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METHODS AND TECHNICS OF EDUCATIONAL RESEARCH

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FOREWORD

It was the original plan to have the review of methods of research prepared as a committee report. This proved to be a more formidable task than was at first realized. It seemed to require the type of cooperation through committee meetings for which neither the requisite time nor money were available. Accordingly, the plan was hit upon of asking the chairman of each subject committee to prepare a chapter on the methods of research in his own field. It was a good deal to ask the chairmen to do, at short notice, on top of the arduous labor of preparing the reviews of research themselves; but they have responded nobly, and I am not sure but that the present type of review of methods is more useful than the type which was originally planned. At least, I think it will be found more useful to practical workers in the respective fields.

This survey of methods will, I believe, be found particularly helpful as a guide and source of suggestions regarding methods of attack on specific problems. It will help the research worker to discriminate between sound and unsound methods. This will be particularly valuable to the administrator or teacher who has not had extensive experience in research but wishes to make an occasional study, as well as to the student in training for research.

Frank N. Freeman,
Chairman of the Editorial Board.

CHAPTER I

Research and Various Approaches to Curriculum Building

DURING the decade preceding the depression there was greater activity in the field of curriculum revision than at any previous time in history. Even within the period of 1928–1930, courses of study were revised in whole or in part in thirty-one states. Curriculum revision has been most active at the elementary school level. An analysis made by the Curriculum Construction Laboratory of Teachers College, Columbia University, of 30,455 courses of study shows that 74 percent have been made for elementary schools, while 13 percent have been made for junior high schools, and 12 percent for senior high schools. The Thirty-first Yearbook of the National Society for the Study of Education (37) showed that much revision has been going on at the college level. Peik's analytical studies (39, 40, 47) of courses in education, to cite one example, illustrated a technic of investigation that has wide usefulness over the whole college curriculum. Meiklejohn (36) showed how the curriculum for one experimental college was developed and offered many suggestions for curriculum building at the college level.

The present period offers excellent opportunity to review and evaluate previous and present methods of research in curriculum building, to offer suggestions for extension of methods now in use, and to define new problems for research.

Problems of curriculum research are so closely tied up with one's basic philosophy of education, with one's ideas on sociology, economics, and psychology, that brief mention must be made of these factors as a background for discussing methods of research in curriculum building. The basic philosophy which one holds naturally determines not only his approach to curriculum building and the research problems which he undertakes, but it also influences his interpretation of the findings of his research studies.

For example, take the question of adult needs vs. child interests. Horn (26) writes: "Whoever is concerned in the education of children must have in mind the permanent and important needs of adult life. On the other hand, the present needs of children, both in and out of school, must be considered also."

Bobbitt (6:8) states emphatically: "Education is primarily for adult life, not for child life. Its fundamental responsibility is to prepare for the fifty years of adulthood, not for the twenty years of childhood and youth."

In a later statement Bobbitt (7:43) says:

> At no time and in no degree is the present to be sacrificed for the future. We do not look forward to the future for the sake of preparing for it; but only for assistance in holding high the current living. Education is not primarily to prepare for life at some future time. Quite the reverse; it purposes to hold high the current living, making it wholesome, intense, abundant, fruitful, and fitting it firmly into the grooves of habit. Only thus can high-grade living be given that momentum that will carry it through to the end.

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Kilpatrick (31:411) writes:

We must then as regards the younger years cease to think of schooling as primarily a period of preparation for later years, but think rather of life as one continuous whole with education as the name we give to the continuing process of building up and refining the organism through ever new and more delicately adequate behavior, a process continuing throughout life and capable of being so directed at each successive stage as to make finer and better the succeeding stages.

Where the adult needs approach is carried to the extreme, the interests of children are respected only where they coincide with the interests of adults. One writer suggests that totally disregarding child interests is like cutting off the polliwog's tail because no frog needs one. Most curriculum builders are coming to recognize that consideration should be given to both child experiences and the needs of society.

Then there is the question: What is the task of education in a period of rapid social change? Bagley (3:568) answers:

. . . the most important function of education in such a period is a stabilizing function. The very time to avoid chaos in the schools is when something akin to chaos rages in the social environment. The very time to emphasize in the schools the values that are relatively stable and abiding is when the social environment is full of uncertainty and when standards are crumbling.

Kilpatrick (29:48), on the other hand, writes:

. . . we must all together study our social problems until we become fired with zeal for the cause of a better social day. We must commit ourselves and our work intelligently to the cause of the public welfare, not in lip service, but in appropriate and effectual endeavor. . . . We must mean to help society, . . . to move along most defensible lines to the ever emerging best social goals.

Among the major variables to be reckoned with in curriculum building are: (1) a constantly increasing body of knowledge from which to select the content of courses of study; (2) a changing social order to which we must relate what we select; and (3) a student body of varying ages, stages of development, intellectual capacities, social and economic backgrounds, present interests, and future plans—to which the curriculum must be adapted, graded, and differentiated. The degree to which these three variables have been recognized has largely determined the different approaches which different people have made in selecting the materials of instruction.

Bruner (10) included these thirteen approaches to curriculum construction:

1. Present practice
2. Child experience
3. Creative values
4. Adult needs
5. Frontier thinkers
6. Socio-economic approach
7. Social values
8. Social statistics
9. Educational shortages
10. Emotionalized attitudes
11. Activity analysis
12. Objectives
13. Scientific approach

In listing these thirteen approaches, Bruner writes: "It is obvious that some of the various phases of the approaches overlap others, and in some cases each does not constitute an entirely separate approach."

This long list may not be entirely satisfactory to the person responsible for a particular program of curriculum revision in a particular city in that it may appear to overlap too much and be too detailed; he may want to reduce it by grouping together several similar approaches. Norton (38:170–72), for example, grouped the various approaches to the selection of curriculum content under three heads: (1) the approach which emphasizes the conservation of elements already found in the traditional curriculum; (2) the approach which seeks to discover what to select from the traditional curriculum; and at the same time strives to add new material appropriate to contemporary life; and (3) the approach which reappraises the material of the traditional curriculum, discovers new material appropriate to contemporary life, and in addition seeks to add content which promises to guide the development of life in the direction of social advance.

For the purpose of reviewing methods of curriculum research, Bruner's long list of approaches to curriculum and course of study construction (10) is helpful in that it offers opportunity to show in more detail the great variety of research studies which have been made to solve problems of selection and grade placement of curriculum content. Hence Bruner's tentative list, with some modifications, will be followed here; other approaches will be added; and brief mention will be made of each approach, including citations to research studies which illustrate it. Only enough studies will be cited to serve as examples, since this article is intended to orient one in the whole field of curriculum construction, rather than to examine in detail specific technics. This orientation should be suggestive in connection with the April, 1934 issue of the *Review of Educational Research*, which will present a wealth of illustrative types of research in curriculum revision.

Present Practice

In this approach, some are guided by the median of current practice, others set up criteria for selecting courses of study which represent the best of current practice, and choose those topics which have the greatest frequency of mention in the group of selected "best" courses. Mann (34), Stratemeyer and Bruner (52), and Curtis (16) have published studies which illustrate this approach to curriculum building.

Those who accept the median of current practice as their guide hold that course of study building is a progressive development or a "sifting process," and that each time a course of study is built, it represents the selection of what educators at that time considered the most valuable material. Those opposed to this procedure argue that it is not always wise to follow present practices and particularly the median of many discordant practices of school systems which are the result of different ideas of what education is and ought to be.

The procedure of selecting topics on the basis of their frequency of mention in a list of selected "best" courses has in its favor the intent eventually to pull up all school practice everywhere to the level of what now, by carefully selected criteria, are considered the best practices, and this would be a tremendous advance. Those who are critical of this approach maintain that it adds nothing to what already exists somewhere in some progressive schools. It is a method of distributing the good rather than augmenting the actual present possessions of the schools.

Child Experience

According to Kilpatrick (30) the conception of the whole child, all sides of life integrated within an effective growing whole, must dominate our every endeavor in school work. He conceives the curriculum as a succession of educative experiences considered with reference to the accumulating educative effect, i.e., either as growing personality or as increasing power and control. Rugg and Shumaker (48) are among those who have appraised this new education.

Researches which illustrate the child experience approach to curriculum building include studies of children's interests and needs in various fields at different ages and experimental units designed to develop personality and individuality. Many illustrations of the latter have been collected by Carey, Hanna, and Meriam (11).

Freeman (19), in answer to the question, "Should the curriculum be built on children's interests or social needs?" writes:

> Perhaps, and quite likely, both extreme positions are wrong. The real difficulty [with the curriculum built wholly on social needs] is that the child is supposed to do things that have no meaning for him. The dietitian has a lesson for the educator. Knowing what foods are best for the child, educators do not try to compel him to eat them as the parents often do. They try to appeal to the child's appetite. The expert has learned to make the child like what he should. . . . The expert goes further. He makes it graphically clear to the child what is to be gained by eating the proper food.

Creative Values

There are those who believe that the way to wisdom and enlarged living is through a broad cultivation of spiritual and creative powers. Mearns (35), for example, writes that:

> Creative power, which is the aim of educational achievement, may easily eventually be directed to the securing of all the information and skills needful for life and living, and that it also may be led to those heights among the intangibles of appreciation and culture which curricular instruction so regularly missed.

Those who use this approach to curriculum building seek to capitalize the natural creative impulses of children. *Creative Expression* (46), which deals with the development of children in art, music, literature, and dramatics, gives special emphasis to the child's own modes of self-expression through all of the creative arts, as opposed to adult standards.

Some even go so far as to suggest that the curriculum should not be made in advance, but should develop from day to day, according to the child's interests and needs.

Some criticize this approach to curriculum building on the basis that it requires artist teachers of which there is a lack and that it often fails to capitalize adult experience. They hold that to leave the child entirely free to select his school activities is to throw on him a burden that he does not deserve. Adults have experience to fall back on, mature judgment, and the guidance of frontier thinkers as to major issues in contemporary life. But even they require the authority of law and of convention. However, the critics of the creative values approach to curriculum revision admit that authority over children should not mean tyranny. It should not deny them the right of individual choice and expression under wise guidance. Children are miserable when they are not left to their own modes of self-expression at least part of the time, and when they are under the oppression of subject-matter in which they see no value, or which they cannot master.

Frontier Thinkers

Those who use this approach to curriculum and course of study construction assume that the best source for the statement of insistent and persistent contemporary problems is the published works of the so-called "frontier thinkers." Specialists, who have devoted years not only to the detailed intensive study of the theoretical aspects of their specialties, but who, in many cases, have become practically acquainted with these problems in the field, are considered by research workers, who accept this approach to curriculum building, to be best qualified to give an insight into, and a more mature judgment concerning, the issues of present-day life.

The published writings of these men, rather than personal interviews, are usually selected for analysis, since they afford a more convenient basis for discovering these problems, and because published writings usually tend to be more critical than the opinions that one would get from personal or oral interviews with them.

By this method the school curriculum is extended beyond what was formerly known to teachers.

Research studies illustrative of this approach to curriculum building include those by Rugg (50), Billings (5), Hockett (24), and Lee (32).

In so far as the writings selected for analysis deal with social issues which are of vital significance, this approach to curriculum building is valid. After discovering these issues, there remains the difficult task of selecting suitable materials bearing upon them, as well as the question of grade placement. The final step in this approach is to subject the materials, which have been developed, to school experiments and to tests which will reveal their suitability. In the future, this method of utilizing the schools as centers for the refinement of material secured from outside the regular school programs, will doubtless be used far more extensively.

Socio-economic Approach

Since the onset of the depression, this approach has received special emphasis. The new Virginia state course of study in the social studies is an illustration of a course which includes this approach among others. This approach seeks to develop a deeper and personal knowledge and understanding of some of the most pivotal world problems. The approach calls for a study of social and economic problems not only in books, magazines, and newspapers, but also in each local community. Studies of local housing conditions, food and clothing supplies, communication and transportation facilities, for example, lead into questions of human relations, distribution of wealth, marketing, and interdependence.

Among the studies which are usable in this approach to curriculum building are Chase's *Men and Machines* (14), Lynd and Lynd's *Middetown* (33), Rugg's *The Great Technology* (49), and the report on *Recent Social Trends in the United States* (45).

This approach, as did the preceding one, emphasizes the relation of life in the school to the social life in the world at large. The source of the new materials is the social and economic life outside the school. School experiments and tests are used to show how successful the selection of the new materials has been.

Few would object to the socio-economic approach to curriculum building, provided it is supplemented by three interrelated lines: (1) aesthetic and spiritual values must not be lost sight of; (2) the basic institutions need to project themselves into the near future to predict what changes will take place in life conditions; and (3) emphasis of training must be placed upon the development of an integrated personality that will be able to meet present and future conditions of human environment.

Closely allied to the socio-economic approach to curriculum construction, if not a part of it, is the social statistics approach, which evaluates social statistics, bearing on many areas of life. Studies such as the following are usable in this approach: *Medical Care for the American People* (42), certain of the White House Conference reports (53), *Recent Economic Changes in the United States* (44), certain reports of the President's Conference on Home Building and Home Ownership (43), *The Modern American Family* (55), *The Reading Interests and Habits of Adults* (20), and the *Education of the Consumer* (22). Statistics as to the number of workers needed in various fields will in the future doubtless largely determine the number to be trained. Just as social planning, legislation, and various governmental departments are relying more and more on social statistics, so in the future will the curriculum builder use them as one approach to curriculum building.

Present Social Values

Those who use this approach emphasize immediate social utility in the selection of curriculum content. They are constantly seeking to discover what knowledge and skills are most needed in present-day life outside the

school, rather than in life as it may be or should be in the future as forecasted by "frontier thinkers."

Illustrative research studies are Horn's word counts (25) to discover the words most frequently used in business and social correspondence; Wilson's survey (54) of the social and business usage of arithmetic; Bowden's study (8) of arithmetic, based on an analysis of newspapers and a study of details of the various occupations; and Finley and Caldwell's study (18) of biology in the public press to determine what knowledge of biology is essential to read current newspapers and magazines intelligently. The National Council of English Teachers (51) also made use of the social values approach to curriculum construction when it secured the judgments of nearly 8,000 persons engaged in various vocations and professions, as to the language skills necessary for ordinary success in life.

Intelligently used, this approach will keep the curriculum abreast of the times, or at least not very far behind. It provides for the reasonably prompt elimination of obsolete material and its replacement by that which is modern and consistent with the practical needs of current life.

Critics of this method say that its weakness, particularly if it is the sole basis of curriculum construction, is that it makes the school a follower, rather than a prophet of social evolution. Whether its ultimate contribution is positive or negative depends upon the direction which life takes as influenced by factors outside the school. In its pure form this type of curriculum construction might act to make the school hasten social degeneration as readily as to contribute to social advance.

Educational Shortages

Those who advocate this approach feel that valid criticisms of present courses of study should be among the guides used in course of study reconstruction. Dulebohn (17), for example, in his analysis of civic and social shortcomings as curriculum indices, sought to find everything pointed to as undesirable in the editorials of nine newspapers and six magazines over a considerable period of time. The shortcomings discovered were classified into four groups: deficiencies of (a) the private citizen, (b) various governmental units, (c) certain social groups, and (d) officials. Bagley's study (2) of education, crime, and social progress involved (a) an identification of the elements of weakness in American education and (b) an effort to replace these with elements of strength. Coe (15) analyzed the moral shortcomings of youth and the program of the schools, and suggests that the former are a reflection of corresponding faults in the latter.

Studies of children's errors or shortcomings in specific subjects are also used in developing courses in these subjects. For example, Harap's composite study (21) of thirty-three previous investigations of grammatical errors made by pupils offers definite suggestions for developing a course of study in grammar. Like lists of "spelling demons," such studies also aid in deter-

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mining where the greatest emphasis should be placed; since, frequency of error is to some extent a measure of the difficulty or ease of learning.

While many might argue that the educational shortages approach would not always develop a complete course of study, few would deny that it aids in showing where to place emphasis.

Emotionalized Attitudes

According to Briggs (9), we feel more than we think, and fixed attitudes are always charged with emotions to a greater or less degree. These emotionalized attitudes stimulate one to action, condition his reception and interpretation of facts, and are influential in integrating the members of a group. Hence they should be of real concern to curriculum makers. Research studies show that the way in which courses are taught is quite as important, if not more so, in the development of emotionalized attitudes as are the courses themselves. Bamesberger (4), for example, found that an activity program is productive of more outside reading, more new interests, and more ongoing enterprises.

Activity Analysis

Charters (12) and other curriculum builders who use this approach feel that curriculum content should originate in the problems, activities, and interests of modern life. Activity or job analysis makes selection objective since it provides a clear picture of the substantial bases of selection. It asks in detail what traits and what information are necessary for success in particular situations in life. Activity analysis provides a definite picture of the activities which are to be treated in books and courses of study. The occupational and job analysis approach is particularly helpful in developing a course of training for a particular occupation or job. The problem narrows down to an analysis of the major and minor duties of that job; the knowledge, habits, and skills for success in it; and the development of units of work which will equip the learner with them. The five methods used separately or in combination in making a job analysis include: introspection, interviewing people on the job, reading about the job, questionnaire, and working on the job.

An illustration of this approach to curriculum building is the *Commonwealth Teacher-Training Study* (13). This study is a thoroughgoing analysis of the activities of teachers. It includes a list of 914 duties. This long list was evaluated for frequency of performance, for difficulty of learning, and for importance. Charters' industrial analyses in Pittsburgh, his analysis of women's activities relative to the Stephens College curriculum, and his analyses of secretarial duties and traits are typical examples of the use of activity analysis in curriculum-making.

Objectives

This approach involves a statement of abilities and the selection of pupil experiences necessary to their acquisition. It offers, as a substitute for

activity analyses, the pooled judgment of thoughtful men and women as to the essential needs of adult life. According to this method, course of study committees make more or less comprehensive lists of human abilities and characteristics which in their judgment are advisable or desirable for men and women. This comprehensive list of abilities is determined wholly without reference to subjects or departments. It presents the characteristics and abilities needed by men and women of large natural ability. The list is cut down to meet the needs of those of lesser capacity. Bobbitt (6), for example, classified such a comprehensive list of abilities under ten major headings. After such a classification of abilities has been made, each department in the school system selects those toward the attainment of which it will direct its efforts. The next question faced is this: What are the activities and experiences on the part of the pupils which are necessary for achieving these objectives? The pupils' experiences and activities agreed upon are the curriculum. Pendleton's study (41) of the social objectives of English is an illustration of the objectives approach to course of study construction.

Many criticisms of this approach have resulted from objectives being stated in vague generalities, or being stated and then more or less ignored when subjectmatter was selected. Harap (23:128) points out that objectives should be so specific as to define with some exactness the scope of the teaching unit which is designed to achieve them. He holds that the inclusion of any unit of teaching material is justifiable only if it points to the achievement of some specific, useful purpose which should be stated at the beginning of each unit of instruction.

Social Heritage

Judd (27, 28), for example, would have the school curriculum include a study of the social contributions which various subjects have made. Using arithmetic as an illustration, he writes:

> . . . society has been transformed in its ways of thinking and in its modes of behavior by the use of number. The history of human intellectual life shows that through long ages the human mind has been perfecting the number system and through all these ages men have learned progressively to depend on number for the regulation of their lives. There is a new kind of psychology in the world because the number system has become a common possession. . . . I find that the number system has given even to ordinary thinkers an attitude of precision in their thinking which is enormously more significant than the ability to add or subtract or perform any particular calculation.

According to this viewpoint, the pupil who is drilled in the use of number is acquiring a mode of thought which will change all of his later mental operations. Arithmetic is a general mode of thinking, not merely a tool. To reduce arithmetic to a few practical applications, such as some research studies suggest, would be to neglect the general idea of precise thinking on which our mechanical and scientific civilization rests.

Those who accept the social heritage approach to curriculum building hold that the chief duty of the school is not merely to train pupils in par-

ticular skills needed in the common affairs of life, but to cultivate comprehensive general ideas. According to Judd (28:323), for example, curriculum research workers "should study the trends of civilization. A trend is much more important to understand than is any particular content of thought or any particular skill. . . . Knowledge of a trend of civilization carries the educator forward. It gives him a standard of selection, a guiding principle." This approach, at its best, leans heavily on historical research.

The Committee on Materials of Instruction of the American Council on Education (1) has made use of this approach in preparing the Achievements of Civilization Series of basic school readings. This series is published "with a view to cultivating a wide acquaintance on the part of pupils with the indebtedness of present-day society to earlier cooperative human efforts." It includes the following titles to date:

1. *The Story of Writing*
2. *The Story of Numbers*
3. *The Story of Weights and Measures*
4. *The Story of Our Calendar*
5. *Telling Time throughout the Centuries*
6. *Rules of the Road.*

A Synthesis of Various Approaches

This would appear to be the most scientific attack on curriculum building, and is the one which is coming to be used most frequently.

For example, the studies most commonly used as bases for the selection of content of home economics courses are those which seek to discover:

1. The place of the home in modern civilization.
2. Trends in family life.
3. The objectives of home economics in a machine age.
4. Most common present-day practices and activities in various types of homes and communities.
5. What high school girls do at home.
6. What girls know before starting on a home economics course.
7. What supplementary home practices and knowledge may be acquired at home.
8. How interested are girls in home activities.
9. Analysis of strengths and weaknesses of best current courses.
10. Gaps in training reported by home-makers who have had home economics courses.
11. Probable changes in living conditions in the next decade.
12. What pupils should know and be able to apply at the completion of each year of work.

The more data that can be secured on all these points, and the more carefully they are evaluated and synthesized, the better will be the resulting course of study in home economics. In the same way, a variety of approaches must be made to course of study construction in practically every field. The curriculum must be as broad as life itself. There is no one approach to life which will give one a liberal understanding of its meaning. Similarly, there is no one type of investigation which will furnish an adequate basis for the determination of curriculum content.

All of the approaches, described and briefly illustrated in the foregoing paragraphs, when skillfully employed, yield findings which are helpful to the broad and practical student of curriculum revision. Some of the principal errors made in curriculum building result from a piecemeal approach, which emphasizes valuable, but at the most partial bases, for determining curriculum content—to the exclusion of other equally valuable bases.

The worth of the various approaches listed above differs markedly according to the educational philosophy lying back of, and the content and method entering into, a particular phase of the curriculum. To illustrate, a detailed activity analysis of shoe shining is extremely valuable, provided it has been decided that a portion of school time may be most advantageously used in equipping a youth with this particular vocational skill. Such an analysis is obviously valueless if the curriculum includes no provision for vocational training of this type. A discriminating analysis of some of the major trends of contemporary civilization is of great value to one who emphasizes contemporary social problems in the education of children. Such an analysis would be of less value to one who emphasizes the spontaneous interests of children as the primary basis on which to build a curriculum. It would be of even less value to one who puts greatest emphasis on "the eternal verities."

Skill in curriculum building consists in the ability to take account of the findings of many types of research which is competently performed, and to synthesize these findings in the development of a curriculum, which permits the individual child to realize the greatest benefits from his school experiences—benefits which will ultimately result in social advance.

CHAPTER II

Technics of Research Used in the Field of Teacher Personnel

RESEARCH in the field of teacher personnel consists of studies of the efficiency and the status of teachers. The areas generally included are: rating; recruitment for training; preparation; selection and placement; load; salaries; health; legal status; tenure; pensions; supply and demand; subject combinations; and teachers' organizations. Survey studies based on official records or questionnaire returns predominate. Simple correlations are used frequently; multiple correlations and regression equations occur in a few instances. Many investigations are attempts to measure teaching efficiency, or to find correlations between teaching effectiveness and various factors in the abilities or backgrounds of teachers.

Investigations made in the field of teacher personnel are, directly or indirectly, studies of teaching effectiveness; or of some factors or conditions which are, presumably, related to teacher effectiveness. For discussion, studies in teaching effectiveness may be grouped as follows:

1. Measurement of pupil progress.
2. Evaluation of teaching procedures.
3. Analysis of teachers' traits.
4. Other factors in teacher-status presumably influencing teaching effectiveness.
5. Correlations between various factors.
6. Values and needs in research in teacher personnel.

Measurement of Pupil Progress

Teaching is effective or not in terms of resulting, worthwhile pupil improvement. Adequately discriminating measures of such improvement are much needed but are as yet not available. The difficulties of measuring the product are those involved in measuring objectively some of the outcomes of instruction such as attitudes toward the subject and appreciations, and determining the amount of allowance to make for learning due to previous teaching or to instruction by parents or from other sources during the period of time when progress was noted.

Crabbs (57) made use of Franzen's accomplishment ratio formula in an attempt to determine teaching success directly in terms of results achieved relative to abilities of pupils. She obtained measures of initial and final mental age, and achievement ratios for reading, arithmetic, spelling, composition, and penmanship. From these she computed the measure of teacher efficiency in terms of the changes in A. R. effected in the pupils. While this technic appears promising, it involved such large probable errors as to make the results highly unreliable.

In addition to difficulties previously mentioned, other questions of adequate measurement arise. Is there agreement as to what should be the objectives of the unit to be measured and as to the amount of emphasis

which each phase of the various outcomes should receive? Do the tests really measure that which they attempt to measure? If all the objectives can be agreed upon as to emphasis, there is still the question of the total rating of the teachers in terms of combinations of objectives within the subject or within the area of instruction covered by a specific teacher. How can proper allowance be made for differences in pupils' abilities to learn?

To date difficulties have prevented much progress in the objective measurement of teaching effectiveness through direct evaluation of the product. Hence, evaluations of teaching success are being sought through observation of teaching procedures and of teacher characteristics in terms of their estimated influence upon pupil development.

Evaluation of Teaching Procedures

Examples of statistical evaluations of teacher rating scales are: correlations of two applications of the same scale by the same raters to the same group of teachers; of the same individual using different scales; of different individuals using the same scale; intercorrelations between specific items on the scale; correlations between specific parts of the scale and general teaching ability; and correlations between administrative ratings of teachers and ratings by pupils. The measurement of the processes is an attempt to find a "short-cut" measure of the progress of pupils in terms of the processes of the teacher. As such it has all the weaknesses of direct measurement of the product with the additional insufficiencies inherent in the question of whether or not the rating scales are sufficient means of measuring teaching activity.

Analyses of Teachers' Traits

Consideration of the teacher himself is another indirect approach to the measurement of teaching effectiveness. Opinions as to qualities most to be desired in teachers are collected from teachers, superintendents, supervisors, school board members, educational experts, and from pupils in the elementary schools, high schools, and colleges. These traits and activities are often evaluated by members of the various groups mentioned above as to items of most frequent performance and of greatest importance in the personality of the teacher. The results of such accumulations and evaluations seem perhaps of more help in the improvement of teaching through self-analysis than in the measurement of the effectiveness of specific teachers. One difficulty in using such findings or in setting up the traits of the ideal teacher as something to be attained by individual teachers is that specific traits and characteristics may be helpful or detrimental to a teacher according to the combinations in which they occur in him. A further difficulty lies in the impossibility of assigning relative values to the different traits. A characteristic which seems relatively unimportant when all teachers have it in some degree may be of paramount importance in determining the failure of a teacher who lacks it altogether.

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