such practices have had the weight of neither convention nor tradition behind them. On the contrary, these

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particular practices may fly in the face of both convention and tradition.

THE EXPERT OR AUTHORITY IN DECISION MAKING

Certainly one of the most common resources resorted to in the attempt to understand the culture, content and work of schools, and to justify practice is the expert. The question, "Have you read Freddie Famouse's latest book?" is often heard in schools. The menu of selected readings in any specific area of educational practice continues to multiply rapidly. If a teacher has enjoyed or been impressed by what he has heard or read by a prominent producer of educational thought, he will probably select his work again from the menu for reading. This writer's work becomes a handle to grasp in trying to sift through the many theories, programs, and plans. The importance of his work is established as much by the number of readers as by what he actually has to say. Frymier suggests that the primary catalysts for much thinking on curriculum are the prolific producers of ideas, whom he calls curriculum "heroes."[3]

Relying heavily upon "authorities" in making educational decisions has obvious pitfalls. Many authorities identify a problem or issue in educational practice well but actually suggest very little in the way of concrete solutions for translation into actual practice. And even the most revered educational experts who have attempted to be more prescriptive in terms of educational practice have had their concepts and ideas interpreted in a number of ways. The process of translating ideas into practice without concern for some scientific implementation and control has always been difficult.

There is no validity inherent in an idea because an authority espouses it. The open warfare among many authorities on a number of practices is well known. Yet, the consumption and analysis of opinions of educational authorities and experts is hardly meant to be dismissed as useless. One can only hope that all teachers have the opportunity to sift the ideas of many scholars, authorities and experts. This method or source of knowing should be utilized frequently but not as the sole means of validation of educational practice.

RESEARCH DATA IN DECISION MAKING

The point has been made that research findings cannot and should not be the primary source of data for much of the teacher's decision

3. Jack R. Frymier, "Around and Around the Curriculum Bush, or In Quest of Curriculum Theory," a paper presented at the annual meeting of the Professors of Curriculum, March 10, 1967, Dallas, Texas.

making. In regard to key policy and operational decision, however, these data should certainly be utilized when available. This is the one source that has built into it some objectivity and validity. Kerlinger states:

> The scientific approach has one characteristic that no other method of attaining knowledge has: self-correction. There are built-in checks all along the way to scientific knowledge. These checks are so conceived and used that they control and verify the scientist's activities and conclusions to the end of attaining dependable knowledge outside himself. . . . A scientist does not accept a statement as true, even though the evidence at first looks promising. He insists on testing it. He also insists that any testing procedure be open to public inspection.[4]

Whereas these research findings provide the teacher with more objective data that have been field-tested and controlled, they are no more sacred cows than are other rationales for decision making. It is at least as fashionable in educational circles to refer to the latest research report as it is to some leading educational figure. Yet the researcher is not a super authority. Guba, in discussing demonstration, makes the point that their aim "is not to huckster a particular invention but to open a further alternative for professional consideration."[5] A similar claim can be made for research.

But before a further exploration of how teachers might better consume research and why the consideration of research is important, it seems appropriate to look at some indications of why such an exercise is necessary.

Knowledge of Research

A number of classroom teachers and principals were kind enough to discuss with the authors of this paper some of their knowledge of and feelings about research. The principals and teachers were given the names of some experienced scholars who have conducted rather extensive research in four major areas related to educational practice: child growth and development, intelligence testing, teacher expectations, and the content and skill areas of reading and language

4. *Foundations of Behavioral Research*, pp. 7-8.

5. Egon G. Guba, "Methodological Strategies for Educational Change," a paper presented to the Conference on Strategies for Educational Change, Washington, D. C., November 8-10, 1965.

arts. The scholars identified as having done extensive work in each of the corresponding four areas were Jean Piaget, Robert Rosenthal and Lenore Jacobson, Guy Bond and Robert Dykstra, and Walter Loban.

As stated before, the operational demands of many schools often prohibit teachers from becoming familiar with recent research developments. It was anticipated, therefore, that teachers and principals might not be in a position to talk about the implications each of these studies might have for them. From the final analysis, very few teachers and principals have even a passing acquaintance with the work done by these men.

The teachers and principals questioned could be classified into three major groups according to their responses. The largest group was in no way familiar with the research or the researchers; the second group had heard of them or their work but had not had an opportunity to read their reports or writings, and a third, very small group had read about them but either didn't understand them, agree with them, or make any change in their operations because of them. Although this group of teachers and principals was not intended to be representative, that none of them could explicitly relate these widely publicized studies to their own practices certainly reinforces the necessity to promote actively the findings of research useful in changing practice in the school.

When the teachers and principals were asked what research was available to them in their buildings, they cited professional journals as their primary source of information. That their information came primarily from articles or periodicals rather than extensive reports and books seemed consistent in terms of the time available to most teachers. The journals most frequently cited, however, are not research oriented in their format. The most frequently cited journals were *The Grade Teacher*, *The Instructor*, *The NEA Journal* (now *Today's Education*), *The State Teachers' Journal*, and state department bulletins. No research journals were listed.

The respondents did make suggestions for disseminating research-based information within the confines of the school building, such as a need for some in-service work to assist teachers in the evaluation and understanding of research data. They also suggested that a staff member—the school librarian, the principal or a teacher—be delegated the responsibility for reviewing and disseminating research. Other changes suggested were more time, a better system of indexing and classification, and the opportunity to share ideas with actual researchers.

For this presentation, feasible approaches to the problems of using research are: (1) the examination of the need to use research findings in making key educational decisions, and (2) the provision of a framework and perspective for analyzing research reports. Although it is seldom that a single research article will provide data that are readily translatable into a desired instructional operation, much valuable information can be gained from a thoughtful analysis of such reports. A set of questions and a number of criteria for helping to decide what and where this research might be relevant and useful will be provided. A number of ways of knowing, or referents for making decisions, are discussed.

Why the Need and the Use

Within the confines of systematic research, the focus in this paper is not on production or development but the manner of understanding and utilizing it. Research findings are not the keys to the kingdom, nor is it suggested that the grasping tentacles of a massive octopus of research crush the vitality out of the teacher's responsibility for making his own decisions in the classrooms. Research, as was noted, is only one way to gain information.

As one suffers the frustration of actions based more upon intuition than on rational thinking, or as one tries to explain the bases of his actions to others, he begins to wish for more firm support than the quoting of some authority or referring to common practice or personal preference provides. As the costs of education continue to spiral, classroom teachers increasingly will be asked to provide a rationale for their actions. Increased public concern is resulting in closer scrutiny of classroom practices by a number of parties. The controlled study of the researcher can help provide a more defensible rationale—a basic rationale built not on any single instance of "I did this because I read this study of . . ." but on an accumulated synthesis of all that one has read, seen or heard about research and development relevant to the matter under consideration.

Through the use of a number of data sources, the teacher assembles, modifies, and broadens his own thinking about his behavior as a teacher and about the kinds of experiences he wants children to have. By becoming familiar with the number and types of knowledge he may use in arriving at a decision, he has the basis for assessing the strength of the information he has utilized in initiating or modifying anything that he does.

If a teacher, for example, wishes to make changes in his primary reading program, he should want information about how other people have made these changes and about how these changes have affected the children's progress in reading. If he is like many, his original way of collecting this information is highly undisciplined. When one buys a car, people keep suggesting strategies such as analysis of prices, efficiency ratings, reliability, and comparative costs of making repairs, yet most buyers tend to rely on subtle influences: pressure of the salesman, praise from a neighbor, the automobile accident witnessed two days ago, or the cost of their automobile insurance. Consciously, at least, the buyers do not use much empirical data that are available to them. Obviously, much scientific analysis had gone into the production of the car which they did not take the time to consider fully.

Similarly, teachers need facts and objectivity as part of their reason for feeling secure about the decisions they make. Verified research findings can help them obtain these conditions.

Research, as the term is used here, refers to the inventing or the constructing of hypotheses and descriptions that will enable one to answer questions about educational endeavors. Research initially is limited by the specific way in which experiments are set up and the data are collected and analyzed. The findings of the research are also limited by the resources available in interpreting and analyzing that data.

Egon Guba summarized major inquiry objectives that are useful in looking at research on schooling.[6] He classified them broadly into four areas. First there are studies that *describe and estimate*. Examples of these include status studies, questionnaires and inventories about such items as classroom behaviors and characteristics of children. Second, he refers to studies which *compare and correlate*. Examples of these would include the similarities and differences in children's writing styles in various communities or the relationship between learner achievement and instructional programs. His third category covers *analysis and synthesis*. This category would include studies that categorize test items according to the level of thinking they require or the compiling of a number of different variables which influence a child's success in reading. His fourth and final classification he calls *testing*. Within this classification one would include studies designed to confirm hypotheses, such as whether the specific

6. *Ibid.*

effects of an individualized mathematics program upon achievement were what was projected, or the demonstration of the effects of field study upon social studies concept development. We would suggest that these categories identified for investigators are also viable for the consumer in identifying the type of research he is reading and in effect delimiting the research area.

Knowing what one is examining increases his power to use research in making decisions. Yet what one will read in many cases seems to lack this kind of definitiveness. If research is to help resolve old issues and invent new procedures and solutions then it must have the larger cohesiveness of being well defined. Daniel Griffiths cautions that a single study rarely produces significant findings: "Major contributions are usually series of inter-connected studies conducted by a number of investigators and at the same time . . . when a single study produces significant findings, it is the culmination of a number of related researches."[7]

Need for Gatekeepers

Unfortunately, when one reads studies in a journal or sees a demonstration he rarely knows the context or interrelatedness of one study to another, unless he is an informed student of recent developments within the area. Because of his lack of orientation the reader is often forced to depend upon the judgment of the editor, the sophistication of the demonstration center director, or the often capricious sense of journal reviewers. Many journal editors are very careful to find out about the quality of the research articles they publish, yet in some fields quality must often be sacrificed to such considerations as creative topics, pioneer endeavors, or lack of sophistication among researchers in an area. One can usually depend upon the integrity of the research and the journal editors to put forth good research. Yet, there is diverse opinion among the researchers, the editors, and the reviewers on what good research is.

Consequently, researchers' reports must be subjected to a number of questions and considerations by each consumer to see of what possible use they might be, or indeed if they are basically acceptable research. The final portion of this paper is intended to help teachers frame some questions that can be asked about research.

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7. *The Ten Most Significant Educational Research Findings in the Past Ten Years* (New London, Conn.: Croft Educational Services, 1967), cited in *SRIS Quarterly*, Spring 1968, p. 23.

In evolving these questions, the authors have tried to avoid asking classroom teachers to make decisions that rightly belong to the researchers themselves and to those whose special training has given them the background to critically evaluate such things as the methods used to analyze data, design of the study, and the relationship of conclusions to statistical evidence. For these areas, most teachers, including the present authors, justifiably need to seek the consultation of research professors, curriculum directors, or teachers with backgrounds that enable them to answer questions in these areas. There are a number of questions which a classroom teacher can raise, however, to provide a critical analysis of research. They are questions which one asks as a literate human being, which one can ask because he is a professional teacher. Two sets of questions are provided. The first set deals with the quality of the research, the second with the usefulness of the research for the classroom teacher.

QUALITY OF THE RESEARCH

Clarity

To emphasize that there are no absolute criteria for answering these questions, a scale with numbers from 1 to 5 is provided.

How clear is the purpose of the study or what the researchers are attempting to do? 1 2 3 4 5

How explicit are the researchers as to whether the study is attempting to: 1) describe, 2) classify, 3) show relationship, 4) test a hypothesis? 1 2 3 4 5

How explicitly are the basic assumptions of the researchers reported? 1 2 3 4 5

How well defined or how understandable are the terms used in the reports? 1 2 3 4 5

How explicitly are the limitations of the study stated? 1 2 3 4 5

Comprehensiveness

How adequately is the population and sample utilized in the study described? 1 2 3 4 5

How adequately are the possible variables affecting the study accounted for? 1 2 3 4 5

How adequately are the procedures or methods of data gathering described? 1 2 3 4 5

Other Considerations

To what extent did the researchers discuss the validity (or

appropriateness) and reliability (or consistency) of the instruments or coding procedures of the study? 1 2 3 4 5

To what extent is the situation in which the research was conducted similar to that which you might accept as real or natural? 1 2 3 4 5

To what extent were you able to differentiate among results, conclusions and implications in the study? 1 2 3 4 5

To what extent do the measures, instruments, attitudes, inventories, test scores, etc., validly (or appropriately) and reliably (or consistently) describe what the research is attempting to demonstrate: i.e., better teaching, better learning, or the relationship among several variables? 1 2 3 4 5

On the basis of the above questions, is the study strong or weak? 1 2 3 4 5

USEFULNESS OF THE RESEARCH

1. Where might additional research or data on the topic under study be found?
2. Does this data support or conflict with the finding of the original research study?
3. Can suggestions of the research be observed in actual operation?
4. On the basis of what you now know, to what extent would you be willing to incorporate procedures or methods suggested by the research into your own program?
5. How feasible is the use of these research findings in terms of your present training, materials, and finances?
6. How appropriate is the research in terms of the needs of your learners?
7. How consistent are the modifications suggested by the research with your own educational philosophy or that of your system?
8. How realistic would it be to make the necessary changes politically, i.e., in terms of anticipated reactions of other teachers, administrators, parents, the community, or even children?

Conclusion

This paper has attempted to introduce some teachers to the uses of research, to help others crystalize an approach to using it, and hopefully to whet the appetite of still others to its use in modifying their own classroom behaviors and in stimulating educational change.

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THE TEACHER AS A PRODUCER OF RESEARCH AND DEVELOPMENT PRODUCTS

MARGARET AMMONS

THE TASK OF THIS SECTION is to present a case for teachers' engaging in research. The intent is not to suggest that research is simple but that it is indeed in the realm of the possible for teachers. This paper is divided into four parts: (1) teacher attitudes toward research; (2) the teacher as an unconscious researcher; (3) the teacher as conscious researcher; (4) brief guidelines to ways in which teachers can produce research and development products.

Before pursuing the four sections, we should explain the use of the term research in this context. Although not a definition of research, the following describes one position regarding the requirements of sound research, or the posture of a sound researcher:

- if he questions his explanations;
- if he challenges the methods by which he arrived at his conclusion;
- if he critically and systematically repeats his observations;
- if he devises special tools for taking, recording, and analyzing these observations;
- if he tests the reliability and validity of these tools and evaluates his data in other ways;
- if he gradually refines his concept of what he is trying to explain and considers anew the necessary and sufficient conditions for proof;
- if he at every step proceeds with the utmost caution, realizing that this purpose is not to arrive at an answer which

is personally pleasing, but rather one which will stand up under critical attacks of those who doubt his answer.[1]

In any case, "Research presupposes that the researcher will gather pertinent evidence to answer pre-arranged questions and then let the chips fall where they may."[2] This latter point raises an interesting question which is dealt with later.

TEACHER ATTITUDES

For the purpose of clarity the description of teacher attitudes toward research will be perhaps a bit overdrawn. Nonetheless, there is sufficient truth in the description to warrant some attention to the question.

My experience suggests two major categories of attitudes: *complete trust, and fear.*

There are some teachers who have been convinced that research is good and beautiful and that their classroom practices should reflect those things which research seems to say to the teacher. Whether such teachers actually alter their classroom practices is a researchable question in itself. Nonetheless, some teachers verbalize their belief in the utility of research findings. They use findings as the unquestioned ultimate authority and stand in awe of those who generate findings. This appears to be the case whether or not a given set of findings conflicts with one or more other sets.

In general, there seem to be fewer teachers who believe in research to the extent that some portion of their own teaching behavior is strongly influenced by research findings. More often, teachers tend to shy away from research findings. This appears to be true for a number of reported reasons. First, their preparation has not equipped them with the language—either standard or statistical—to read and interpret research. Second, they are not equipped through study of research design and statistics to engage in research themselves. Third, many are fearful that research, that of others and their own, will reveal weaknesses in their instructional programs. Fourth, many teachers see researchers as living "in ivory towers," and their findings as unrelated to the real world. One further illustration regarding fear of research is the graduate student who finally

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1. Carter V. Good and Douglas E. Scates, *Methods of Research* (New York: Appleton-Century-Crofts, Inc., 1954), p. 11.

2. Don Davies, "Research in Teacher Education: Nature, Classification, and Evaluation," *Leadership Through Research*, ed. Ingrid M. Storm, Bulletin 4 (Cedar Falls, Iowa: The Association for Student Teaching, 1961), p. 14.

faces the task of producing a Master's thesis. Many seek topics which will relieve them of engaging in what they conceive to be research.

In this connection Stratemeyer has outlined some attributes of college teachers and teaching which may be useful in overcoming some teacher fears of engaging in research.

1. That all teachers demonstrate, in their teaching, research and experimentation as a necessary part of the teacher's work.
2. That all teachers encourage students, as a regular part of their class work and independent study, to raise questions, set up hypotheses, and test those hypotheses—in some instances through gathering evidence found in published writing, in others through setting up a plan for gathering firsthand evidence.
3. That all teachers contribute to the student's research orientation by referring to experimental studies appropriate to individual or class work (i.e., use of original research rather than secondary sources).
4. That, as appropriate, individual instructors or groups of instructors carry on research studies at the college level or jointly with members of the laboratory or cooperating school—with students sharing in the experimentation.
5. That teacher preparing institutions assure the college student opportunity to engage in action research as a part of student teaching and other laboratory experiences.
6. That the staff of a teacher preparing institution cooperatively plan an overall framework of experiences and allocate responsibilities to assure that students will be provided to help needed to develop the desired research orientation—acquaintance with the major kinds of research, the essential and differentiating characteristics of each type, and the place of research and experimentation in the teacher's work.[3]

If it is the case that lack of information breeds fear, then Stratemeyer's six recommendations are relevant to the attitude of many teachers toward conducting research. Recently in a meeting whose attendants included teacher educators from a college campus and public school teachers, the latter group asked how much oppor-

3. Florence Stratemeyer, "The Contributions of Individuals and Institutions to a Research Orientation to Decision Making," *ibid.*, pp. 20-21.

tunity new teachers have during their preparation to engage in research. The response from campus personnel was that such training was not appropriate for a pre-service program. Public school people in this context did not agree.

Thus teachers, and perhaps with good reason, tend to under- or over-use research findings and to neglect research activities in their own classrooms.

THE UNCONSCIOUS RESEARCHER

In spite of the foregoing, teachers do in fact engage in research. Dyer puts the case nicely in the following words:

> Get them (teachers) to regard all their classroom work as a continuous series of both minute and longer-range experiments in pupil learning which, in fact, it always is, *whether teachers realize it or not* . . . (italics mine). The teacher should come to realize that every judgment she makes of pupil performance is in the nature of a working hypothesis which needs constant checking and revision in the light of new information that accumulates as she moves from one activity to the next . . . The realization of uncertainty is achieved only after the cold steel of such ideas as sampling error, the variability of human behavior, and the fallibility of casual observation and personal judgment has entered the teacher's soul. She will learn that she cannot be sure, and accordingly her approach to the instructional task will be less rigid, more tentative, and more responsive to the individual learning needs of the pupils with whom she works.[4]

Contrary to earlier statements, the situation as described by Dyer suggests that the teacher in fact engages in research activities at an unconscious level. Is unconscious research sufficient either to teaching or to research? The obvious response is "No." What is a reasonable alternative?

THE CONSCIOUS RESEARCHER

Let us look again at what Dyer says and cast the teacher in the role of a conscious researcher: "She will learn that she cannot be sure, and accordingly her approach to the instructional task will be less rigid, more tentative, and more responsive to the individual learning needs of the pupils with whom she works."

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4. Henry S. Dyer, "What Point of View Should Teachers Have Concerning the Role of Measurement in Education?" *Fifteenth Yearbook, National Council on Measurement Used in Education* (New York: The Council, 1958), pp. 12-14.

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If the literature can be believed, this making teachers more responsive to the needs of individual students is one goal of all teacher education. One could almost restate the foregoing to say that if one is not researching, one is not teaching in the best sense of both words. Therefore, to construct an imperfect syllogism, we need teachers who are conscious researchers. Further, research done apart from the teacher's own situation may not be directly applicable to that situation. His own questions may not have been treated in a way useful to him. Finally, as a professional, the teacher is almost required to engage in production of knowledge which can improve the state of the field. It also increases the teacher's array of choices. This means that as a teacher engages consciously in research and produces answers no matter how tentative to new questions in education, he enlarges his repertoire of knowledge, strategies and approaches to teaching in his own classroom.

GUIDELINES FOR TEACHERS AS PRODUCERS

So much for attitudes, conscious and unconscious research. Can some guidelines be offered to teachers? Obviously yes—or this work would not be attempted. Following are eleven guidelines to teachers who would embark on research projects.

1. Heed the preceding presentation regarding consumption of research. The first step to production of research is familiarity and almost "old-shoe" comfort with the research of others. Contrary to prevailing opinion, researchers are human, and in the words of a colleague, "put their pants on one leg at a time as do all men." Thus, as one reads research reports of others, one must recognize the possible weaknesses in a study as well as the strengths.

2. Recognize that research will not solve value problems but that it can shed helpful light on bothersome educational questions. Research findings are generated through asking questions of the "What is the case?" variety. Once one is convinced that something is true or probably true, one still must ask himself, "Should this be the case?" For example, if it is true that some three-year-old children *can* be taught to read, then is it also the case that these children *should* be taught to read?

3. Admit (and no one teacher is infallible) that all is not perfect in the classroom. This amounts to two types of inquiry: "How many places do I itch?" and "Which place itches the most?" Begin by identifying the problem, the first step in the list of Good and Scates' description of sound research. They call it questioning the

soundness of explanations. One additional way to describe problem identification is a disciplined approach to decision-making.

4. The next step is an extension of the number three—to state the problem with such clarity that next steps become clearer.

Describing four research projects undertaken by teachers in classrooms will illustrate.

One teacher was concerned with the question of what approach seemed to help children produce the best creative writings. The teacher had employed several approaches including discussion of words and their meaning; multi-experiences, such as nature walks, stories and tactile experiences. She, however, had not kept records or systematically tested results of any one approach as compared with others. The question was "Which approach is 'best'?" The problem was to design ways to collect data and to analyze the results so that the question could be answered. This study was conducted during regular class time.

A second teacher was interested in whether or not sixth-grade students could learn Aristotelian logic and in what their attitude toward this subject would be. (She obviously believed that such study was a "good" thing, particularly as an aid in mathematical study.) She designed a "unit" on logic, including objectives, lesson plans, worksheets, and tests. She secured two groups of children and determined their similarity through appropriate statistical techniques. (She was not proficient in statistics but was able to secure expert help; she ultimately became fairly independent in the use of several techniques.) To begin the study this teacher gave a pre-test to both groups, "taught" the unit for six weeks to the experimental group, gave a post-test to both groups and compared the results. She completed the collection of data by retesting for retention some weeks after the study was completed.

A third teacher was concerned with teaching beginning reading. She chose two approaches, basal series and individualized. Ultimately she hoped to identify those children for which either approach would be most useful. She randomly divided her class into two groups and subdivided each group according to selected criteria, for example, I.Q. scores and sex. Her measure was reading achievement. At the end of the study she was able to say that for her class and for individuals within the class certain things appeared to be true.

A fourth teacher had become excited about the use of primary data sources in the teaching and learning of social studies information. Her interest was "unbridled" and undifferentiated; her question

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was, "How can I focus both interest and skill to produce a useful tool for teaching?" Her study led her to develop a guide to the use of maps in historical inquiry. Hers was a type of research which led her to library study of many varieties. The result was a thorough, readable, well-documented guide, useful to any intermediate teacher.

These serve to show the necessity of clarifying the problem so that next steps are more easily designed.

5. Determine what evidence would be relevant to determine whether—and which—comparative groups are essential, to ascertain what resources and techniques are necessary, both to conduct the study and to analyze results. Here again, in many instances, teachers have sources of assistance available to them. Increasingly, school systems employ individuals who are proficient in research skills.

6. Discover whether the assistance of other teachers is useful or necessary.

To illustrate with another real situation: Two second-grade team teachers were convinced that a team situation produced children who were more self-directing than children of similar types who were in self-contained second grades. The question intrigued six other primary teachers in a school system some 200 miles distant. This writer worked with both groups for one school year to develop an operational definition of "self-directing behavior," which resulted in a 17-item check list. The team situation allowed teachers to be free to observe individual children in a classroom situation and to communicate easily about these children. While these teachers were in teams, similar arrangements could be made among teachers in self-contained classrooms.

7. Decide what data to collect. In many studies there are "things" which are considered to be related to the question under study. That is, there are factors which at least on logical grounds might influence the results of a study. Most teachers have done this kind of sorting—e.g., two stores sell the same item, say floor wax. One advertises a price of 98¢ a gallon and the other $1.23 for the same amount of wax. Now what factors which occur in both circumstances might differ sufficiently to produce the price difference? The store which sells the wax for 98¢ is 15 miles farther from home than the one which sells for $1.23 (note these findings simply paint the picture, they don't say which store to patronize). Or the 98¢ store may have self-service and be in an unattractive building whereas the reverse may be the case in the other store. All this is meant to illustrate only that as one attempts to compare two anythings—

one must identify those terms which could be relevant and could control them. These factors and variables may help account for differences in results. In a classroom these variables typically include age, sex, I.Q. scores, other test data, and the like. One must identify those variables relevant to a given problem.

8. The study must be designed carefully. Designing includes establishing hypotheses that get at the question, determining what data are to be collected, how data are to be analyzed. Help needed to assure an adequate design is available from a number of sources.

9. Data should be carefully collected and recorded. This seemingly small detail is the most bothersome to students. *If data are carelessly or nonchalantly recorded one can find himself in the position of losing his study.* If the data are carelessly collected, one may at the very least have to repeat collection.

10. Analysis of the data must be done appropriately. While some teachers may conduct studies which require sophisticated statistical techniques, others will not. Many such techniques are understandable with little effort. Again, help is available. In any case the technique must fit the problem.

11. Conclusions must be drawn with care. The confidence one can place in results is determined by the limits placed by the design and the statistics used, and the extent to which these are recognized.

These are fairly simplistic guides. They serve to suggest that teachers can produce research and development products which can be useful not only to themselves but which can point direction for other teachers.

The foregoing raises another point. As researchers, teachers must distribute findings so that they may be reviewed, evaluated, and/or repeated. Any study that suggests roads to improvement of classroom instruction needs, in most cases, refinement. If the study were sufficiently sturdy not to need refinement, it perhaps merits trial by other teachers. In one school district some years ago twelve teachers implemented individualized reading programs. They controlled what appeared to be relevant variables, kept careful records, and in the spring reported findings to the total elementary faculty.

Many other teachers were impressed with the results and moved toward such reading programs in their own classes. Children, on the average, in that district improved markedly in reading achievement and displayed a more positive attitude toward reading. Had

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the original findings not been shared there is some question whether the general improvement would have occurred. Dissemination is an obligation.

Now to return to an earlier statement by Davies which said in part that a researcher seeks answers to questions and lets the chips fall where they may. While this may be true of the "pure" researcher who works in a laboratory with non-human subjects, it cannot be totally true of the teacher-researcher, for he deals in humanity.

The teacher who engages in research seeks to serve two groups: fellow professionals and individual children, and to serve both without sacrificing either. At first blush, this may seem impossible. It is impossible only if one fails to heed Dyer's words regarding the teacher as a researcher.

> . . . she will learn that she cannot be sure, and accordingly her approach to the instructional task will be less rigid, more tentative, and more responsive to the individual learning needs of the pupils with whom she works.[5] What they (teachers) need is a strong dose of fundamental research theory well salted with the principles of statistical inference and experimental design, and the whole *so intimately* and obviously related to the business of teaching live pupils that no teacher can possibly miss the point.[6]

5. *Ibid.*
6. *Ibid.*, p. 15. Italics not in original.

RESEARCH AS AN INSTRUCTIONAL TOOL IN ELEMENTARY CLASSROOMS

B. ROBERT TABACHNICK

OUR CONCERN IN SENDING children to school is that they use their school experience to learn about themselves in a world where natural and social events may be ordered and understood in different ways. These events may even be anticipated or predicted with more or less accuracy—natural events, like the coming of spring or the expansion of metals when heated; social events, like the coming of election oratory every four years; or the variation in price of *identical items* in different grocery stores.

It is not sensible to say, as some people do, that teachers care about the child and not about the world outside him. Any organism is inextricably interwoven with his surroundings. He helps to make the environment; the environment helps to make him. We have no alternative but to care about the child *in* society, the child *in* a natural environment. A concern that children come to know themselves (that children realize their potentialities for doing and becoming what is of value to them) means a concern for helping children learn about the world.

DISCIPLINES AND PERCEPTIONS

It is not sensible to say that teachers care primarily about history or biology rather than about children, that our decisions about what should happen to children in school must respond primarily to what such a discipline as history or biology "demands." Disciplines are human creations, inventions that help us explain events through the

organization of general ideas and supporting data into tentative patterns that may make it easier to explain what we perceive and to predict what is going to happen. History, biology, and the rest are the persons who do them as much as what those people do, and that is the case whether the persons are older or younger, adults or children.

Our business in coming into schools as teachers, most of us would agree, is to facilitate learning, to help children become able to construct and use devices for organizing their perceptions, so that the world appears understandable and behavior and events can be anticipated in some part. We expect, as teachers, to help children to change the ways in which they respond to their perceptions of events around them. We expect children to become increasingly more adept at inventing categories useful in explaining what things are happening, why they may be happening, what things are going to happen. Jacob Bronowski refers to such a process, remarking:

> Man has only one means to discovery, and that is to find *likenesses* between things. To him, two trees are like two shouts and like two parents, and on this likeness he has built all mathematics. A lizard is like a bat and like a man, and on such likenesses he has built the theory of evolution and all biology. A gas behaves like a jostle of billiard balls, and on this and on kindred likenesses rests much of our atomic picture of matter.
>
> In looking for intelligibility in the world, we look for unity; and we find this (in the arts as well as in science) in its unexpected likenesses. This indeed is man's creative gift, to find or make a likeness where none was seen before—a likeness between mass and energy, a link between time and space, an echo of all our fears in the passion of Othello.[1]

It may be that some teachers are not interested in questions about events occurring around them, not interested in invented areas of knowledge—history, economics, biology, physics. These teachers may be interested only in wise men or strong men or good men, in having children remember the responses these important men have formed to questions about events occurring around them. Schooling, in that case, can be a ritual of presenting, remembering, repeating. In such a ritualistic schooling we can take comfort in our ability to

1. Jacob Bronowski, "Science as Foresight," in *What is Science?* ed. James R. Newman (New York: Simon and Schuster, 1955), pp. 427-28.

recognize achievement, since we need to measure merely the sound of understanding rather than its substance.

Most of us, however, are unwilling to settle for so little. We want children to become increasingly rational, constructive, compassionate people, with all the connotations of openness to sensation, willingness to think independently, readiness to act which our intentions imply.

RESEARCH-BASED LEARNING

It is not argued here that research be added as an instructional technique in order to embellish our teaching and make it thoroughly modern. Rather, it is insisted that research activities by children make learning possible in schools, because these activities lead children to rely upon the testimony of their own senses and the results of their own thinking. Research is a necessary instructional tool through which we come to realize the tentative, inferential nature of what we know.

Engaging in research helps us to be critical of ideas and to understand that a generalization is an invitation to think, a challenge, not a signal to stop thinking.

> A student has only a very distorted idea of what the data mean (in a textbook or scientific report) unless he has tried to gather similar data for himself. Only then can he appreciate the fragmentary evidence upon which hypotheses and judgments must be built. It is in the struggle to gather data that answer a question that one learns the practical limitations of using what he knows to predict what he does not yet know. Do you think you know what a family is? Try predicting the make-up in people (how many, how old, how related) of a family you have never seen or heard about. Does the history book tell you what "really" happened at the Battle of Saratoga, or does it present the best guess that one historian could make based on his personal way of looking at the incomplete evidence available to him?[2]

As an example of this point, the distinguished historian, Garrett Mattingly, opened his book, *The Armada*, with a superb scene: A bare room in a castle in the reign of Queen Elizabeth I is filled with members of nobility. They are all standing and waiting for Mary, Queen of Scots, to enter so that they may witness her execution.

2. H. M. Clements, W. R. Fielder, and B. R. Tabachnick, *Social Study: Inquiry in Elementary Schools* (Indianapolis: Bobbs-Merrill, 1966), p. 11.

Mary arrives wearing a black velvet gown which she removes before her execution to reveal a scarlet petticoat. In a note at the end of that chapter Mattingly wrote that there was some question about the color of the undergarments of Mary, Queen of Scots, on this occasion. Of four eyewitness accounts, one finds them called brown (this man was obviously color blind), "crimson," "cramoisie" and "pour pre." "I have opted for crimson" Mattingly wrote, "not so much because it is in more early MSS than any other, but because if Mary had crimson undergarments (and we know she had) I think she would have worn them."[3]

Finally, research is a necessary instructional tool because it is sometimes the only road to developing precise referents which can infuse abstractions with meaning for child learners. It may be this possibility which causes Ausbel to comment, "In the early unsophisticated stages of learning any abstract subject matter, particularly prior to adolescence, the discovery method is invaluable."[4]

There are many worthwhile activities going on in school that are not research. Listening to a teacher explain a concept, practicing a skill like multiplying or spelling are not research, but they are certainly worthwhile. Some activities are not so worthwhile. For example, reading three textbooks instead of one, when all three present substantially the same list of conclusions and opinions (while omitting the data on which these conclusions are based) is not research. At best, the textbooks might actually offer different conclusions; they might disagree with one another! That would be an invitation to search for a resolution of the conflict, but reading the discrepant sets of conclusions is not, in itself, research.

PHRASING QUESTIONS

Research depends partly on the questions children ask, partly on the sources to which their questions lead them, and partly on the uses they make of those sources.

The questions that motivate research behavior may not be answerable. What kinds of work do people in families do? (There are more kinds of work than we can know.) What was it like to live in Madison, Wisconsin, 100 years ago? (We can never recapture the past; there are more kinds of living that went on than we can ever uncover.)

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3. (Boston: Houghton-Mifflin, 1959). p. 410.

4. D. Ausbel, "Learning by Discovery: Rationale and Mystique," in *Studying Teaching*, ed. J. Raths *et al.* (Englewood Cliffs: Prentice-Hall, 1967), p. 230.

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Big, unanswerable questions can suggest smaller, highly focused questions which are more nearly answerable. These questions are answerable to the degree that they are limited, and also to the extent that they point to a source or sources. What do parents, brothers and sisters say when we ask them what work they do at home? We can ask them; they will say something; our question will be answered. We shall not know what work is done, but we shall know what parents say.

"How did people live 100 years ago?" is a very broad question. Children may ask questions somewhat narrower in scope: How many people lived in Madison then? What kinds of houses did they live in? What kinds of work did children do? How were children punished? What did children learn in school? What did people do to have fun?

These are all essentially unanswerable, too, but the scope of each question is not so broad. Sometimes we mislead children by encouraging them to think they have learned answers to these narrower questions because they read something in a textbook or even in a diary written 100 years ago. But these questions are not any more answerable than the first ones. No one can know, for example, how many people lived in Madison in 1869. One can guess it was a number near that of the U.S. Census figure for 1870. It is impossible to be absolutely accurate. The question, "How many people lived in Madison in 1870?," is not precisely answerable. "What does the U.S. Census of 1870 report?" is an answerable question.

Together with Professor William Fielder of the Claremont Graduate School I have attempted to identify what may be critical operations of classroom inquiry. Once children have framed questions that are answerable, they must find data or make data that respond to those questions. Next, they must process those data so that, finally, they can use the data to confirm or deny hypotheses, infer relationships and conclusions, and project new hypotheses for testing. Sources of data exist in the present. Social events when they occur leave some residue behind them. The event itself is gone and can never be recreated. But something lingers on, embedded in a photo, a diary, a newspaper, a memory.

These are the presently existing sources of data which a student, child or adult must uncover if he is to search out tentative answers to questions he has raised. Sometimes questions ask for the opinions or knowledge that people have about some contempo-

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rary question (e.g., "Would you prefer to live in a city or on a farm?"). The opinions exist, but they are not usable as data until a researcher asks questions in a systematic way.

By gathering the answers he wants, a researcher "makes" the data he needs to answer his questions. (He does not, of course, "make up" the data!) Once they have been collected, data can be examined, counted, arranged in groups wherever the likenesses referred to by Bronowski are discovered. Following processing operations such as these, the data are ready to be used: to confirm or deny hypotheses; to develop into general statements which relate concepts to one another; to project new hypotheses; to decide about appropriate actions to take.

Suppose we select the two broad notions of division of labor and of the variety of patterns of family life as significant topics for children to learn something about. A teacher might ask, "What work do mothers do?," and show pictures of mothers working, read stories about "mother's work," listen to children say things about mothers working. The next question might deal with the work of fathers and follow the same procedure. At its best, this procedure would include work that some mothers do outside the home. (It is curious that this information is often overlooked by teachers who are themselves working mothers.) A report on findings might mention work that fathers do around the house.

Alternative to listening, reading, looking at pictures in order to be informed is research, an alternative available even to the very young children. As an example, a question such as "Who are the people who live in my home (house or apartment)?" might be followed by a second question, "What do they say when I ask them what work they do in and around the house, outside, or away from home?"

These latter questions are far more useful as research questions than the first two were. The first questions about mothers' and fathers' work are not answerable. The latter questions *are* answerable. This is because they are worded to ask what people say rather than what they do. The latter questions are open to discovering conventional family arrangements, but they can also discover less usual arrangements, such as the presence of elderly relatives, uncles or aunts in the home.

A secondary effect of the latter questions is the acceptance of all family patterns and work arrangements without implying that any are peculiar. As the data are processed, differences are dis-

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covered within the broad range of behavior and patterns characteristic of the class. The neutral, open quality of the questions may make it easier for teachers to help children accept differences rather than reject themselves and others because they are different. Once the data have been organized (through charts, graphs, murals in which a separate cut-out figure represents each family member, etc.), they can be used to generalize about variety within the class, about variety or difference within and between such categories as "sisters," "fathers," "older relatives," or others that appear from the data collected. The range of responses from this year's class can be compared with those from previous years or with responses from classes in other cities.

TEACHERS AS LEARNERS

If research depends on questions, teachers will need to be inventive in finding ways to help children learn the consequences of asking different kinds of questions, those which are answerable and those which are not.

If research depends on sources, teachers will have to assemble data and data sources to which children can take their questions. This is probably one of the most serious blocks to teachers using research as an instructional tool in classrooms. They don't have readily accessible sources of data or they don't see that they have. Every teacher has children in his classroom. There are adults in whose homes those children live. There are other children in the schools, either younger or older, and there are adults (teachers, principals, etc.) who are in the schools too. Membership in any one of those groups, as well as the membership in the group of girls, women, boys and men, might be a source of variance—that is, a reason for answers to questions to differ from one person to another. Any teacher has available to him, therefore, quite a few sources of data that are appropriate for answering questions about opinions or beliefs about topics, from the nature of cities to what should be done about delinquent children. To go beyond this kind of exploration, teachers must begin systematically to collect and bring into their classrooms data that children can search for and organize in ways relevant to the questions they want to raise.

If research depends upon the willingness to risk thinking about what one has himself perceived, teachers will need to encourage children to acquire an attitude of skepticism, which is, however, not contemptuous of knowledge. It is important to develop in children

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the courage to propose ideas whose value can be known only after they can be tested. Developing such an attitude is easier if a teacher can adopt the stance of learner.

Teachers rarely come into their own classrooms intending to learn anything, apart from their professional need to learn how well their pupils are learning. Their intent usually is to inform, direct or manipulate and manage children and children's behaviors. Some teachers believe they know what a wise child should do or say about something in order to demonstrate that he has learned it. They think they know what the work of mothers and fathers is and that their task is to get a statement or a drawing or some expression from each child that enunciates that sure truth.

Research leads us to ask questions about whose answers we are genuinely curious. The teacher as a learner realizes that he does not know all there is to know about division of labor. He certainly can't know what responses his pupils can get to the question they are going to ask. He is interested to see if he can learn more about the possibilities that exist for dividing labor or for not dividing it. He is interested in any new light which discovering these new possibilities may throw upon conventional notions of the usefulness of such divisions in modern society.

As a learner, the teacher models the attitudes toward knowledge and learning that he hopes to develop in children. It is possible that only by becoming a learner can one realize the heights of successful teaching.

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ORGANIZING THE SCHOOL FOR RESEARCH AND DEVELOPMENT ACTIVITIES

HERBERT J. KLAUSMEIER

THE THEME FOR AMERICAN education in the past decade has been innovation. Every aspect of public schooling has been critically examined by researchers and developers, supported by foundations and public agencies. Modern mathematics programs, increased use of media, linguistic emphases in the language arts, and inquiry in social studies and science are a few of the visible innovative practices in our schools. Associated with these curriculum changes have been differentiated roles for educational personnel. Efforts to establish differentiated staffing patterns include team teaching, teacher aides, and others.

These many efforts to improve schooling have met with only partial success. It is now recognized that piecemeal innovation can be expected to be only partially successful in promoting educational improvement. Each new idea must be accomplished with relevant improvements in all the various components of our educational system.

The traditional elementary school with each teacher responsible for about thirty children is not a suitable organizational pattern for evaluating the innovations being advocated or for developing the school as a self-renewing system. Ways must be found to design schools and organize educational personnel and students for instruction in ways which facilitate student learning.

The development of a new organization for instruction has been one activity of the Research and Development Center for

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Cognitive Learning at the University of Wisconsin. Out of this effort has come the Multiunit Elementary School. This is not proposed as the only meritorious organizational pattern. It is, however, a comprehensive plan and one from which the interested reader can identify the major issues which need to be resolved. The Multiunit Elementary School, then, represents one effective way in which schools have been organized to facilitate student learning and to become self-renewing.

THE WISCONSIN RESEARCH AND DEVELOPMENT CENTER FOR COGNITIVE LEARNING

In 1964 the first four research and development centers, of which Wisconsin Research and Development Center for Cognitive Learning was one, were established with support from federal funds. The goal of the Wisconsin Center is to facilitate children's learning in the cognitive domain, particularly in language arts, mathematics, science, and social studies.[1] From the beginning, four conditions were regarded as essential to achieve the goal: first, educational researchers and developers with ideas and skills who were willing to work cooperatively in achieving the goa ; second, time to plan and carry out research and development activities; third, monetary support assured over an extended period of time, mainly for people's time and for supplies and equipment; and fourth, facilitative school environments in which to carry out research and development activities and to demonstrate successful practices.

As the Center got under way in 1964-65, it was found that the usual elementary school environment hampered, rather than facilitated, cooperative research and development by school people and the Center staff. The usual elementary school had a building principal and a number of certified teachers, each equally responsible for the instruction of about thirty children and each being involved with children throughout most of the instructional day. The whole staff spent most of its energy and time in keeping school going, not in curriculum improvement, research, development, or innovation. The atmosphere was one of frustration. The staff wanted to move ahead but could not.

Four limitations of this environment merit brief attention. *First,*

1. A more complete account of the Wisconsin R & D Center is given in H. J. Klausmeier, and G. T. O'Hearn, eds., *Research and Development Toward the Improvement of Education* (Madison: Dembar Educational Research Services, 1968), pp. 146-56.

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teachers busy with children with no time to share in identifying research or development projects, in planning the projects, or in carrying them out, properly recognized that little constructive work could be done after school hours as an unpaid overload. *Second,* each teacher had to be treated as equally capable of carrying out research and development activities. Differentiated responsibilities had not been worked out whereby some teachers could take greater initiative and responsibility than others. *Third,* working and other conditions did not permit principal and teachers to mount an effort within the building to utilize available knowledge or best practices in developing excellent programs. For example, many schools in 1964-65 had moved only partially from traditional to modern mathematics after ten years of effort; some teachers were still using 1925 methods with 1965 textbooks. *Fourth,* each classroom, operating as an independent unit, did not allow for appropriate research designs, especially "randomization" of children or teachers according to instructional treatments.

Thus, in 1964-65 school people in Wisconsin were not opposed to relevant longitudinal research or to the development of new substantive and procedural products that would improve educational practices. Rather, the total system of education, not having changed much for decades, prevented the improvement of practices through research and development. The system, rather than individual teachers or principals, was responsible for the limitations.

Interested school people and the staff of the R & D Center first identified elements that contributed to the static, nonfacilitative environment. They then attempted to develop a system that would simultaneously facilitate children's learning and the conduct of research and development activities. Agreement was readily reached that the latter activities should contribute in the long run to higher student achievement and should not lower achievement, even during the first year when major modifications were made.

What has emerged after three years of an iterative cycle of development, testing, and revision is called a Multiunit Elementary School.[2] A Multiunit Elementary School may be thought of as an

2. The characteristics of the Multiunit Elementary School and the concepts of individually guided education are outlined in H. J. Klausmeier, R. Morrow, and J. E. Walter. *Individually Guided Education in the Multiunit School: Guidelines for Implementation* (Madison: Wisconsin Research and Development Center for Cognitive Learning, 1968).

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invention, emerging from a synthesis of relevant knowledge and the best practices regarding horizontal and vertical organization for instruction, role differentiation, decision making, communication, and individually guided education. Horizontally, the Multiunit Elementary School incorporates the concepts and best practices of team teaching rather than independent or self-contained classroom teaching. Vertically, it embodies continuous pupil progress and non-grading rather than age-graded classroom groupings. In the Multiunit School, the roles of educational personnel to perform clearly differentiated tasks are those of the lead teacher, staff teacher, resident or beginning teacher, intern, instructional secretary, and instructional aide. Specialist roles have not yet been studied systematically, but it is obvious that high competence in various subject-matter areas and technological fields is clearly required. Decision-making is under continuous study in order to identify which decisions are best made at the system level, building or school level, unit level, or directly with the child. In this connection, morale improves markedly when teachers are permitted to decide, for example, which materials, activities and tests will be used with each child. Communications between building principal and teachers and between building and central office are being modified through mechanisms similar to those involved in decision making. A system of individually guided education as outlined in Figure 1 is emerging. A program of education is arranged for each child whereby he achieves socially and individually valid objectives through instruction in one-to-one relations with adults or other children, small groups, class-size groups, large groups, and independent study. Inasmuch as the present concern is with organizing the school for research and development, the organizational pattern and related roles that facilitate research and development are now given major attention.

THE PROTOTYPE MULTIUNIT SCHOOL ORGANIZATION

The Multiunit School organization includes both a formal organizational structure and a procedural style consisting of several essential components. Figure 2 illustrates the formal organizational plan of a Multiunit School of 600 students. The organizational hierarchy of the Multiunit School consists of interrelated groups at three distinct levels of operation: At the classroom level is the Instructional and Research (I & R) Unit, at the building level is the Instructional Improvement Committee, and at the system level is the System-Wide Policy Committee.

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Figure 1

MAJOR COMPONENTS OF AN INSTRUCTIONAL SYSTEM

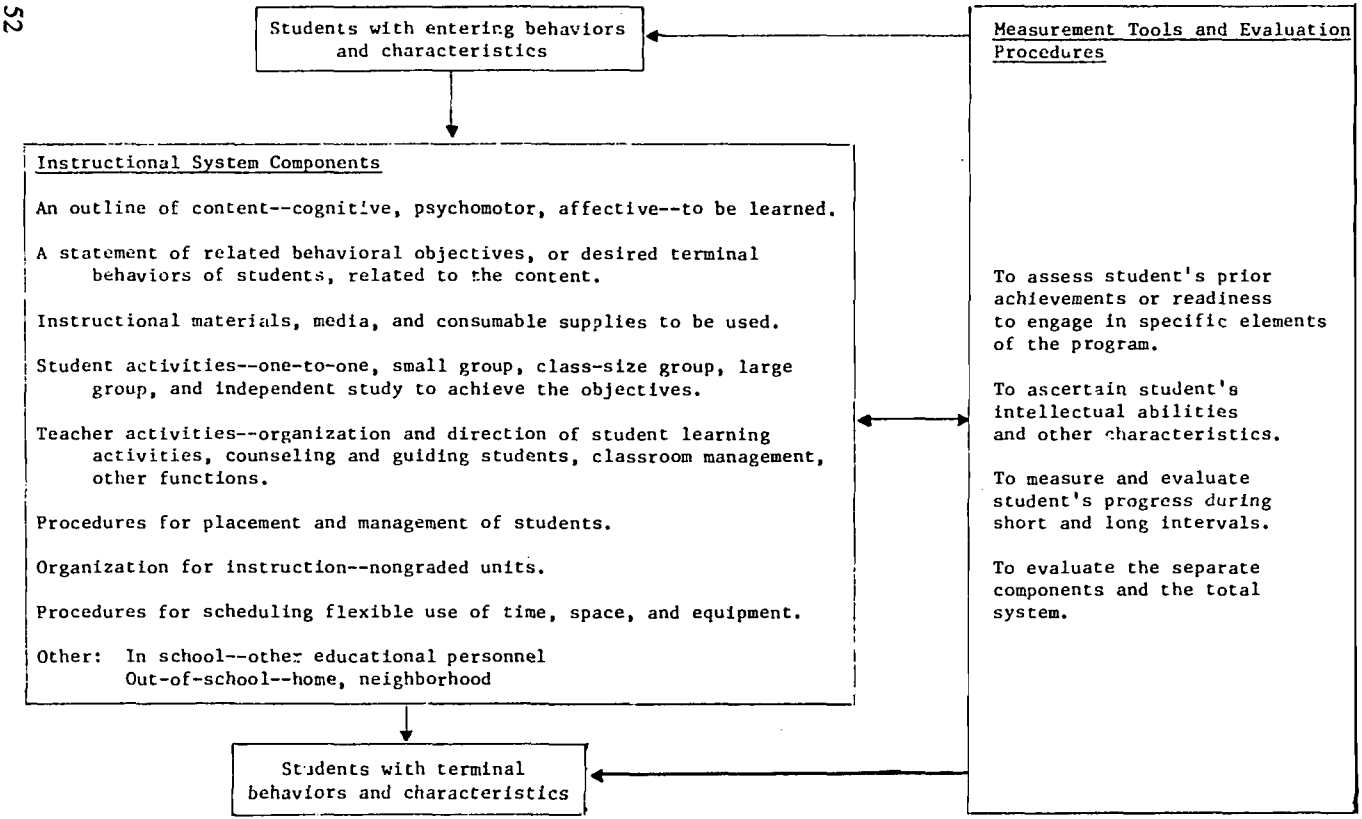
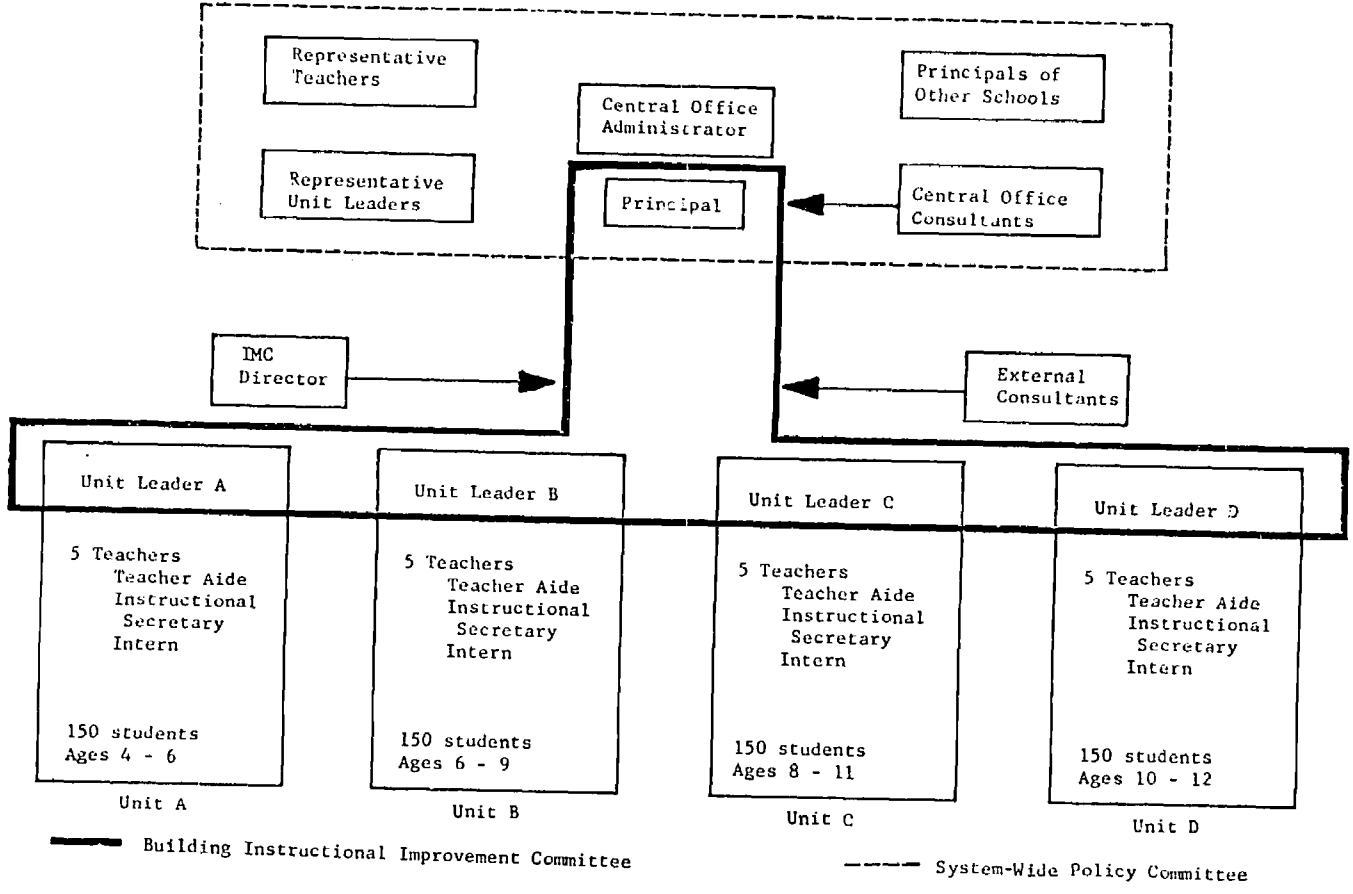


Figure 2

ORGANIZATIONAL CHART OF A MULTIUNIT SCHOOL OF 600 STUDENTS



Each I & R Unit has a unit leader or lead teacher, two or more regular staff teachers, one or more aides or secretaries, and in some cases an intern, who assumes instructional responsibilities without routine and clerical duties. Each unit has three main functions: planning and carrying out a continuously improved instructional program, planning and conducting research and development within the unit, and conducting any preservice or inservice education within the unit.

Unit meetings lasting from 30 minutes to a half-day are held once weekly and more often if necessary. At least two hours a week appears to be necessary during the first year.

Children are placed in units primarily on the basis of years of school attendance; the range in age within a unit is about four years when two usual grade levels are combined into one unit. There is some interchange of students among units for part of the instruction. In the instructional program within each unit, grade lines are completely abandoned as children are assigned to one-to-one, small-group, class-size group, and unit-size activities.

The instructional program and research and development projects in each unit are planned by the staff cooperatively. In connection with the instructional program, as shown earlier in Figure 1, assessing content and activities, identifying materials, placing each child in relevant activities, and evaluating are decided jointly. Similarly developing new methods and materials of instruction or carrying out a controlled experiment are cooperative activities. The unit usually has consultants to assist in planning both the instructional program and research and development projects. The consultant's time is used efficiently, some meetings are during regular hours and for clearly defined purposes related to the unit's program and children.

Routine tasks (preparation of materials, etc.) are done by the aide and instructional secretary. These paraprofessionals, who work directly with staff teachers and children, are directed and provided inservice education primarily by the unit leader.

At the second level of organization is the Instructional Improvement Committee of the building, comprised of the building principal and unit leaders. The agenda for their weekly meetings is formulated by the principal in consultation with unit leaders.

The functions of the Instructional Improvement Committee may be considered at three levels: interpreting and synthesizing

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system-wide and statewide policies that affect the building program; developing the broad outlines of the instructional program, research and development projects, and teacher-education for the building; and coordinating the activities, including the use of facilities, time, material, etc., that the units do not manage independently. It thus has both development and management, but not supervisory, functions. Policies and guidelines developed by the Instructional Improvement Committee are transmitted to the unit staff by the unit leader. In turn, the highly significant decisions regarding an appropriate instructional program for each child are made and carried out by the certified teachers of the unit. They, too, carry out the treatments of an experiment and collect necessary information.

The decision-making responsibilities of the Instructional Improvement Committee and the units are not sharply demarcated since the unit leaders are key members of both. How much responsibility to give any unit in part depends upon its capabilities. In general, the Instructional Improvement Committee makes certain that each unit leader has the information about each component of the building program that is essential to effective unit operations. The Committee transfers responsibility for decision making as quickly as possible to the units. The principal, as the school leader, assures himself that each unit carries the total school program of instructional improvement, research and development, and teacher education effectively.

At the third organizational level is the System-Wide Policy Committee, chaired by the superintendent or his designee, and including principals, unit leaders, teachers, consultants, and other relevant central office staff. It meets less frequently than other groups, but its operation is important to the Multiunit School. Its members are selected in terms of their decision-making power and specialized knowledge. The decision-making and facilitative responsibilities of the System-Wide Committee deal with the functions to be performed in the Multiunit Schools of the system, personnel of each school, instructional materials available for the system, and information service within the system and community.

In connection with these responsibilities, a decision may be made that one function of one Multiunit School is to refine and evaluate a new science program for the entire school system. The staff of at least one Multiunit School must share in this decision making. After the decision is made, the System-Wide Policy Committee makes sure that the necessary material and human resources

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are available to the school and the project is properly interpreted to school board and community.

This brief description of the structure of the Multiunit School implies several operational characteristics of a successful Multiunit School. *First*, decisions are made by individuals and groups at the appropriate level in the organization. *Second*, leadership of the staff is properly provided for at various levels. *Third*, clearly defined roles produce excellent performance of specialized tasks and thereby lessen friction among the staff. *Fourth*, communication flows freely among teachers, administrators, other staff, and parents and others in the local community. *Fifth*, the personnel of each unit carry out the instructional, research and development, and teacher-education functions cooperatively. The combination of all these features produces a facilitative environment for longitudinal research and long-term development designed to improve educational practices.

STAFF ROLES IN THE MULTIUNIT SCHOOL

A significant characteristic of the Multiunit School is the changed roles of the professional personnel. These roles are becoming reasonably well delineated in current Multiunit Schools. The descriptions that follow are derived from continuing interaction among personnel of local schools, the Wisconsin R & D Center for Cognitive Learning, the Department of Public Instruction, and teacher-education institutions.

The role of the principal is changed in the Multiunit School in two ways. *First*, he assumes greater responsibility for various functions not yet common in today's elementary school. Taking more positive leadership in connection with developing improved educational practices, managing the preservice and inservice teacher-education activities in his building, and administering the research and development projects. *Second*, he organizes and chairs his building committee, arranges for its meetings and sets the agenda, a function which in turn provides the mechanism and communication system through which the principal provides administrative leadership in connection with the three functions of the school. It is not assumed that the principal is the expert in any subject-matter field, in research design, or in teacher education. But he utilizes the knowledge of his staff and consultants, delegates responsibilities, and assists the Instructional Improvement Committee in arriving at group decisions which can be implemented effectively.

The unit leader, or lead teacher, is the key new role. The unit

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leader has responsibilities as a member of the Instructional Improvement Committee, as a leader of a unit, and as a teaching member of a unit. The role is one of ' dership, not administration or supervision. As a member of the instructional Improvement Committee, he contributes to planning of his unit in relation to other units. He heads a unit and, when not teaching, plans; he coordinates the efficient utilization of the unit staff members, materials, and resources; and he serves as a liaison between unit staff and principal, consultants. parents and others. The unit leader teaches from one-half to three-fourths time, the proportion depending upon the size of the unit and the amount of research and development and teacher education performed in the unit. He is a model teacher of children, taking initiative in developing and trying out new materials and instructional procedures.

Certain rewards are associated with the kind of responsibilities assumed by unit leaders. The unit leader receives a higher salary than the regular teachers because he carries out expanded professional responsibilities; knows more about instruction, research and development, and teacher education; and works more hours per week and more weeks per year. It should be apparent also that the unit leader must continually improve his professional capabilities by pursuing further education and gaining relevant experience during the school year and summer. Many teachers committed to a career of teaching will qualify as unit leaders if they desire to assume additional responsibilities and are willing to secure the requisite graduate education.

The role of the staff teacher is also changed somewhat in the Multiunit School. The unit teacher plans with other members of the unit, works with more children and performs more professional work. The higher level of professional activity is manifested through participating in research and development activities, preservice teacher education, and in carrying out several components of the instructional system such as formulating objectives for each child, assessing each child's characteristics, using new materials and equipment, and trying out new instructional procedures. The most important rewards to the unit teacher are participating in all the relevant functions of the school, engaging in decision making about all components of the instructional program, making a maximum contribution according to his strengths and interests, being relieved of nonprofessional activities by aides and secretaries, and having a stimulating learning and teaching experience.

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CONTROLLED EXPERIMENTATION IN THE MULTIUNIT SCHOOL

The Multiunit School was developed in part to facilitate controlled experimentation without involving a large number of intact classrooms, hundreds of children, and many teachers. A consideration of a few of the specific features of the Multiunit School will clarify its facilitative role in controlled experimentation.[3]

A main feature of the Multiunit School is flexibility in the deployment of the staff and students. Teachers and pupils typically change rooms as pupils are regrouped for instruction throughout the day. Assignment of pupils to new groups, teachers, or instructional spaces is an ordinary rather than unusual experience. Experimental arrangements requiring random assignment of pupils to groups are thus far less likely to react with the treatment than would be the case in experiments involving pupils from self-contained classrooms.

Teachers as well as pupils may be randomly assigned to treatments. Furthermore, teachers may be rotated among treatments so that a potential source of confounding is eliminated. In the I & R Unit staff, the experimenter has persons to administer the treatments who are both qualified to teach and have some appreciation of requirements of experimental rigor. Use of teachers as experimenters not only makes the research generalizable to usual school situations where children are taught by certified teachers, it also acquaints the teachers with new methods, contributing to their professional growth.

This is not to say that all the problems of conducting a controlled experiment in a school setting are solved. Strictly speaking, performing the "randomization" on pupils is a necessary but not sufficient condition for their being treated as the unit of analysis. If the pupils are instructed as a group after randomization, then intrasession history, as well as the treatment, can affect the measurements gathered on a particular group. In many units during the past years, however, the experimental treatments were individually applied, and thus even this requirement for a true experiment was met.

DEVELOPMENT ACTIVITIES IN THE MULTIUNIT SCHOOL

The goal of initial development activities is to produce materials, methods, processes, equipment, organizational patterns, or any com-

3. Mary Quilling gives special attention to controlled experimentation in H. J. Klausmeier, J. L. Wardrop, M. R. Quilling, T. A. Romberg, and R. E. Schutz, *Research and Development Strategies in Theory Refinement and Educational Improvement* (Madison: Wisconsin Research and Development Center for Cognitive Learning, 1968).

bination thereof to achieve clearly specified objectives with carefully described target populations at identifiable dollar and time costs. A product may be as small as a writing instrument or sheet of paper or as large as a complete system with many interacting components, such as is represented in the concept and practices of the Multiunit Elementary School. Development-based research following the initial development of a usable prototypic or experimental product involves trying out, testing, and refining the product iteratively until the product achieves the specified objectives under the prescribed conditions.

With the rapid changes in society and technology, we assume that very few large-scale products, such as textbooks, instructional methods, and organizational structures will survive without considerable updating every five or ten years. For example, continuing research on the Multiunit School, now in its third year, shows that much yet remains to be done to achieve certain objectives. It must change and improve continuously, just as airplanes and farming methods do, in order to prevent obsolescence and related impoverished educational opportunity for the majority of American children.

Another major development project of the R & D Center is in elementary mathematics.[4] It has two main thrusts. One is to identify relevant content, sequence, instructional materials, and instructional methods for kindergarten through sixth grade. Here Center personnel are working closely with the staff of one Multiunit School in initial development of the program. The Center personnel tentatively identify the mathematical concepts and skills the children might acquire and also a tentative sequence for introducing the concepts and skills. Also, they formulate ideas about materials and methods. A full-time teacher with specialization in mathematics, who is employed by the Center and is part of the Center planning group, then works in the school building. She teaches mathematics to one experimental group of children where the initial ideas are tried out. When the initial program works reasonably well, other unit teachers try it. Eventually, the first editions of a teacher's manual, a related inservice education program and materials for children are developed. These, in turn, require further development, testing with larger numbers of children and teachers and revising.

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4. T. A. Romberg and J. G. Harvey, *Developing Mathematical Processes: Background and Projections* (Madison: Wisconsin Research and Development Center for Cognitive Learning, 1969).

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A problem in implementing concepts of individually guided education is to secure frequent reliable estimates of the student's achievement level today so that the next learning tasks may be identified quickly. The second thrust of the mathematics project is to develop a computer-managed system of instruction. The initial management-system is being developed to permit children at the intermediate level maximum opportunity to decide what each will undertake in sequential steps in mathematics. The more complete management system is intended to be sufficiently flexible to permit its application to all subject fields and with varying amounts of pupil independence in setting their own learning goals.

SUMMARY

The organizational pattern described in this paper is not presented as the final answer to the problem of organizing the new elementary school, but as an example of one approach to the solution of a major education problem. Incorporated among the innovative features of the Multiunit Elementary School is a combination of many ideas prevalent in new patterns of school organization being tested nationwide. It is hoped that teachers and administrators will see in this organizational structure an opportunity for greater participation in research and development that will lead directly to improved educational practices in our schools.

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RESEARCH AND DEVELOPMENT RESOURCES FOR THE CLASSROOM TEACHER

THEODORE J. CZAJKOWSKI and DONALD N. LANGE

PRACTICAL PROBLEMS OF TIME limit teachers' ability to identify and pursue relevant research resources. The objective herein is to identify many of the pertinent research resources which in some way may be useful to elementary teachers. If many relevant resources have been overlooked, the authors will appreciate notification of unintentional omissions.

Each resource has been briefly annotated to assist teachers in determining its appropriateness. Some information came from the various resources; other information was gathered from descriptive publications. The basis for selection is that of provision of relevant information or services to the classroom teachers.

ORGANIZATIONS, FOUNDATIONS, AND SERVICES

RESEARCH AND DEVELOPMENT CENTERS

During the last five years nine centers for research and development in education have been jointly developed by the United States Office of Education and nine universities. R & D Centers are designed to create improved educational programs and practices through systematic, long-term programs of research and development. Each center brings together resources and interdisciplinary talent to focus on a significant educational problem. It then designs and conducts interrelated programs of basic and applied research, development, and dissemination that will systematically move toward the solution of the problem. Prototypes of educational innovations are developed and tested in actual school settings.

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The University of Georgia publishes a quarterly *Journal of Research and Development in Education* (University of Georgia, 122 Baldwin Hall, College of Education, Athens, Georgia 30601) which frequently contains publications and monographs available from the R & D Centers. Many of the centers' research reports and program and project summaries are available to the public. They may be obtained by contacting the director of the R & D Center that developed them. General topics dealt with by the specific R & D Centers are found in the list below.

Center for the Advanced Study of Educational Administration
(Max G. Abbott, University of Oregon, Eugene, Oregon 97403)
The Control of Instructional Policy
Organizational Implications of Instructional Change
Strategies of Organizational Change
Procedures for System Planning
Production and Evaluation of Training Materials

The Learning Research and Development Center
(William Cooley and Robert Glaser, University of Pittsburgh, Pittsburgh, Penn. 52000)
Basic Learning Studies
Computer-Assisted Instruction
Educational Field Studies
Individualization of Education
Clarifying Environments

Wisconsin Research and Development Center for Cognitive Learning
(Herbert J. Klausmeier, University of Wisconsin, Madison, Wisconsin 53706)
Conditions and Processes of Learning
Processes and Programs of Instruction
Environments which Facilitate Cognitive Processes

Research and Development Center for Educational Stimulation (3-12)
(Eugene Boyce, University of Georgia, Athens, Georgia 30602)
Studies on Cognitive Learning and Development
Curriculum development for sequentially structured educational stimulation of children three to twelve

Center for Research and Development in Teaching
(Robert N. Bush, Stanford University, Palo Alto, California 94305)
Heuristic Teaching
The Environment for Teaching
Teaching the Disadvantaged
The Computer as an Authority Figure

Research and Development Center for Teacher Education
(Robert F. Peck and Oliver H. Bown, University of Texas at Austin, Austin, Texas 78712)
Research on the Effects of Various Kinds of Teacher Preparation on Actual Teaching Behavior
Development of a Comprehensive Library of Instruction Modules for Teacher Education

Center for Research and Development in Higher Education
(Leland L. Medsker, University of California, Berkeley, California 94720)
Educational Impact and Student Development
The Viability of Institutional Structures and Functions for the Future of Higher Education
Development Projects Directed to the Improvement of Higher Education
Development of New Research Instruments
Task Force on Urban Higher Education

Center for Study of Evaluation
(Marvin Alkin, University of California, Los Angeles, California 90024)
Evaluation of Instructional Programs
Evaluation of Educational Systems
Evaluation Theory and Methodology

Research and Development Center for Social Organization of Schools
(Edward L. McDill, The Johns Hopkins University, Baltimore, Maryland 21218)
Simulation Games
Education and Social Change
The Development of a System of Social Accounts
Socialization, Social Class and Cognitive Style
A Program for the Study of Standard Language Acquisition in Educationally Disadvantaged Children
The Politics of Public Education
A Comparative Study of School Board Operations

NATIONAL LABORATORY ON EARLY CHILDHOOD EDUCATION

The National Laboratory on Early Childhood Education consists of a group of six university-based centers coordinating their research and development efforts through a National Coordination Center at the University of Illinois. They seek to add to the basic knowledge about children, to evaluate the theories and methods being employed in working with young children, and to develop instructional programs based on this research.

The National Laboratory consists of the National Coordination Center, the Education Resources Information Center Clearinghouse

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on Early Childhood Education at the University of Illinois, and six centers located at other institutions. The components of the National Laboratory are:

National Coordinating Center (James O. Miller, Director, University of Illinois)

ERIC Clearinghouse (Lillian Katz, Director, University of Illinois)

Arizona Center for Early Childhood Education (Marie H. Hughes, Director, University of Arizona)

Early Education Research Center (William E. Henry, Director, University of Chicago)

Research Program in Early Childhood Education (Henry N. Ricciuti, Director, Cornell University)

Research Center for Early Childhood Education (Barbara C. Etzel, Director, University of Kansas)

Demonstration and Research Center for Early Education (Susan W. Gray, Director, George Peabody College)

Center for Research and Development in Early Childhood Education (William J. Meyer, Director, Syracuse University)

REGIONAL EDUCATIONAL LABORATORIES

Title IV of the Elementary and Secondary Education Act of 1965 amended the Cooperative Research Act by authorizing a network of *Regional Educational Laboratories* designed to bridge the gap between educational research and educational practice. The Office currently supports 15 autonomous, not-for-profit laboratories which are developing, in cooperation with all segments of the education community, tested alternatives to current educational practice.

Laboratory efforts include programs designed to provide tested programs for children from poor, migrant, or culturally different families, children with special learning disabilities, children who learn at a slower or faster rate than average, and children in isolated rural or inner-city schools.

For information on any of the laboratory programs described, write directly to the institutions or to:

The Division of Educational Laboratories
Bureau of Research
U.S. Office of Education
400 Maryland Avenue, S.W.
Washington, D.C. 20202

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A list of the laboratories and their major program efforts follow.

Appalachia Educational Laboratory (AEL)
1031 Quarrier Street
P.O. Box 1348
Charleston, West Virginia 25325

Mission: To help rural and isolated schools upgrade their programs through cooperative relationships and modern technology, including:

- A home-oriented preschool program using television and mobile facilities;
- A self-instructional vocational guidance system for high school students using video tapes and microfiche equipment;
- An Appalachia-focused reading and language development program, with animated films and television.

Center for Urban Education (CUE)
105 Madison Avenue
New York, New York 10016

Mission: To create an interaction among universities, public schools, and local communities that will improve the quality and relevance of urban education, through:

- Instructional materials, curriculum units, and teaching strategies;
- Community planning and participation techniques to help decentralized schools operate more effectively;
- Clearinghouses of materials and information on problems facing urban education.

Central Midwestern Regional Educational Laboratory (CEMREL)
10646 St. Charles Rock Road
St. Ann, Missouri 63074

Mission: To contribute to the quality and breadth of curriculums and instruction throughout the nation, through:

- Comprehensive and individualized curriculums in mathematics and aesthetics for all students from kindergarten through high school;
- Instructional strategies for teachers of students with special learning problems.

Eastern Regional Institute for Education (ERIE)
635 James Street
Syracuse, New York 13203

Mission: To increase the ability of students to acquire and apply knowledge through curriculums that stress process learning by:

- Selecting curriculums such as the science curriculum developed by the American Association for the Advancement of Science;
- Revamping, testing, revising, and diffusing these curriculums through a network of elementary schools, colleges and universities, state departments of education, and Title III Centers.

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Education Development Center (EDC)
55 Chapel Street
Newton, Massachusetts 02160

Mission: To create improved systems of inservice education in urban schools, through:

- Instructional Resource Teams trained in social and educational change to provide background for educators, parents, and community groups in sensitivity, curriculum development, teaching techniques, child development, administration and supervision, and efficient distribution of teaching materials.

Far West Laboratory for Educational Research and Development (FWLERD)
Claremont Hotel
1 Garden Circle
Berkeley, California 94705

Mission: To develop educational products and methods that enhance learning, including:

- Inservice and preservice self-instructional training units which provide teachers with critical teaching skills;
- Information systems and training programs to help school personnel modify their organizations and make decisions about adopting educational developments;
- Preschool and primary education programs to develop the intellectual abilities and self-concept of youngsters.

Mid-Continent Regional Educational Laboratory (McREL)
104 East Independence Avenue
Kansas City, Missouri 64106

Mission: To improve instruction through inservice and preservice training, including:

- Instructional processes and classroom arrangements to insure that teachers effectively use the Biological Sciences Curriculum Study materials to foster student inquiry and self-directed learning;
- Realistic preservice training, in which potential teachers of the inner city live and teach in an inner city and work with community agencies and professionals to upgrade instruction.

Northwest Regional Educational Laboratory (NWREL)
400 Lindsay Building
710 Southwest Second Avenue
Portland, Oregon 97204

Mission: To develop and disseminate instructional systems meeting selected educational needs:

- To help school administrators and teachers make the teaching-learning process more effective;
- To provide students, teachers, and administrators with experience and understanding in using computers in the classroom and in curriculum development;

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- To provide representatives of inner-city, Indian, and migrant groups with skills to plan and implement cooperative educational projects in their communities;
- To broaden and enrich the curriculum in small schools through self-instruction in counseling and academic and vocational subjects.

Regional Educational Laboratory for the Carolinas and Virginia (RELCV)
Mutual Plaza
Durham, North Carolina 27701
Mission: To increase the capability of educational institutions, primarily two- and four-year colleges, for self-improvement, initially through:

- A research-based planning and decision-making system for institutional change, including a computerized management information system, and training for decision-makers and for "educational development officers," who serve as institutional researchers and catalysts for change;
- Instructional and curricular programs directed toward explicit performance measures and accommodation of different rates of learning;
- Models for diffusion and installation of instructional systems in primary and secondary schools.

Research for Better Schools, Inc. (RBS)
1700 Market Street, Suite 1700
Philadelphia, Pennsylvania 19103
Mission: To restructure education, with emphasis on learning systems that individualize and humanize, initally through:

- Implementation strategies for Individually Prescribed Instruction, including training for school personnel, continued development of materials in schools across the nation, and use of modern technology such as the computer;
- Specifications for an instructional program that develops and integrates children's social, intellectual, and emotional skills;
- Training programs and materials for school administrators on approaches for adopting new programs.

Southeastern Education Laboratory (SEL)
3450 International Boulevard
Hapeville, Georgia 30054
Mission: To alleviate educational deprivation in the Southeast through:

- Instructional materials in communications skills to overcome the educational and occupational problems that arise from nonstandard speech patterns;
- Curriculum materials in interpersonal relations for students, teachers, and parents to facilitate learning and mental health in schools with newly integrated faculties and student bodies;
- A mobile program of cultural enrichment and school readiness for rural preschoolers.

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Southwest Educational Development Laboratory (SWEDL)
800 Brazos Street
Austin, Texas 78767

Mission: To improve the education of Mexican-, Negro-, and French-American children through products such as:

- A mathematics curriculum designed for deprived elementary and junior high students;
- Multi-cultural social education that provides social concepts and skills and an appreciation of cultural diversity for economically deprived and culturally different children;
- Bilingual materials and teacher training for preschool through grade 6 to teach children subject matter in their native language at the same time they learn English as a second language;
- Curriculum for ages 2 through 5 emphasizing communications and psychosocial development, and involving parents and the community in their children's education.

Southwestern Cooperative Educational Laboratory (SWCEL)
117 Richmond Drive, N.E.
Albuquerque, New Mexico 87106

Mission: To improve the primary education of Indian, Negro-, and Spanish-American children, initially through:

- A preschool program to develop English oral language skills;
- A primary grade program to improve English oral language;
- A program to facilitate the transition from oral language to reading.

Southwest Regional Laboratory (SWRL)
11300 LaCienega Boulevard
Inglewood, California 90304

Mission: To change the nature of instruction to performance-referenced, computer-managed, and learner-controlled bases, and to develop a technology of instruction, initially through:

- Comprehensive computer-managed kindergarten and primary curriculums, which include communications and problem-solving skills and the humanities;
- Administrative planning systems, utilizing computer technology and simulation to assist school administrators in decisions on staff, curriculum, facilities, and instructional procedures.

Upper Midwest Regional Educational Laboratory (UMREL)
1640 East 78th Street
Minneapolis, Minnesota 55423

Mission: To maximize each student's learning by increasing teachers' skills in managing the learning environment, through:

- Programs that train educators to analyze behavior, design learning strategies, individualize the curriculum, and reinforce learning according to behavioral principles;
- Behaviorally engineered schools with inner-city and Indian children in which these methods are taught and tested.

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ERIC CLEARINGHOUSES

ERIC is the first nationwide, comprehensive information system designed to serve American education. Operating within the Office of Education as a Branch of the Division of Information Technology and Dissemination, Bureau of Research, the headquarters office is referred to as Central ERIC to distinguish it from its components in the field. In addition to the overall development, coordination of field activities, and operation of the system, Central ERIC is responsible for making available to the public the findings of research supported by the Office of Education through the Bureau of Research. ERIC also currently includes 19 decentralized clearinghouses, each focused on a separate subject-matter.

ERIC indexes much of the unpublished literature in the field of educational research and related areas. ERIC's monthly abstracting journal, *Research in Education* (*RIE*), announces current documents (monographs, bibliographies, reviews, etc.) of interest to educators. *RIE* can be purchased from the Government Printing Office, Washington, D.C., for $21 per year. Most documents cited in *RIE* can be purchased from the ERIC Document Reproduction Service in either microfiche or hard copy form. A number of full ERIC microfiche collections are located at educational institutions throughout the country. An ERIC collection may be available at your state education agency or local superintendent's office.

Since June 1969 ERIC has been providing educators with another helpful tool—*Current Index to Journals in Education* (*CIJE*). This monthly journal indexes over 200 periodicals in the field of education. Teachers and administrators will find *CIJE* useful in keeping abreast of current issues and new developments in their subject area of interest.

For further details on the operation and products of the ERIC program, a brochure, "How to Use ERIC," is available from the Government Printing Office for 25 cents per copy.

ERIC Clearinghouse on Counseling and Personnel Services (Dr. Garry Walz, Director, University of Michigan, Ann Arbor, Michigan 48104) is responsible for materials and research reports on the subject of educating, trying out, and supervising counselors and other personnel workers at all educational levels and in all settings.

ERIC Clearinghouse on the Disadvantaged (Dr. Edmund W. Gordon, Director, Yeshiva University, 55 Fifth Avenue, New York, New York 10003) is responsible for research reports and other documents on the educational, psychological, social, and general development of urban

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children and youth who are socially, economically, or culturally disadvantaged.

ERIC Clearinghouse on Early Childhood Education (Dr. B. W. Carss, Director, University of Illinois, 805 West Pennsylvania Avenue, Urbana, Illinois 61801) is responsible for research documents on the physiological, psychological, and cultural development of children from birth through primary grades.

ERIC Clearinghouse on Educational Administration (Dr. William Piele, Director, University of Oregon, Eugene, Oregon 94703) is responsible for research reports dealing with the organization, leadership, and administration of educational programs and organizations, and with the preparation of educational administrators.

ERIC Clearinghouse on Educational Facilities (Dr. Howard E. Wakefield, Director, University of Wisconsin, 606 State Street, Room 314, Madison, Wisconsin 53703) focuses on information about sites, buildings, and equipment used for educational purposes; included are the efficiency and effectiveness of related activities, such as planning, financing, constructing, renovating, maintaining, operating, insuring, utilizing, and evaluating educational facilities.

ERIC Clearinghouse on Educational Media and Technology (Dr. William Paisley, Director, Institute for Communication Research, Stanford University, Stanford, California 94305) is responsible for information on application of new media and technological innovation to education, including such subjects as instructional television, computer-assisted instruction, and programmed learning.

ERIC Clearinghouse on Exceptional Children (Dr. June B. Jordan, Director, Council for Exceptional Children, National Education Association, 1201 16th Street, N.W., Washington, D.C. 20036) is responsible for documents on educating children and youth who require special services—those who are gifted, mentally retarded, visually impaired, deaf, hard of hearing, physically handicapped, emotionally disturbed, or speech- and language-impaired.

ERIC Clearinghouse on Higher Education (Dr. Carl J. Lange, Director, George Washington University, Washington, D.C. 20006) is responsible for research documents on higher education, with the exception of reports on both teacher education and teaching English in higher education.

ERIC Clearinghouse on Junior Colleges (Dr. Arthur M. Cohen, Director, University of California at Los Angeles, 405 Hilgard Avenue, Los Angeles, California 90024) is responsible for research documents about public and private community and junior colleges, including studies on students, staff, curricula, programs, libraries, and community services.

Library for Adult and Continuing Education (Mr. Roger DeCrow, Director, Syracuse University, 107 Roney Lane, Syracuse, New York 13110) is responsible for research documents on formal and informal adult and continuing education in all settings.

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ERIC Clearinghouse on Library and Information Sciences (Dr. W. Simonton, Director, University of Minnesota, 2122 Riverside Avenue, Minneapolis, Minnesota 55404) is responsible for research documents on the operation of libraries and information centers, the technology used to improve their operations, and the education and training of library and information specialists.

ERIC Clearinghouse on Linguistics and Uncommonly Taught Foreign Languages (Dr. A. Hood Roberts, Director, Center for Applied Linguistics, 1755 Massachusetts Avenue, N.W., Washington, D.C. 20036) is responsible for research reports on linguistics and related language sciences and languages not commonly taught in the United States; that is, all except French, Italian, German, Spanish, Russian, Latin, and classical Greek.

ERIC Clearinghouse on Reading (Dr. Edward G. Summers, Director, Indiana University, 204 Pine Hall, Bloomington, Indiana 47401) is responsible for research reports on all aspects of reading behavior, with emphasis on the physiology, psychology, sociology, and teaching of reading.

ERIC Clearinghouse on Rural Education and Small Schools (Dr. E. D. Edington, Director, New Mexico State University, University Park, New Mexico 88070) is responsible for research documents on organization, administration, curriculum, instruction, innovative programs, and other aspects of small schools and rural education in general.

ERIC Clearinghouse on Science Education (Dr. R. Howe, Director, Ohio State University, 1314 Kinnear Road, Columbus, Ohio 43212) is responsible for reports on all levels of science education, and on adult and continuing education in science.

ERIC Clearinghouse on Teacher Education (Dr. Joel L. Burdin, Director, American Association of Colleges for Teacher Education, 1156 Fifteenth Street, N.W., Washington, D.C. 20005) focuses on materials relative to the preparation of school personnel (nursery, elementary, secondary, and supporting school personnel); the preparation and development of teacher educators; and the profession of teaching. The scope includes recruitment, selection, lifelong personal and professional development, and teacher placement.

ERIC Clearinghouse on Teaching of English (Dr. B. O'Donnell, Director, National Council of Teachers of English, 508 South Sixth Street, Champaign, Illinois 61820) focuses on research reports and other documents relevant to all aspects of the teaching of English from kindergarten through grade 12, the preparation of teachers of English for the schools, the preparation of specialists in English education, and the teaching of English.

ERIC Clearinghouse on the Teaching of Foreign Languages (Dr. Kenneth Mildenburger, Director, Modern Language Association of America, 4 Washington Place, New York, New York 10003) is responsible for

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research documents on teaching French, German, Italian, Russian, Spanish. Latin. and classical Greek.

ERIC Clearinghouse on Vocational and Technical Education (Dr. Robert E. Taylor. Director. Ohio State University. 980 Kinnear Road. Columbus, Ohio 43212) is responsible for research documents on the general field of vocational and technical education.

OTHERS

Association for Childhood Education International (ACEI) Information Service (3615 Wisconsin Avenue, N.W., Washington, D.C. 20016) answers members' requests for information on specific topics related to childhood education. For best service request information specifically and indicate purpose for which it is intended. Fee for nonmembers, $2.

DATRIX (Dissertation Abstracts. Ann Arbor, Michigan) is a computer source for over 125,000 dissertations sorted by subject. On request, the user receives a DATRIX from which he specifies the peripheries of his inquiry. Abstracts of all relevant studies are provided. A modest fee is charged for this service.

National Education Association (NEA) (Research Division, 1201 16th Street. N.W.. Washington. D.C. 20036) provides the following types of information for its members upon request: general studies on such topics as pupil reporting. promotion. library services. health. safety, and public relations; summaries of relevant research and bibliographies on special request topics of interest to teachers, 16,000 requests per year.

National Education Association. Association of Classroom Teachers (1201 16th Street. N.W.. Washington, D.C. 20036) publishes in cooperation with AERA a series of pamphlets entitled *What Research Says to the Teacher* on over thirty specific topics. It is published to provide classroom teachers and others with concise, valid. and up-to-date summaries of educational research findings and their implications for teaching.

School Research Information Service (SRIS) (William J. Gephart, Director, Research Service Center. Bloomington, Indiana 47401) has been developed by Phi Delta Kappa under the auspices of a Kettering Foundation grant; it focuses on reports of research and innovation in elementary and secondary schools and includes many reports that otherwise would not get published. The user simply requests information by topic from the above address.

PERIODICALS AND JOURNALS

In providing a list of periodicals and journals, the authors selected only those furnishing some form of research information. A three-point scale was developed to categorize material according to level of presentation:

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(1) Research reported requiring substantial knowledge of research methods and statistics for critical review. However, implication and conclusion sections of reports are generally informative and may provide useful information for teachers.

(2) Research reported or interpreted at a level to be reasonably understood by persons without extensive statistical or research experience.

(3) Research applied, cited, or discussed as it relates to particular topics.

(1) *American Research Journal* (American Educational Research Association. 1201 16th Street. N.W., Washington, D.C. 20036) reports a broad range of research topics, many of which are relevant to classroom teaching. Quarterly

(2) *The Arithmetic Teacher* (National Council of Teachers of Mathematics, 1201 16th Street. N.W., Washington. D.C. 20036) contains some research reports relevant to mathematics teaching among its articles. Monthly (Oct.-May)

(2) *AV Communication Review* (Department of Audiovisual Instruction, National Education Association, 1201 16th Street, N.W., Washington, D.C. 20036) contains abstracts of research involving AV which may be relevant to classroom teaching. Quarterly

(2) *California Journal for Instructional Improvement* (California Association for Supervision and Curriculum Development, Burlingame. California 94010) includes research reports relevant to classroom teaching. Topics dealing with improvement of instruction. Quarterly

(1) *California Journal of Educational Research* (1705 Murchison Drive, Burlingame, California 94010) contains research topics of interest to teachers and for researchers in education. Bi-monthly (Sept.–May)

(2) *Child Development* (Child Development Publications, University of Chicago Press, 5750 Ellis Avenue, Chicago 60637) includes research topics applicable to instructional processes in the area of child development. Quarterly

(3) *Childhood Education* (Association for Childhood Education International, 3615 Wisconsin Avenue, N.W., Washington, D.C. 20016) has a research column which interprets and describes educational research. Monthly (Sept.-Oct.–May)

(2) *Contemporary Education* (217 N. 6th Street, Terre Haute, Indiana 47809, name changed January 1968—formerly *Teachers College Journal*) includes research articles by topics by volume. For ex-

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ample, Jan. 1969 topic: *Early Childhood Education.* (Oct.–Jan., March and May)

(3) *Education Digest* (416 Longshore Drive, Ann Arbor, Michigan 41807) includes some condensed research reports applicable to instruction. Monthly (Sept.–May)

(2, 3) *Educational Forum* (Kappa Delta Pi, National and Publication Office, J. Richard McElheny, P. O. Box A, West Lafayette, Indiana 47906) includes research reports and discussions on a wide range of topics related to education. Some are applicable to elementary teaching. Bi-monthly (Nov.–May)

(3) *Educational Leadership* (Association for Supervision and Curriculum Development, National Education Association, 1201 16th Street, N.W., Washington, D. C. 20036) has a research and review column which interprets and describes educational research. Monthly (Oct.–May)

(1) *Educational and Psychological Measurement* (Frederic Kuder, ed., Box 607 College Station, Durham, North Carolina 27708) includes thorough reporting of research studies pertaining to testing and measurement. Quarterly

(3) *Educational Record* (American Council on Education, One Dupont Circle, N.W., Washington, D. C. 20036) contains carefully edited studies covering a wide range of topics all pertaining to education. Quarterly

(2) *Educational Research* (The National Foundation for Educational Research in England and Wales, Newness Educational Publishing Co., Ltd., Tower House, South-Lampton Street, London WC2) includes reports of full studies on topics which pertain to the instructional situation.

(2) *Educational Sciences* (Pergamon Press, Inc., 44-01 21st Street, Long Island City, New York 11101) includes complete reports on studies which would be of use to the classroom teacher. Three times a year

(2) *Educational Television International* (Pergamon Press, Inc., 44-01 21st Street, Long Island City, New York 11101) includes research on educational television which frequently pertains to its use in the classroom. Quarterly

(3) *Elementary English* (National Council of Teachers of English, 508 S. 6th St., Champaign, Illinois 61820) includes articles based upon research in the communicative arts. Monthly (Oct.–May)

(3) *The Elementary School Journal* (University of Chicago Press, 5750 Ellis Avenue, Chicago 60637) publishes some reports of research which pertain to the classroom situation. Covers a wide range of topics. Monthly (Oct.–May)

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(2) *Exceptional Children* (Council for Exceptional Children, National Education Association, 1201 16th St., N.W., Washington, D. C. 20036) contains full reports of research studies which pertain to the instruction of exceptional children. Monthly (Sept.–May, July)

(2) *Investigations in Mathematics Education* (J. Fred Weaver, ed., A. C. Vroman, Inc., 367 South Pasadena Avenue, Pasadena, California 91105) reports abstracts of research reports related to mathematics education. Published occasionally

(2) *Journal for Research in Mathematics Education* (David C. Johnson, ed., 330 Peik Hall, University of Minnesota, Minneapolis, Minnesota 55455) includes empirical studies in mathematics education articles and research summaries. Quarterly

(2) *Journal of Applied Behavior Analysis* (Society for the Experimental Analysis of Behavior, Department of Human Development, University of Kansas, Lawrence, Kansas 66044) publishes reports of experimental research involving applications of the analysis of behavior to problems of social importance. Quarterly

(1) *Journal of Applied Behavioral Science* (NTL Institute for Applied Behavioral Science, NEA, 1201 16th Street, N.W., Washington, D. C. 20036) publishes research dealing with the psychology of adjustment to society. Not necessarily concerned with education per se. Quarterly

(1) *Journal of Applied Psychology* (American Psychological Association, 1200 17th Street, N.W., Washington, D. C. 20036) includes complete research reports on a wide range of topics many of which are applicable to the instructional setting. Bi-monthly (monograph supplements included)

(2) *The Journal of Communication* (National Society for the Study of Communication, Mark L. Knapp, Business Manager, University of Wisconsin, Milwaukee, Wisconsin 53211) publishes abstracted research reports on topics germane to the communicative process many of which are applicable to the classroom situation. Quarterly

(2) *Journal of Creative Behavior* (Creative Education Foundation, State University College of Buffalo, 1300 Elmwood Avenue, Buffalo, New York 14222) includes articles and research topics dealing with creativity and related fields. Quarterly

(1) *Journal of Educational Psychology* (American Psychological Association, Inc., 1200 17th St., N.W., Washington, D. C. 20036) publishes many of the complete research reports applicable in the instructional setting. Bi-monthly (monograph supplements included)

(1) *The Journal of Educational Research* (Dembar Educational Research Services, Inc., Box 1605, Madison, Wisconsin 53701) con-

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tains many research reports applicable to the classroom situation. Ten times a year

(2) *The Journal of Experimental Education* (Dembar Educational Research Services, Inc., Box 1605, Madison, Wisconson 53701) includes complete research reports on topics germane to the educational process. Quarterly

(1) *Journal of Learning Disabilities* (Professional Press, Inc., Room 1410, 5 North Wabash Avenue, Chicago, Illinois 60602) includes research reports concerned with learning disabilities.

(2) *The Journal of Negro Education* (The Journal of Negro Education, Howard University, Washington, D. C. 20001) reports on research topics relevant to Negro education. Quarterly

(1) *Journal of Psychological Studies* (American Psychologists Association, 102 Napau Street, Princeton, New Jersey) publishes a broad range of original experimental and theoretical research reports in psychology and related disciplines. Quarterly.

(3) *Journal of Reading* (International Reading Association. 6 Tyre Avenue, Newark, Delaware 19711) presents articles reporting research related to the process of reading. Monthly (Oct.–May)

(3) *The Journal of the Reading Specialist* (College Reading Association, Dr. Leonard Braam, Reading Clinic, Syracuse University, Syracuse, New York) reviews research pertinent to the reading process. Quarterly

(2) *Journal of Research in Music Education* (Music Educators National Conference, NEA Bldg., 1201 16th St., N.W., Washington, D. C. 20036) contains reports, pertinent research in music education. Quarterly

(1) *Journal of Research in Science Teaching* (National Association for Research in Science Teaching, 605 Third Avenue, New York, New York 10016) reports research studies in the teaching of science. Quarterly

(3) *The Journal of School Health* (American School Health Association. A. O. DeWeese, Executive Secretary, 515 E. Main St., Kent, Ohio 44240) includes some research related to school health. Monthly (Sept.–June)

(2) *Journal of School Psychology* (Journal of School Psychology, Inc., College of Education, University of Akron, Akron, Ohio 44304) contains topics of research reports usually pertaining to the child and his relationship to the school environment. Quarterly

(2) *Journal of Teacher Education* (National Commission on Teacher Education and Professional Standards of the National Education Association, 1201 16th Street, N.W., Washington. D. C. 20036) includes research reports concerned with the education of teachers. Quarterly

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(1) *Journal of Verbal Learning and Verbal Behavior* (Academic Press, Inc., 111 Fifth Avenue, New York, New York 10003) presents many full research reports applicable to the instructional setting. Bi-monthly

(2) *Merrill-Palmer Quarterly of Behavior and Development* (Merrill-Palmer Institute, 71 East Ferry Avenue, Detroit, Michigan 48202) publishes researches representing the various disciplines bearing on human development, personality, and social relations. Quarterly

(1) *The Modern Language Journal* (Modern Language Journal, Wallace G. Klein Business Manager, 13149 Cannes Drive, St. Louis, Missouri 63141) publishes occasional research reports pertinent to the communicative arts. Monthly (Oct.–May)

(1) *Ontario Journal of Educational Research* (The Ontario Institute for Studies in Education, 102 Bloor Street, West, Toronto 5, Ontario) contains many research reports applicable to the classroom situation. 3 times a year

(3) *Phi Delta Kappan* (Director of Administrative Services, Phi Delta Kappan, Inc., Eight Street and Union Avenue, Bloomington, Indiana 47401) has a Research Notes Column which interprets and describes educational research. Monthly (Sept.–June)

(1) *Programmed Learning and Educational Technology* (27 Torrington Square, London, England. WC1) includes research studies reported on topics relevant to programmed instruction.

(2) *Psychology in the Schools* (Psychology Press, Inc., Brandon, Vermont) reports several studies pertinent to the instructional process in each issue. Quarterly

(1) *Reading Research Quarterly* (International Reading Association, 6 Tyre Avenue, Newark, Delaware 19711) reports location and reviews of research on topics related to reading.

(3) *The Reading Teacher* (International Reading Association, 6 Tyre Avenue, Newark, Delaware 19711) includes research reports on topics related to reading in the instructional situation. Monthly (Oct.–May)

(2) *The Research Quarterly* (Association for Health, Physical Education and Recreation. NEA Publications—Sales, 1201 16th Street, N.W., Washington, D. C. 20036) includes reports pertinent to research in the health sciences. Quarterly

(3) *Review of Educational Research* (American Educational Research Association, 1126 16th Street, N.W., Washington, D. C. 20036) reviews educational research findings and conclusions by areas of interest by identifying, summarizing, and critically analyzing research studies. 5 times yearly.

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(3) *School Science and Mathematics* (School Science and Mathematics, Donald Winslow, Business Manager, P.O. Box 246, Bloomington, Indiana 47401) reports on topics relating to science and mathematics instruction. Monthly (Oct.–June)

(2) *Science Education* (Science Education, Inc., C. M. Pruitt, University of Tampa, Tampa, Florida 33606) publishes research on science and its relation to the classroom setting. 5 times a year

(3) *Social Education* (National Council for the Social Studies, 1201 Sixteenth Street, N.W., Washington, D. C. 20036) includes articles and some research reports concerning the teaching of social studies. Monthly (Oct.–May)

(3) *The Social Studies* (McKinley Publishing Co., 112 S. New Broadway, Brooklawn, New Jersey 08030) contains reports upon the results of research in articles pertinent to instruction in the social sciences. Monthly (Oct.–April)

(2) *Studies in Art Education* (National Art Education Association, Charles M. Dorn, Managing Editor, 1201 16th St., N.W., Washington, D. C. 20036) publishes research reports relevant to the process of art instruction. 3 times a year

(3) *Young Children* (The National Association for the Education of Young Children, 1834 Connecticut Avenue, N.W., Washington, D. C. 20009) includes articles and some research reports concerning the learning of children of nursery, kindergarten, and primary age. October, November, January, March, May, and September

Research References and Publications

This section of the chapter is divided into two separate parts. The first part includes those references the authors consider to be basic in the pursuit of research. Each reference listed provides a specific kind of information to help the researcher, or the consumer, or both, locate information in the area of his interests and immediate concern.

The research publications are offered as examples of sources of information on educational research. They represent a few of the many available sources from which teachers can obtain information on educational research, research methods, statistics, and research design.

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A Cross-Section of Educational Research (Edwin Wandt, ed., David McKay Company, Inc., New York, 1965) is a compilation of 40 educational research articles which are published in 40 different journals. The articles are to serve as illustrating those being published as opposed to being used as models. It also contains a section on evaluating educational research.

Dissertation Abstracts (University of Michigan Microfilms, Ann Arbor, Michigan, 1952—) makes available abstracts of doctoral dissertations.

Education Index (Julia W. Ehrenlich, ed. H. W. Wilson Company, New York, 1929—) indexes articles published in educational periodicals in the United States. 3 times a year

Encyclopedia of Educational Research (Robert Ebel, ed. MacMillan, New York, 1969) includes critical and evaluative syntheses of the literature of educational research arranged alphabetically by subject.

Handbook of Research on Teaching (American Educational Research Association, N. L. Gage, ed. Chicago, Rand McNally Co., 1963) is a very comprehensive handbook attempting to aid the research worker with a high level of competence and sophistication. It is designed to assist the professional in improving the conceptual and methodological equipment used in research on teaching. The purchase price may prohibit the average classroom teacher from putting it on her professional shelf, but a copy is generally found in the public school administration offices.

Research for the Practitioner in Education (Fred C. Barnes, Department of Elementary School Principals of the NEA, 1964) is a book written for the administrators and the classroom teachers who are on the job in American schools that close the gap between need for research in the schools and workable approaches to accomplishing that research in reality. It is the "must" for the non-research oriented teacher or administrator who wishes to find out about understanding and doing research.

Research Studies in Education (edited by Stanley Elam, Phi Delta Kappan, Inc., Bloomington, Indiana, 1941—) indexes by subject and author doctoral dissertations, reports, field studies and contains a research methods bibliography.

The Sixth Mental Measurement Yearbook (edited by Oscar K. Buros, Gryphon Press, Highland Park, New Jersey, 1934–1964) compiles brief descriptions of tests and critical reviews of these tests. The section, "Classified Index of Tests," lists every test printed during the years covered by each volume.

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Selected ACEI Publications

Bulletins

Basic Human Values for Childhood Education
Values educators should consider in their work with children.
76 pp. $1.25

Children and Oral Language
A cooperative effort of four major organizations in education—ACEI, ASCD, IRA, and NCTE—this bulletin highlights the importance of listening and speaking skills for those adults of the 21st century who are today's pupils in elementary classrooms.
38 pp. $1.00

Children's Views of Themselves
Self-concepts that influence living and learning. 36 pp. $ .75

Intermediate Education
Curriculum areas, grouping, logical thinking, social studies, reading, new math, science, esthetics, experiences. 80 pp. $1.25

Research in Oral Language
Supplement to *Children and Oral Language*. Published jointly with ASCD, IRA, and NCTE. 68 pp. $1.50

Toward Effective Grouping
Ungraded classes, other ways to group. Research. 56 pp. $ .75

Portfolios

Transitional Years: Middle School Portfolio
1968 revision. 12 leaflets. $1.25

Children and International Education
1969. 8 leaflets. $1.25

Leaflet

Research: Children's Concepts
8 pp. 10¢ ea.; 25 copies, $2.00

The above publications may be ordered directly from

Association for Children Education International
3615 Wisconsin Avenue, N.W.
Washington, D. C. 20016

A complete publications list with membersh ɔ information will be sent upon request. (Orders amounting to less than $2 (nnot be billed. Include check or money order payable to ACEI; stamps not accepted.)

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ASSOCIATION for
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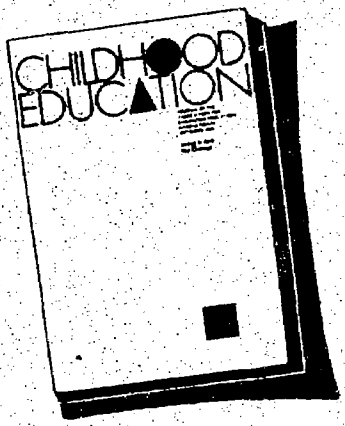

CHILDHOOD EDUCATION (ACEI's official journal): Brings you professional articles, editorials, reviews and news notes. Published monthly from September-October combined through May. Membership (includes subscription to magazine with *Branch Exchange* inserted) one year, $6 **(after June 30, 1970, $12).**

Annual Bulletin Order (includes the ACEI Yearbook and all bulletins and leaflets published during the year), $10 **(after June 30, 1970, $15).**

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