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## Team Teaching and Academic Achievement

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Dating from the work of secondary school staff utilization theorists in the 1950's, team teaching has spread across all grade levels to become a fixture of the American educational scene. Born in a time of acute teacher shortage and a national concern for improving scientific and technical education—a response to Sputnik I—team teaching has survived both a shift from teacher shortage to teacher surplus and a change in the national consensus concerning the proper outcomes of education. Team teaching, in short, has proved to be an extraordinarily resilient innovation.

In its most generic sense, “a *teaching team* is a group of two or more persons assigned to the same students at the same time for instructional purposes in a particular subject or combination of subjects” (Johnson & Lobb, 1959, p. 59). Cunningham (1960) suggests four general organizational patterns in team teaching:

1. team leader type: In this arrangement one team member has a higher status than the other(s). He may well have a special title such as “team leader.”
2. associate type: In this arrangement there is no designated leader. Leadership may be expected to emerge as a result of interactions among individuals and given situations.

3. master teacher—  
beginning teacher: In this arrangement team teaching is used to foster acculturation of new staff members to the school.
4. coordinated team type: In this arrangement there is no joint responsibility for a common group of youngsters. What *is* involved is joint planning by two or more teachers who are teaching the same curriculum to different groups of youngsters. (pp. 2-3)

Regardless of the form of team teaching, those committed to teaming have made numerous attempts to formulate expressions of “strengths” of this pattern of school staffing. A composite list of purported “strengths” might look something like this:

- Strength 1: Team teaching permits team members to take advantage of individual teacher strengths in planning for instruction and in working with learners.
- Strength 2: Team teaching spurs creativity because teachers know they must teach for their colleagues as well as for their learners.
- Strength 3: Team teaching facilitates individualized instruction because it is possible to provide learning environments involving close personal contact between teacher and learner.
- Strength 4: Team teaching provides for better sequencing and pacing of increments of instruction because perceptions of an individual teacher must be verified by at least one other team member.
- Strength 5: Team teaching builds program continuity over time. Team teaching programs abide. Specific teachers within a team do not.

Underlying *all* of these “strengths” is the often unstated, but fundamental, assumption that team teaching results in improved learner achievement. Without evidence that team teaching enhances academic performance, the listed “strengths” of team teaching will not stand. What, then, *is* the evidence that supports team teaching as a facilitator of academic achievement?

An answer, it is hoped, will begin to emerge from a consideration of the studies reviewed here.

### *Studies Involving Elementary School Pupils*

In a study of 5th and 6th grade youngsters, Jackson (1964) selected three 5th grades and three 6th grades from three different schools to be team-taught. Solitary-teacher-taught 5th and 6th grade pupils were compared with team-taught pupils on (a) the Iowa Test of Basic Skills, Form 4A and (b) the California Tests in Social and Related Sciences, Part II, Forms AA and BB.

At grade 5, the team-taught group scored significantly higher than the solitary-teacher-taught group in reading achievement. No significant differences between groups of 5th graders were reported in achievement in science, social studies, language, work study, or arithmetic. At grade 6, the team-taught group scored significantly higher in work study skills. No other significant differences between scores of the two 6th grade groups were reported.

Lambert, Goodwin, and Wiersma (1965) conducted a study involving two schools. In School 1, 349 pupils were assigned randomly either to a team-taught or to a solitary-teacher-taught condition. In School 2, all 381 pupils were taught by solitary teachers.

During the first year of the study, School 1 solitary-teacher-taught pupils scored significantly higher than team-taught pupils in reading, arithmetic, and total achievement components of the California Achievement Tests. During the second year of the study, School 1 team-taught 1st graders scored significantly higher in reading, language, and total achievement than their solitary-teacher-taught counterparts. Additionally, team-taught 2nd graders in School 1 scored significantly higher in language than solitary-teacher-taught 2nd graders.

Burningham (1968) matched 27 pairs of pupils in two 4th grades on (a) sex, (b) IQ, and (c) reading achievement scores on the Sequential Test of Educational Progress, Form A. One 4th grade was team-taught. The other was taught by a solitary teacher. Differences between the two groups were assessed on the basis of score differences on a spring administration of the Sequential Test of Educational Progress, Form B. Scores significantly favored team-taught pupils in the areas of mathematics and science. No other score differences were significant.

Sterns (1969), using a matched classes procedure with a total group of 203 pupils, assigned three 4th grade classrooms and three 6th grade classrooms to either a team-taught or to a solitary-teacher-taught condition. Pre- and posttests were administered on mental maturity and reading achievement. The

investigator reported no significant differences between the scores of pupils in the two treatment groups.

Rhodes (1971) selected a sample of 316 pupils in grades K through 6 in an all-team-teaching school and another sample of 316 pupils in grades K through 6 in an all-solitary-teacher school. Achievement of pupils in the two schools was compared in the areas of reading, spelling, arithmetic, and attitude toward school and learning. Measures were taken at the beginning and at the end of the school year. In terms of average reading gain, the investigator reported that the solitary-teacher group scored significantly higher than the team-taught group. No other differences were significant.

Working with a population of 155 pupils, Cooper and Sterns (1973) assigned two 4th grades and two 6th grades to a team-teaching condition and one 4th grade and one 6th grade to a solitary-teacher-taught condition. Pre- and posttests included (a) the California Short Form Test of Mental Maturity, 1963 revision, Level 2 for grades 4-6, and (b) the California Reading Test of the California Achievement Tests, 1957 edition, 1963 norms, for grades 4-6. No significant differences were reported between the scores of team-taught and solitary-teacher-taught pupils.

Because the number of investigations at the elementary school level is small, generalization from findings is hazardous. Qualitative differences in experimental design further inhibit induction of grounded statements that might form the beginnings of defensible instructional prescriptions.

Realizing the limitations of the studies reported here, one still is struck by the relatively large number of investigations reporting no observed differences in the achievement of team-taught and solitary-teacher-taught pupils. There is a problem in interpreting this pattern because studies reviewed here consistently fail to provide information that would permit precise scaling of the substantive differences between what is described as a team-teaching condition and what is described as a solitary-teacher-teaching condition.

In those studies where significant differences between the two conditions were reported, those differences favored team-taught groups slightly more frequently than solitary-teacher-taught groups. To reiterate the point noted above, the importance of these findings is open for debate because of the sparse number of investigations and because of the wide divergences in design features within the investigations reported.

An intriguing hint, possibly providing a lead toward an explanation for the high number of "no significant differences" findings, is contained in Lambert, Goodwin, and Wiersma's (1965) discovery that in the second year of their study some team-

taught pupils scored significantly higher than solitary-teacher-taught pupils. While admittedly very fragmentary evidence, this finding may indicate that a teaching team requires a necessary "percolation time" before it becomes an efficient instructional unit. This conclusion is consistent with some recent work by Kennamer and Hall (1975) to be discussed in more detail in a later section of this paper.

The findings of elementary school studies are summarized in Table 1.

### *Studies Involving Secondary School Students*

Considering that the original impetus for team teaching came from secondary education specialists, it is not surprising that a greater number of empirical studies on teaming have been conducted with secondary school students than with elementary school pupils. Still, even at the secondary level, the number of reported studies is small in light of the enormous publicity that team teaching has enjoyed over the past decade and a half.

Two large scale studies (Johnson, Lobb, & Patterson, 1959, 1960) investigated academic achievement in several subject areas by comparing team-taught and solitary-teacher-taught students. No significant differences were reported in the 1959 study. With the exception of the team-taught English students, who scored significantly higher than their solitary-teacher-taught opposites, the 1960 investigation revealed no significant differences between the two groups.

Taffel (1962) matched 55 pairs of high school physics students on age, sex, grades, science-mathematics scores, intelligence scores, and scores on the Dunning Physics Test. One student from each pair was assigned to a team-taught physics class, and one was assigned to a solitary-teacher-taught physics class. Criterion measures included (a) the Dunning Physics Test, (b) the Bronx High School of Science Mid-Year Physics Examination, and (c) the New York Regents Examination in Physics. The investigator found no significant score differences between team-taught and solitary-teacher-taught students.

Georgiades and Bjelke (1964) matched 38 team-taught 9th graders with 38 solitary-teacher-taught 9th graders on the basis of (a) age, (b) sex, (c) California Test of Mental Maturity scores, and (d) Educational Testing Service Cooperative English Test (2A) (1060) total converted scores. The investigators reported no significant differences between the two groups on scores on the end-of-the-year criterion test, Form 2B of the Cooperative English Test.

In a California study (Oakland Public Schools, 1964), 7th and 8th grade students of "normal ability" who were performing an

TABLE 1  
Summary of Investigations Comparing Performances of Team-Taught and  
Solitary-Teacher-Taught Elementary School Pupils

<i>Investigator</i>	<i>Significant Differences Favoring Team-Taught Pupils</i>	<i>Significant Differences Favoring Solitary-Teacher-Taught Pupils</i>	<i>No Significant Differences Between Team-Taught and Solitary-Teacher-Taught Pupils</i>
Jackson (1964)	(5th graders) reading achievement  (6th graders) work study skills		(5th graders) science, social studies, language, work study, arithmetic (6th graders) science, social studies, language, arithmetic, reading achievement
Lambert, Goodwin, & Wiersma (1965)	(2nd year; 1st graders) reading, language, total achievement (2nd year; 2nd graders) language	(1st year; all pupils) reading, arithmetic, total achievement	(1st year; all pupils) language (2nd year; 1st graders) arithmetic (2nd year; 2nd graders) reading, arithmetic, total achievement (2nd year; grades 3-6) reading, arithmetic, language arts, total achievement
Burningham (1968)	(4th graders) mathematics, science		(4th graders) all remaining subject areas measured by Sequential Test of Educational Progress
Sterns (1969)			(4th graders and 6th graders) mental maturity, reading achievement
Rhodes (1971)		(K-6 pupils) average reading gain	(K-6 pupils) spelling, arithmetic, attitude toward school and learning
Cooper and Sterns (1973)			(4th graders and 6th graders) mental maturity, reading

average of one year below their respective grade levels were team taught. The comparison group consisted of solitary-teacher-taught 7th and 8th graders who were undifferentiated in terms of grade level performance. Gains as measured by scores from fall and spring administrations of the Sequential Test of Educational Progress in mathematics, reading, and writing (STEP, Forms A and B) and the School and College Ability Test—Academic Aptitude (SCAT, Forms 4A and 4B) were analyzed both for team-taught and for solitary-teacher-taught students. In spite of the possibility for “improved” gain scores on the part of the team-taught students of “normal ability” who were below grade level that might result from the regression toward the mean phenomenon, the investigators reported no significant differences between scores of the team-taught and the solitary-teacher-taught groups.

Klausmeier and Wiersma (1965), using five junior high schools, identified 7th grade English and social studies students of low and average abilities. Students in both groups were assigned either to a team-teaching or to a solitary-teacher-teaching condition. Some students were in homogeneously grouped classes; others were in heterogeneously grouped classes. Using teacher-made tests as measures of achievement, comparisons were made between scores of the two groups. In homogeneously-grouped classes, team-taught students of “low ability” scored significantly higher than solitary-teacher-taught students.

Georgiades and Bjelke (1966) investigated the impact of a team teaching experience involving 74 9th grade students on achievement in English. Students were enrolled in a three-hour block of instruction for algebra, English, and social studies. One hundred forty-nine students in the control group were taught by solitary teachers in each of the three subjects (algebra, English, and social studies). Criterion measures included (1) the California Reading Test-Reading Comprehension, (2) the California Reading Test-Reading Vocabulary, and (3) an English test prepared jointly by English teachers at the school where the study was conducted. The investigators reported that team-taught students scored significantly higher on the California Reading Test-Reading Comprehension and on the teacher-made test than students in the solitary-teacher-taught classes. No significant differences were found between scores of the two groups on the California Test of Reading-Reading Vocabulary.

Fraenkel (1967), utilizing a sample of 137 11th grade United States history students, assigned 63 to a team-teaching condition and 74 to a solitary-teacher-teaching condition. Unlike many other investigators of team teaching, Fraenkel devised a crite-



tion instrument that yielded achievement scores at two levels of cognitive functioning. This instrument, specifically prepared for this study, was divided into two parts. Part 1 consisted of questions emphasizing recall or recognition of facts. Part 2 demanded higher-level thinking processes and called upon students to demonstrate understanding of concepts, of the relationship of cause and effect, of historical development, and of the principles of logical inference. On Part 1 (the low level recall and memory section), the investigator found no significant differences between scores of team-taught and solitary-teacher-taught students. On Part 2 (the section calling for higher-level thinking skills), the team-taught group scored significantly higher than the solitary-teacher-taught group.

Robinson (1968) reported the results of a large-scale effort involving 17 teachers and 529 biology students from six high schools. Commendably specific in terms of his operational descriptions of the experimental conditions, the investigator reported that the 261 students assigned to the team-teaching condition were taught either by two-teacher or three-teacher teams who had total responsibility for (a) planning, (b) instruction, (c) testing, (d) grading, (e) scheduling, (f) discipline, (g) counseling, and (h) parental relations. To assure a certain minimum of small group activities, students in the team-taught group met at least 40 times a year in a group no larger than one-third the total of the group to which they were assigned. Members of teaching teams met daily as a team to plan and also worked together for two weeks during late summer to plan the year's work.

Students assigned to the solitary-teacher condition were taught by teachers who taught groups of youngsters no more than one-third the size of the three-teacher team-teaching groups or one-half the size of the two-teacher team-teaching groups. Criterion instruments included the following: (a) five locally developed unit tests given at intervals throughout the course; (b) the New York State Regents Examination in Biology given at the end of the course; and (c) the Nelson Biology Test given nine months after the course as a measure of delayed retention. The investigator found no significant differences in the achievement scores of team-taught and solitary-teacher-taught students on any of the criterion instruments.

Schlaadt (1969) assigned 57 high school health students to a team-teaching condition and 57 others to a solitary-teacher-teaching condition. Each of three team teachers also taught one class of students in the solitary-teacher-teaching condition. Achievement of students in the two groups was compared by the use of scores from the Shaw Health Knowledge Test. The inves-

tigator reported no significant differences between scores of team-taught and solitary-teacher-taught students.

Lutenbacher (1970) assigned classes of 8th and 9th grade honors social studies, honors English, and remedial English students to either a team-taught or a solitary-teacher-taught condition. Team-taught and solitary-teacher-taught classes were instructed by the same teachers. Using alternative forms of the Stanford Achievement Test as a pretest and a posttest, the investigator reported no significant differences between scores of the two groups.

Working with 145 9th grade students in English and world history classes, Gamsky (1970) assigned 74 to a team-taught condition and 71 to a solitary-teacher-taught condition. Team-taught students were exposed to both English and world history during a common two-hour time period. Criterion instruments consisted of teacher-prepared 100-item tests (true/false, multiple-choice, completion) given at the end of the first and second school semesters. At the end of the first semester, the team-taught group scored significantly higher than the solitary-teacher-taught group on the English test. There were no significant differences at this time between scores of the two groups on the world history test. At the end of the second semester, there were no significant differences between scores of the two groups on either the English test or the world history test.

Of the studies conducted at the secondary school level, few report significant differences in achievement between team-taught and solitary-teacher-taught students. Possible explanations for the frequency of these "no differences" findings may include (a) factors relating to the relatively short periods of time allotted for the alternative instructional modes to affect student achievement and (b) a possible failure of the compared instructional modes to result in patterns of teacher functioning that varied in substance as well as in name.

Of those studies in which differences were noted, the Klausmeier and Wiersma (1965) investigation reported an apparently facilitating interaction between team teaching and homogeneously-grouped low-ability students. This interesting finding suggests the possible existence of a measured-intelligence/mode-of-instruction preference, and it points, furthermore, to the possibility that research attention might be turned with profit to the whole general area of trait-treatment interactions as they might relate to the efficacy of team-teaching practices.

Fraenkel's (1967) findings suggest that team teaching designs may more efficiently facilitate learning of a more sophisticated order than do solitary teacher models. Admittedly in need of

replication, this study points to a need to develop criterion instruments that bring to light possible differences in cognitive functioning of team-taught and solitary-teacher-taught students.

The findings of investigations focusing on secondary school students are summarized in Table 2.

### *IGE: A Broad-Scale Application of Team Teaching*

A difficulty with the studies of team teaching reported in preceding sections has been their isolation from one another. These generally small-scale investigations typically have focused on small numbers of teachers and students over a short period time. Most of these investigations studied team-teaching practices that had been in operation for no more than a single academic year. Even if most of the studies had reported a generally facilitating effect on achievement for team teaching programs (which they did not), generalizability of findings would be restricted because of a lack of consistent patterns of procedures and practices across reported studies.

Large-scale efforts to incorporate team teaching into consistent and well-defined programs in impressive numbers of schools over long periods of time have been few. Perhaps the best known of these large-scale projects has been the Individually Guided Education program, IGE, developed by Herbert J. Klausmeier and others at the Wisconsin Research and Development Center for Cognitive Learning. In 1969, the Institute for Development of Educational Activities, I/D/E/A, joined forces with the Wisconsin Center to promote the spread of the IGE program. At present, IGE multiunit schools number in the hundreds.

IGE incorporates, as part of the total system, a teaching team composed of a unit leader, three to five teachers, and other support personnel. But IGE includes much more than team teaching alone. Indeed,

...IGE supporters claim it is a total system of... education—one concerned first with changing the organization for instruction and the related staffing pattern so that instructional improvements can more readily occur. (Holzman, 1972, p. 5)

IGE, as a system, represents a composite of a number of elements. Developers of the program promote the view that educational innovation frequently has meant piecemeal, fragmented introduction of changes. The IGE response has been a program that

encourages the adaptation of some of the most talked about innovations of the past two decades—team teaching, differentiated staffing, inquiry-directed learning, multi-age grouping, peer instruction, open classrooms, continuous progress learning, programmed instruction, computer-assisted instruction and others. (Holzman, 1972, p. 4)

There has been a great deal of evaluation of IGE programs, but relatively little of it has focused upon learner achievement. One such report, issued by the Cedarburg, Wisconsin, Public Schools, presented results of an evaluation after the IGE program had been operational for three years. This report revealed increases in Iowa Basic Skills Test raw grade equivalent scores between the fall of 1966 (pre-IGE) and the spring of 1972 in grades 3, 4, and 5 in reading, language, work study skills, mathematics, and total test achievement. (Cedarburg, Wisconsin, Public Schools, 1972). Significances of these increases were not reported.

The Janesville, Wisconsin, Public Schools reported a comparison of the scores of 2nd and 6th grade pupils from schools that had been on the IGE program for three years and schools that were still in transition from traditional to IGE programs. Second graders in IGE schools were found to have Metropolitan Achievement raw scores higher than 2nd graders in transitional schools in word knowledge, word analysis, reading, total reading, spelling, math computation, math concepts, math problem solving, and total math. Sixth graders in IGE schools had higher Metropolitan Achievement raw scores in word knowledge, reading, total reading, language, math computation, math concepts, math problem solving, total math, science, and social studies. (Janesville, Wisconsin, Public Schools, 1972). Significances of raw score differences were not reported.

A 1973 report issued by the Wisconsin Research and Development Center for Cognitive Learning presented findings of a two-year evaluation designed to compare pupil performance in the pre-IGE year 1970 and in 1972, when IGE was the adopted program, in 23 inner city and suburban schools. Based on data from the Cooperative Primary and the Stanford Achievement batteries on word attack skills, evaluators concluded that, at most grade levels, pupils in 1972 scored significantly higher than their 1970 counterparts. (Wisconsin Research and Development Center for Cognitive Learning, 1973).

A report, issued by I/D/E/A in 1975, reported the results of a survey of principals in IGE schools. Of the principals surveyed during the 1974-1975 academic year, 7% reported significantly higher reading and/or verbal achievement scores by their pupils, and 5% reported significantly higher mathematics and numerical achievement scores by their pupils since the adoption of the

TABLE 2  
Summary of Investigations Comparing Performances of Team-Taught  
and Solitary-Teacher-Taught Secondary Students

<i>Investigator</i>	<i>Significant Differences Favoring Team-Taught Students</i>	<i>Significant Differences Favoring Solitary-Teacher-Taught Students</i>	<i>No Significant Differences Between Team-Taught and Solitary-Teacher-Taught Students</i>
Johnson, Lobb, & Patterson(1959, 1960)	(1960) English		(1959) language arts, English, plane geometry, American history (1960) social studies, geometry, science, business education
Taffel (1962)			physics
Georgiades & Bjelke (1964)			English
Oakland Public Schools (1964)			mathematics, reading, writing
Klausmeier & Wiersma (1965)	(low ability students, homogeneously-grouped classes) English, social studies		(low-ability students, heterogeneously grouped classes) English, social studies

		(average-ability students, homogeneously grouped classes) English, social studies
		(average-ability students, heterogeneously grouped classes) English, social studies
Georgiades & Bjelke (1966)	reading comprehension	reading vocabulary
Fraenkel (1967)	(using criterion instrument demanding higher level thinking skills) United States history	(using criterion instrument demanding recall and memory skills) United States history
Robinson (1968)		biology
Schlaadt (1969)		health
Lutenbacher (1970)		social studies, English
Gamsky (1970)	(after one semester) English	(after one semester) social studies (after two semesters) English, social studies

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IGE program (Paden, 1975). The principals' criterion instruments and levels of alpha selected for determining significance were not reported.

The strength of these reports of learner achievement in IGE schools is that, collectively, they begin to build a data base around widespread practices that are similarly executed in a large number of schools. Unlike the independently undertaken, and often fragmented, empirical studies of team teaching reported earlier, there is a heartening commonality among the practices addressed by the data gathered from IGE schools. Yet, despite these positive points, little can be generalized about the impact of team teaching on achievement from these evaluations of IGE programs.

Reports based on data collected from IGE schools suffer from comparisons made between and among nonrandomly selected populations, investigator commitment to the success of IGE programs, and from other problems, as such figures as Hemphill (1969) have pointed out, that are commonly associated with evaluation studies as opposed to purely investigative research studies. Compounding the interpretive difficulty is the complex design of the IGE program. IGE involves the simultaneous introduction of a large number of innovations, sometimes as many as nine at once. Given this simultaneous infusion of multiple variables, measured gains in learner achievement cannot logically be attributed to team teaching alone—or to any other single variable that might be of interest.

A tacit assumption of the developers of the IGE program seems to have been that each innovation included in the total program had been previously validated. Consequently, no need may have been felt to design IGE programs in such a way that the specific impact of each constituent innovation could be assessed. This situation, while presenting difficulties for the individual interested in determining the impact of team teaching on learning, must be approached in the realization that the IGE program was designed more to promote a process of collective decision-making and professional cooperation than to provide an opportunity for researchers to assess the impact of instructional innovations.

Considering the purposes for which IGE was intended, it is not surprising that evaluation reports on IGE schools overflow with data on attitudinal issues and refer much less often to learner achievement. The importance of the IGE program to team teaching resides more in its illustration of the wide appeal of the innovation than in its utility as a research vehicle that can serve as a laboratory for testing the efficacy of teaming as a promoter of academic achievement.

### *Conclusions*

The relatively small number of studies on team teaching as it affects achievement (the topic has practically disappeared as an area of research interest since 1970) may have resulted from the wide coverage given the innovation in professional educational journals in the late 1950's and early 1960's. A series of articles by J. Lloyd Trump in the *National Association of Secondary School Principals Bulletin* described the procedure to leading decision-makers and provided a great deal of descriptive data regarding the innovation's successes in pilot schools. (Trump, 1957a, 1957b, 1957c, 1958a, 1958b, 1958c, 1959). This exposure spawned dozens of other articles of a more descriptive and, in some cases, of a purely promotional nature. This heavy media coverage may have planted the idea that this widely-heralded innovation sprang forth from a solid base of research evidence. In such a context, thoughts about validating team teaching as a facilitator of achievement may have been dismissed as trivial, perhaps even petty, attempts to attack intuitive "truth."

Some recent work at the Research and Development Center for Teacher Education at the University of Texas at Austin has focused on teachers' "stages of concern" about team teaching as an innovation. Hall and Rutherford (1975) reported results of a stages-of-concern checklist distributed to 307 teachers. These teachers varied in terms of their having had either (a) no experience with teaming, (b) less than one year of experience with teaming, (c) less than two years of experience with teaming, (d) less than three years of experience with teaming, or (e) more than three years of experience with teaming. Regardless of their length of experience with teaming, teacher respondents' concerns about student achievement ranked relatively low. This finding suggests that teachers may view team teaching as having primary benefits not associated with learner achievement. If other priorities rank higher among teacher concerns about team teaching—concerns about organization and concerns about working with others for example—perhaps it is not surprising that there have been few investigations directed at determining the impact of team teaching on achievement.

Many of the studies reviewed in the elementary and the secondary school sections of this paper reported findings of no significant differences in achievement scores of team-taught and solitary-teacher-taught learners. Rutherford (1975) reports on the use of a newly-developed "level-of-use" instrument that may provide a partial explanation for the frequent absence of observed differences. The level-of-use instrument scales users' involvement with an innovation across seven categories, from a



level characterized by no knowledge of the innovation through a level characterized by sufficient knowledge and use of the innovation that substantive changes, based on the innovation's impact on learners, are contemplated. After administering this instrument to 411 team teachers, Rutherford (1975) found that most were either still coping with mechanical and administrative problems associated with team teaching or were settling into a routine pattern of use characterized by little concern for the innovation's impact on learner achievement. Rutherford concluded that most of the 411 teachers appeared to view team teaching as an administrative management scheme having little connection with the nature of the instructional process. This observation suggests that instructionally, in terms of patterns of interaction between teacher and learner, there may be few differences between practices that are labelled "team teaching" and others that may be labelled "solitary teacher teaching."

The study by Charters and Jones (1974) provides added support for the implication derived from Rutherford that teacher *use* of an innovative practice is the critical variable that must be controlled if significant impact on learner achievement is to be realistically expected as a consequence of the introduction of that innovative practice. These investigators conducted a careful analysis of an earlier report in which no differences in achievement were noted between team-taught and solitary-teacher-taught learners. They discovered that, in terms of actual patterns of instruction, there were no substantive differences between the two teaching conditions. Rutherford's work, taken together with that of Charters and Jones, suggests that failure of many of the studies reported here to note significant differences in achievement may have resulted from investigators' failure to attend well to the degree to which team teaching represented a real change in actual instructional practice.

Another factor contributing to the infrequent incidence of significant differences in achievement in reported studies may relate to researchers' attempts to make comparisons between groups after too short a period of time. Studies reported in the elementary and secondary school sections of this paper were typically based on instances of team-teaching behavior of no more than the duration of a single school year. Hall and Rutherford (1975) and Kenamer and Hall (1975) report that a minimum of three years of teaming is required before team members become operationally comfortable with the innovation. Findings of these investigators suggest that many studies in this area have made comparisons before team members had gone through a settling-in period of sufficient length for them to become truly proficient.

Although frustrating in terms of the revelation that dependable answers are not yet at hand, the reported studies of team teaching do begin to bring into tighter focus some of the issues investigators might profitably continue to pursue. These issues fall into two broad categories, (a) methodological issues and (b) substantive issues. Before specific substantive issues can be properly addressed, methodological issues must be confronted and resolved. Generalizability of findings across different studies of team teaching would be enhanced if researchers would provide specific information regarding the following:

1. *Number of innovations being attempted*      Is team teaching the only innovation being introduced? If others, what are they? How will multiple innovations be integrated into the program?
2. *Training in use of team teaching*              What training was provided for people on teaching teams?
3. *Length of time people on team have been functioning together as a team*      How long have the same people worked together on teaching teams?
4. *Organization of learners*              How many total learners are there? Are they heterogeneously or homogeneously grouped? What factors were considered in grouping decisions? What percentage of time do learners spend in large group instructional settings? In small group meetings? In independent study sessions?
5. *Specific teachers responsible for strategies used with learners in each learning configuration*      Are all teachers involved in a symposium-like presentation to the large group? Does one teacher alternate with another in preparing large group presentations? Does each teacher take the large group for a block of time when learners study mate-

- rial in his area of expertise?  
Do several teachers handle small groups together?  
What is role of paraprofessionals in both large and small group settings? . . . etc.
6. *Teaching strategies used in each configuration*      What strategies are used in large group sessions? In small group sessions? With individuals?
7. *Criteria used to assess achievement*      Are criteria standardized, readily available tests capable of being obtained for use in replications of research? Do examinations test cognitive functioning at several levels? What response modes are demanded of students taking examinations? . . . etc.

The studies reported here, although reasonably good in describing the composition of teaching teams and the criterion instruments used and marginally adequate (in most instances) in describing the learner population sampled, failed to provide much detail about the day-to-day organization of learners, strategies selected, and patterns of interaction with learners. Without more operational specifics concerning these practices, which relate to how the innovation of teaming was actually used, any comparisons between team teaching and solitary teacher teaching must remain at a very superficial level. Research findings based on such comparisons will be of dubious utility as guides to the refinement of educational practice.

If one looks on the bright side and assumes the resolution of many of these thorny methodological problems, what issues of substance might researchers interested in team teaching and academic achievement profitably pursue? A number of questions, derived from studies reviewed, are listed below:

1. Is team teaching of homogeneously grouped learners likely to result in higher levels of learner achievement than team teaching of learners in heterogeneously grouped classrooms?
2. Does team teaching promote learners' abilities to function

- at higher cognitive levels more efficiently than solitary-teacher teaching?
3. Do learners taught by teacher teams who have worked together five or more years achieve more than learners taught by teacher teams who have taught together only three years?
  4. Do learners in team-teaching classes involving two teachers achieve more than learners in team-teaching classes involving more than two teachers?
  5. Do learners assigned to teacher teams staffed by individuals with a firm conviction that team teaching is a better way to teach than solitary-teacher teaching achieve more than learning assigned to classes taught by solitary teachers?
  6. Do learners achieve more in classes where members of teaching teams plan and teach only in areas of their own major expertise than they do in classes where members of teaching teams occasionally plan and teach in areas going beyond their major areas of expertise?
  7. Do learners who have been team-taught for two or more years achieve more than learners who have been team-taught for one year?
  8. Do learners entering a solitary-teacher-taught class after having been previously team-taught achieve more than learners entering a solitary-teacher-taught class from a previous solitary-teacher-taught class?

In summation, one is struck by the very basic nature of the questions for which research has failed, after fifteen or more years of team teaching, to supply at least tentative answers. Team teaching, it is evident, represents one of those educational practices that have not been subjected to truly intensive and systematic investigation. Support for team teaching has been more of a validation through affirmation than a validation based on empirical evidence. At this juncture, little in the research literature provides solace either for team teaching's critics or its most ardent supporters.

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