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AN ALTERNATIVE TO SELF-CONTAINED, AGE-GRADED CLASSES.

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THIS PAPER DESCRIBES THE RESEARCH AND INSTRUCTION (R/I) UNITS WHICH WERE ORGANIZED IN ELEMENTARY SCHOOLS IN FIVE WISCONSIN CITIES TO IMPROVE STUDENT LEARNING AND TO FACILITATE SCHOOL-RELATED RESEARCH, DEVELOPMENT, AND INNOVATION. EACH UNIT IS COMPOSED OF A LEADER (TEACHER SPECIALIST), CERTIFIED TEACHERS, NONCERTIFIED AIDES, AND STUDENTS. THE NUMBER OF PERSONNEL VARIES ACCORDING TO THE NUMBER OF STUDENTS IN A GROUP. AN IMPORTANT FEATURE OF THE R/I SCHOOL IS THE INSTRUCTIONAL DECISION-MAKING COMMITTEE MADE UP OF THE PRINCIPAL AND UNIT LEADERS. WHEN TEST SCORES IN THE EXPERIMENTAL R/I UNITS WERE COMPARED WITH SCORES IN CONTROL SCHOOLS, THE R/I UNIT CHILDREN SHOWED GREATER GAINS IN SPELLING, LANGUAGE, VOCABULARY, AND ARITHMETIC. "DRAMATIC" FIELD TEST RESULTS WERE OBTAINED IN ONE SCHOOL SERVING DISADVANTAGED CHILDREN, WHERE STUDENTS HAD A GREATER THAN EXPECTED GAIN IN MEAN PERFORMANCE ON THE STANFORD ACHIEVEMENT TEST. IT IS FELT THAT THESE DATA SHOW THAT IT IS POSSIBLE TO NARROW THE ACHIEVEMENT GAP BETWEEN DISADVANTAGED AND AVERAGE STUDENTS. THE PAPER ALSO DISCUSSES SUCH INNOVATIVE INSTRUCTIONAL METHODS AS INDIVIDUAL CONFERENCES, THE USE OF OLDER CHILDREN AS ARITHMETIC HELPERS, THE OFFER OF SMALL REWARDS TO STIMULATE READING. THESE R/I UNITS ARE SAID TO BE VERY HELPFUL TO THE BEGINNING TEACHER WHO BENEFITS FROM FREE PERIODS FOR PREPARATION AND FROM THE GUIDANCE OF THE UNIT LEADER. (NH)

AN ALTERNATIVE TO SELF-CONTAINED, AGE-GRADED CLASSES*

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During the second year, 1965-66, of the Wisconsin Research and Development Center for Cognitive Learning, a new organization was developed in local school buildings of Janesville, Madison, Manitowoc, Milwaukee, and Racine. The organization is designed to improve student learning and also to provide a facilitative environment for school related research, development, and innovation. The 1966-67 school year was the second year in which these organizations, called R & I (research and instruction) Units, functioned in elementary schools of the preceding Wisconsin cities. Preliminary data are now available to indicate how well the R & I Units have performed their several functions.

What is an R & I Unit? It is the basic unit of a new instructional organization within the elementary school in which new roles exist for teacher leaders and noncertified personnel. A Unit is comprised of the Unit leader, two or more certified teachers, one or more noncertified aides, and the students. The number of certified and noncertified personnel varies according to the number of the students. The Unit leader is responsible for the instructional program, and teaches from one-half to two-thirds of the school day. The certified teachers carry out the usual instructional responsibilities, operating as a unit rather than as self-contained classroom teachers. The noncertified personnel perform

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a variety of secretarial, management, and other school-related activities under the leadership of the Unit leader and teachers. The best features of team teaching are incorporated into the instructional practices of the Unit.

Features going beyond the best of team teaching practices are currently being operationalized as schools, which had only one or two Units last year, are wholly organized on the unit basis this year. An important feature of the R & I school is the instructional decision-making committee comprised of the building principal and Unit leaders. Figure 1 makes clear the organization of the elementary school.

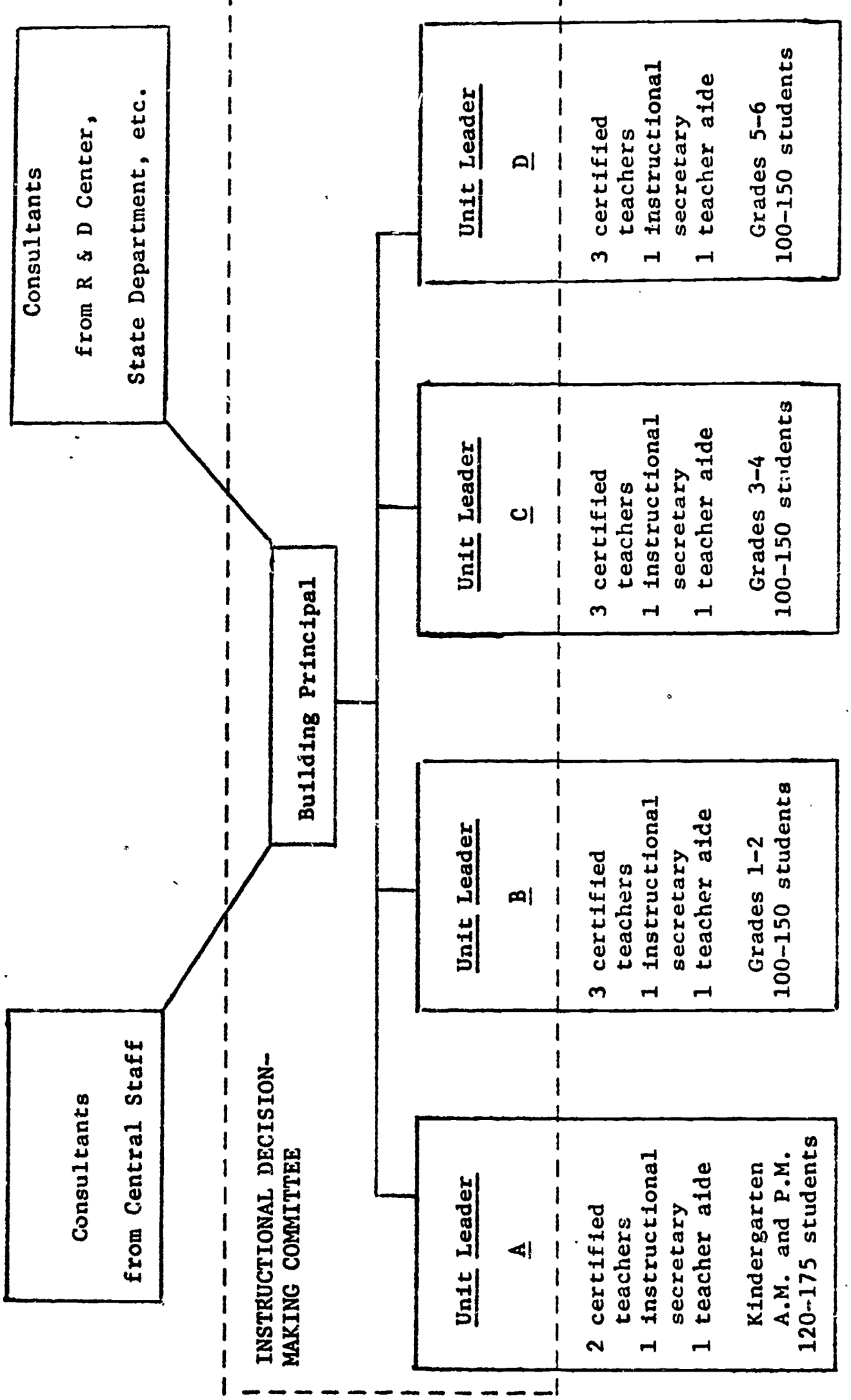
[Figure 1 here]

The instructional decision-making committee meets at least weekly, and works with consultants from central staff, the R & D Center, and the State Department of Public Instruction. Decisions made by the committee are executed through the Unit leader. Advantageous aspects of the building organizations are that (a) time during regular school hours is provided for planning the instructional program, (b) the instructional program for an entire school is clearly articulated, (c) the effectiveness of the principal is enhanced by the increased time for working with instructional personnel, and (d) the opportunity for teachers to operate at a professional level is increased.

While the description of a school organization necessarily emphasizes staff functions, it is the effect of this organization upon pupil learning which is of primary concern. First, let us look at some of the outstanding gains made by children in R & I Units indicated by the field test data for which fall and spring scores on standardized achievement tests were obtained. In most instances, similar data were

Figure 1

PROTOTYPE ORGANIZATION OF ELEMENTARY SCHOOL



collected in a control school chosen to be as similar to the R & I school as possible. In some instances, however, substantial differences between R & I and control schools, such as ten point differences in mean IQ, were subsequently found to exist, thus precluding meaningful comparison of academic growth of the two pupil groups. In such cases, gain scores of the R & I pupils alone were considered.

In a fourth grade R & I Unit in Manitowoc, where research in individualization of spelling was conducted, both experimental and control subjects in the R & I Unit had fall means on the spelling subtest of the Iowa Tests of Basic Skills of 4.4. The experimental group made 1.6 years gain, the control group 1.4 years gain in a seven-month period. Thus, the typical child's standing relative to other fourth graders in the nation was at the 58th percentile in the fall and the 74th percentile in the spring, a substantial improvement.

In a Janesville sixth-grade R & I Unit emphasizing improvement in spelling, field test data indicated that mean achievement in spelling and language was below grade level despite a mean IQ of 107. The control group in another school building were superior both in IQ and achievement in the fall, but R & I pupils made average gains as large or larger than control school pupils. The gains of the R & I pupils in a seven-month period were 1.1 years in spelling and 1.3 years in language. Evidently the achievement rate of these children changed from slightly below average to above average during the period of time they were in an R & I Unit.

A Milwaukee school, located in a predominantly Spanish-American neighborhood, had an R & I Unit for children of fourth and fifth grades. The nine-point difference in mean IQ between the R & I school and its

controls favored the controls. This R & I school's mean IQ was 87, the three control schools' mean was 96. This difference was reflected in the fall achievement scores of the fourth-graders—for the R & I school, typical achievement across Stanford subtests was at the 20th percentile, that of control school pupils above the 30th percentile. R & I pupils, nevertheless, made greater gains in vocabulary and arithmetic concepts than did the control pupils. In arithmetic concepts, an area in which an experiment was undertaken, pupils averaged five months gain to four months for control school students. Such progress is at least as good as that typically made in previous six-month intervals by children in this school.

In Racine, for a fifth-grade Unit in a school primarily serving disadvantaged youngsters, dramatic field test results were obtained. Evidence of the initial comparability of control and R & I schools exists. Yet, on three of the nine Stanford subtests administered in the spring, the R & I group performed significantly better and on four more subtests performed somewhat better than the control school. The gain scores are even more impressive, and range up to an average of 1.2 years in word meaning for a group with a mean IQ of 96. The median gain across subtests for the R & I Unit was seven months. This greater than expected gain is all the more remarkable for a group whose previous mean performance was one to almost two years below grade level on the various subtests in October. The Unit staff seems to have succeeded here in narrowing the gap between the achievement of these disadvantaged students and the average student. The usual trend, of course, is for the gap to widen as the students progress through the grades.

Similar results were obtained at another Racine school where a fifth-grade group averaged seven months gain across Stanford subtests in the

six-month interval between test administrations. Substantial gains were made in areas most closely related to the language arts developmental project: 1.1 years in word meaning, nine months in spelling, seven months in reading. Parenthetically, one can't help but wonder what great gains in creative expression would have been found had we been able to measure the real outcome of the language program.

In a completely unitized Madison school, only at the second primary year, was the same test administered fall and spring so that gain scores could be calculated. The gains for this one level were impressive. On the Gates-MacGinitie Reading Tests these children gained 13 and 15 months in vocabulary and comprehension respectively during a six-month period. Even so, ceiling effects of the test in the spring were noted.

Now let us turn to the results of some of the research and developmental activities undertaken within the Units from which significant results were obtained.* We are concerned here with indicating how the R & I Unit contributed to the second main objective, namely, facilitating school-related research, development, and innovation.

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*More complete descriptions of the research and developmental activities reported herein and their evaluation will be found in a series of Technical Reports to be issued by the Wisconsin Research and Development Center for Cognitive Learning later this year:

Research and Development Activities in R & I Units of Two Elementary Schools of Manitowoc, Wisconsin 1966-67, James L. Wardrop, Doris M. Cook, Mary Quilling, and Herbert J. Klausmeier, R & D Center; Constance Espeseth and Carolyn Grout, Manitowoc Public Schools.

Research and Development Activities in R & I Units of Two Elementary Schools of Janesville, Wisconsin 1966-67, Doris Cook, James Wardrop, Glenn Tagatz, Mary Quilling, R & D Center; Dwane Kamla, Edna Shuman, Janesville Public Schools.

Research and Development Activities in R & I Units of Two Elementary Schools of Milwaukee, Wisconsin 1966-67, Mary Quilling, Doris Cook, James Wardrop, and Herbert J. Klausmeier, R & D Center; Ruth Baldwin and Caroline Loose, Milwaukee Public Schools.

In a Racine school, the arithmetic progress of third-grade students in two treatment groups was compared. One group, using arithmetic folders in which concepts were listed, colored in a square whenever a skill was demonstrated at criterion. Pupils in the other group had an individual conference in conjunction with the coloring of squares. Achievement of the group having both folder and conference was significantly better on a teacher-made test. Apparently, the informative feedback and one-to-one contact together were effective in motivating students to perform better.

Another motivational procedure was found effective in an Inner City school in Milwaukee whose student body was predominantly Negro. Sixth-grade pupils were randomly assigned to be helpers in arithmetic for first graders. The sixth-graders were briefed weekly by the first-grade Unit staff regarding concepts being emphasized and appropriate games and concrete devices to use in building the first graders' understanding of the concepts. While all first graders received the same mathematics instruction four days a week, the experimental group met with their helpers the fifth day. The performance of the experimental children on a teacher-constructed test of arithmetic concepts was significantly better than the performance of the control students. The results of this experiment lead one to believe that older children who can identify with a teacher serve as effective models for younger children of the same ethnic background.

Research and Development Activities in R & I Units of Five Elementary Schools of Racine, Wisconsin 1966-67, Herbert J. Klausmeier, Mary R. Quilling, and James Wardrop, R & D Center, editors.

Research and Development Activities in R & I Units of Four Elementary Schools in Madison, Wisconsin 1966-67, Herbert J. Klausmeier and Mary R. Quilling, R & D Center, editors.

In another Inner City school in Racine, a third motivational technique worked well. Seventy-two third-grade children who had previously shown scant interest in reading library books, read over 2,000 books after a reward system was implemented. Upon reading a book, the child reported to an adult, either one of the Unit staff or a volunteer "Racine reading listener." The child was rewarded for reading single books initially and several books subsequently with inexpensive objects, such as a Batman pencil, crayons, and a Tiny Golden book. The results of this developmental study indicate that relatively small rewards may effectively motivate disadvantaged children. Confounded with these results, of course, are the effects of individual attention given by the adult listening to the child read and report.

An investigation of language enrichment experiences appropriate for the disadvantaged kindergarten child led to the conclusion that an overdose of language experiences in place of play-time activities facilitated the development of communication skills. On a teacher-made test of vocabulary and comprehension, the experimental group performed significantly better. Results of language enrichment programs in other units often yielded inconclusive results, probably because of the short duration of some of the studies. This particular experiment, conducted in Racine, provided convincing evidence that a carefully designed year-long program <u>can</u> make a difference.

Finally, let us consider the results of Racine experiments in handwriting in which traditional and individualized approaches were contrasted. The individualized groups, at both the third and fourth grade levels, performed consistently better than did pupils receiving traditional

instruction. Furthermore, boys and girls performed better on the average than did pupils in a statewide sample of fourth graders rated on the same scale and by two of the same judges as the R & I pupils. These results indicate that the experiments had a positive effect on the students' handwriting and that individualization was successful despite the lack of significant differences in the analysis.

These handwriting studies, as well as some of the other experiments also illustrate the fact that frequently all children benefit from an experiment even though some are assigned to traditional treatments. Whether the great gains across all groups are due to Hawthorne effect, extra teacher preparation, or enthusiasm, is not known. In a number of Units last year significant differences were not found between treatments but gains beyond expectancy were noted for the typical pupil in any treatment group. These results should allay the doubts expressed by some that the control pupil receives no benefits by participating in an experiment.

While the preceding results suggest that the R & I Units performed their instructional, research, and development functions well, not all R & I Units had such encouraging test results. For five of the twenty-three Units, field test data indicated that expected gains across subjects were not realized. Several hypotheses can be offered to account plausibly for less favorable outcomes. First is the inadequacy of paper and pencil tests for measuring some of the instructional objectives of the R & I Units. It is, in fact, surprising that some R & I Units made such gains on standardized tests when curricular innovations were emphasized in the instructional program. In the Racine Unit in

which a creative writing project was undertaken, for instance, the type of objective data by which the program was evaluated consisted of proof-reading tasks, such as making corrections of capitalization and punctuation in a written sample.

Secondly, one may look at characteristics of the Unit which could prevent its functioning in a manner that would promote pupil learning. Some Unit leaders did not have the leadership potential essential to their effectively coordinating the instructional program and building rapport among the staff. Other personnel problems, such as resignation or prolonged illness of either the Unit leader or a teacher prevented smooth functioning of three Units.

Finally, the desired physical environment for an R & I Unit was not provided in some school buildings. While structural changes were made in some buildings, and additional equipment supplied in many others, some Units were handicapped by both a shortage of supplies and inadequate facilities. Units whose teaching stations were located on different floors, or had no large group meeting place, could hardly be expected to match the scheduling flexibility or cooperative planning of the Unit having adjacent rooms of various sizes.

Despite these problems, only three of the twenty-three Units were unable to continue under the new organizational pattern throughout the year.

Enrollment changes affected the functioning of two Units. In one instance, the number of pupils was too small to justify a Unit organization, and a single classroom teacher was able to handle instructional duties adequately. The opposite problem--unexpectedly large enrollment--hampered the effectiveness of another Unit. The third Unit was

discontinued because of the resignation of the Unit leader.

All of the twenty remaining Units participated in at least one research or development activity. This, coupled with the fact that positive instances of test results far outweigh the negative indicate that despite inevitable problems of adjustment to a new organizational pattern, teachers were able to provide excellent instruction while pursuing research and development activities. Test results, of course, do not tell the whole story as far as positive outcomes are concerned either.

To assess favorable outcomes other than those based upon test data and significance tests, one must consider data which is subjective in nature. To this end, representatives of the five school systems* in which R & I Units were located described innovations and procedures and evaluated other aspects of the R & I approach to organizing an elementary school.

In Manitowoc, evaluation of the spelling study cooperatively planned by the school system and R & D Center personnel, has led to extension of the procedures to other classes. Specifically, different spelling programs are being used for low achievers in spelling than for other pupils. This promptness in utilizing results of last year's experiment and in planning corroborative study with an expanded sample illustrates how research and development may truly become an integral and vital aspect of the school program.

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*The authors acknowledge with appreciation the responses of Miss Helen Hoyer, elementary consultant, Manitowoc Public Schools; Mr. Earl Nelson, Principal, Racine Public Schools; Miss Ruth Saeman, Reading Consultant, Madison Public Schools, and Unit leaders Dwane Kamla of Janesville and Mrs. Caroline Loose of Milwaukee to the request for this information.

One of the largest developmental projects of the 1966-67 school year took place in Madison, where the only completely unitized school was located. Evaluation of the project has just begun. It is interesting, however, to consider how the R & I Unit structure facilitated development of the reading program. The project was initiated by the Unit leaders, who felt the need for continuity and organization in a multitext and individualized approach to the instruction of reading. While the initial plan was to level the texts and other material being used, Professor Wayne Otto from the R & D Center proposed a leveling of the skills instead. After the Unit leaders, assisted by the teaching staff, defined the goals of the reading program, they and the Madison reading consultants ordered the skills according to levels. Central staff personnel, R & D Center assistants, and the Unit leaders participated in creating assessment exercises. The preparation of a prototypic guide for implementation of the program was the joint work of the reading specialists in the school system and R & D Center. Other persons instrumental in expediting the project include the elementary director, who established a policy of cooperation between the system and Center in his role as curriculum leader, and the principal, whose administrative planning made possible the participation of the Unit leaders. Implementation of the program is proceeding during the current year in four Madison schools, including the one in which it originated.

Nor do the research and development activities alone account for the innovations which appeared in virtually all R & I Units. Typically students and teachers changed rooms throughout the day and met in groups of various sizes and characteristics. In Janesville, for instance, the R & I organization was found to provide the flexibility needed to

organize activities for social studies and science units. Large group instruction was used for audio-visual presentations, and both homogeneous ability and interest groups were formed for other purposes. Thus it is evident that R & I Units provided a physical setting in which innovations not amenable to the self-contained classroom can be carried on in conjunction with or apart from research and development projects.

The professional growth of the staff constitutes another objective of the organization. Particularly notable are the opportunities it provides for inducting beginning teachers into the profession. Whereas the beginning teacher placed in a self-contained classroom must largely rely on her own resources from the first day of school, one assigned to an R & I Unit has several sources of daily and immediate assistance available. In a Milwaukee R & I Unit, a first-year certified teacher had at least four free periods a week, some of which coincided with free periods of the Unit leader or another experienced teacher. These free periods were used for preparation, orientation to school system procedures, and discussion of student problems. The Unit leader, in addition to helping this teacher at team meetings, met with her each morning to consider classroom concerns, and attended staffing conferences held between the teacher, principal, and social worker, thus supporting her in discipline situations. Initially, the Unit leader and teacher together made home visits. Demonstration lessons were performed by all experienced members of the Unit for the new teacher. The experienced teachers also handled large group instruction at the beginning of the year, giving the beginning teacher an assisting role. Through the Unit leader curriculum

assistance from the central office was arranged on a regular basis. Belonging to the R & I Unit staff thus helped the new teacher effectively meet problems of preparation, discipline, and individual differences. Her professional growth was facilitated by the types of in-service arrangements possible in an R & I Unit. Similar opportunities existed for interns assigned to R & I Units in Manitowoc and Janesville.

R & I Units furthermore provided a unique setting for differentiated teaching roles to evolve. The position of Unit leader gives the competent teacher with leadership capabilities an opportunity for advancement without leaving teaching. Where the position is adequately compensated and recognized, it is expected to reduce the exodus of the professional from classroom to office. As Unit leader, the experienced teacher serves as an instructional leader with teaching responsibilities only a portion of each day. Curriculum planning and coordination of instruction are major uses of the hours from which the Unit leader is released from teaching.

While staffing patterns varied greatly among Units, almost all made use of paraprofessionals. In some Units these auxiliary personnel were used chiefly to free the teacher from routine clerical tasks and from supervisory tasks, such as lunchroom or playground duty. Other Units found that teacher aides could effectively work side by side with the teacher involved in instructional tasks. The R & I Unit staff has the opportunity to explore and evaluate the potential uses of the paraprofessional. In the opinion of one Racine principal, the supervision of the Unit leader and team organization led to better use of teacher aides than in the self-contained classrooms in his school.

The preceding preliminary information regarding the progress of the staffs of R & I Units in fulfilling their roles--as capable instructors, as researchers and innovators, and as professionals--is encouraging. During the current year seven elementary schools in Janesville, Madison, and Racine have been completely unitized, thus extending the concept of an R & I Unit to an R & I school. Field-test information in greater detail is being collected from a larger number of students. While much of the energy and enthusiasm of Unit staffs last year was dissipated by the need to adjust to the new situation and to develop procedures to maximize the opportunities for flexibility and cooperation, many of these organizational difficulties have now been averted. Some Units were ready and experienced in working as Units on the first day of school. Thus, there is every reason to expect an even more favorable evaluation at the end of the current year.