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ABSTRACT

Two studies examined the effectiveness of the Multicultural Reading and Thinking Program (McRAT), in which teachers infuse higher-order thinking strategies and performance-based assessment into classroom instruction. Four broad categories of thinking skills are included: analysis, comparison, inference/interpretation, and evaluation. In the first study, 234 McRAT students (grades 4-6) in 16 classrooms and 106 comparison students in 12 classrooms in 6 Arkansas schools were administered pre- and post-writing assessments. The second study, a follow-up of the first study, involved 53 second-year McRAT students who were in the first study and 53 first-year McRAT students enrolled in 20 McRAT classrooms. Assessments similar to those of the first study were used. Results of the first study indicated that: (1) McRAT students significantly exceeded comparison classes on all four thinking skills on the posttests; (2) far more comparison students were "off-task" than McRAT students on posttest measures; and (3) no statistically significant differences were found for boys and girls, white and minority students, and grades 4, 5, and 6. Results of the second study indicated that the differences between the posttest means were less dramatic than in the first study; however, the second-year McRAT students did display a slight advantage over their first-year counterparts. Findings of both studies suggest that McRAT students demonstrate significant increases in higher order thinking, and that these effects are independent of gender, prior achievement level or ethnic background. (Four tables of data are included.) (RS)

Multicultural Reading and Thinking Program (McRAT)

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This paper describes two studies reporting the results of student assessment for the Multicultural Reading and Thinking Program (McRAT). McRAT was developed by the Arkansas Department of Education. Through a intense staff development process, teachers are taught to infuse higher order thinking strategies and performance-based assessment into classroom instruction. Students' thinking is assessed through essays that employ the four types of reasoning that are the focus of the McRAT program. Analyses of McRAT students' essays reveal increased ability to reason and to communicate ideas through writing as compared to students in non-trained teachers' classrooms. Results are consistent regardless of students' gender, race or prior achievement level. Chapter 1 students' gains are particularly striking. Additionally, there is some evidence that students transfer McRAT thinking strategies to other academic subjects and real life situations.

McRAT embodies much of what has been learned from contemporary research about effective contexts for learning, staff development, literacy, and assessment. Further, it empowers teachers to deliver effective instruction to the wide range of abilities found in regular classrooms - including special education students, Chapter 1 and gifted students, as well as the "average" students. The program incorporates research on effective reading comprehension instruction, the interrelationship of reading, writing and thinking, effective staff development, the relationship of effective teaching and assessment, and the need for multicultural content in a increasingly more diverse nation.

Wells (1990), Graves (1983), and Anderson (1983), among others, have emphasized that reading comprehension is enhanced by reading a wide range of content, by reading strategy instruction and by the explicit linking of writing and reading. Other national reports on student achievement in reading and writing have indicated the need for instruction which teaches students to reason more effectively about what they have read, to defend or elaborate on their ideas, and to communicate them in writing (Applebee, 1988; Langer, 1990).

McRAT utilizes the framework of thinking skills outlined by Quellmalz (1985). Four broad categories of thinking skills are included: analysis, comparison, inference/interpretation and evaluation. This particular framework was selected because it addresses a common body of knowledge in philosophy and psychology (e.g, Bloom, 1971); it is conceptually clear; and it easily generates classroom assessment data (Stiggins, 1989).

McRAT incorporates findings from research on effective staff development (e.g., Guskey, 1986). This body of work shows that, to change classroom practices, teachers need extensive training which includes modeling of the desired practices. Moreover, teachers need continuous support from administration, competent and easily accessed technical assistance, and clear evidence that their changes are benefitting students. McRAT's training of teachers extends over two years with an initial training of nine to fourteen days and a follow-up of three to five days in the second year. Administrators are strongly encouraged to participate in the initial 3-5 days of training. The program also recommends that a local coordinator be named; that individual is expected to attend the training-of-trainers program (five additional days).

McRAT uses literature from many cultures as its content base. The program recommends fiction and non-fiction that will expose children to other historical periods as well as different parts of the world. In the increasing diversity of our nation, as well as the emergence of "the global village," the program helps children learn about others through their own eyes.

Methodology

Design: Study I (1989-90) utilized a nonequivalent control group design (Cook & Campbell, 1979). Pre- and post- writing assessments were administered to students in Grades 4-6 between September and May. Mean ratings of pre- and post-writing assessments were compared for treatment and comparison groups for each of the four thinking skills by grade level, achievement level, and off-task responses. Pre- and post- means were also compared for boys and girls, white and minority students, and students of different achievement levels within the McRAT group. Study II (1990-91) was a follow-up of McRAT students in Study I with a comparison group of 1st year McRAT students.

Sample: Six sites in Arkansas were chosen on the basis of their geographic diversity and socioeconomic and achievement levels. The sites included rural and

urban schools in which there were a range of ethnic compositions including majority black and racially balanced.

The sample for Study I included 234 McRAT students (Grades 4-6) in 16 classrooms and 106 comparison students in 12 classrooms in six Arkansas schools. Schools were selected in terms of geographic diversity and included both McRAT and non-McRAT classrooms. All teachers (treatment and comparison) were regular classroom teachers, employing similar curricula with the exception of the McRAT intervention. Of the 16 McRAT teachers, 11 had received one week of training in the previous summer and were beginning their first year with the program while five were beginning their second year of the program. The comparison teachers had not received training in McRAT. None of the students in either group had received McRAT prior to September 1989. 340 students' portfolios were randomly selected from each classroom. The percentage of portfolios chosen varied, but at least one-third were selected.

The sample for Study II included 53 second-year McRAT students who were in Study I and 53 who were beginning their first year of McRAT instruction. They were enrolled in 20 McRAT classrooms. As in Study I, students' portfolios were randomly selected for inclusion in the study sample.

Students in both studies were identified by demographics and prior achievement. In Study I, approximately 30% of students were minority while in Study II, 22% were minority. In Study I, 25% of the McRAT students were identified as educationally disadvantaged and received Chapter 1 services while 10% of the comparison group were so classified. In Study II, 8% were Chapter 1. 15% of McRAT and comparison students in Study I were classified as "academically gifted and talented" while in Study II, 17% were so designated. Samples were equal in terms of gender.

Instrumentation: Four pre- and post- writing assessments were administered to all students in the two studies. The rating protocol follows the framework outlined by Quellmalz (1985). Essays are scored using five criteria (except Evaluation which uses six criteria). Students in each classroom wrote essays (pre- and post-) to demonstrate their skills in analysis, comparison, inference /interpretation and evaluation. Two independent raters scored each essay with the two sets of ratings averaged; scores ranged from 0 to 100 for each essay, except Evaluation in Study II where the maximum score was 120. Inter-rater

reliability was computed as 0.8 for Study I and 0.95 for Study II. Essays that were "off-task" (e.g, not in essay form) were given a score of "0."

Analysis: Independent-samples hypothesis tests of both pre- and post-tests scores were conducted with class mean as the unit of analysis. Other analyses were conducted to ascertain the effect of gender, race and prior achievement, as well as a separate analysis of students whose pre-test essays were unscoreable (0).

Results

Table 1 displays the means for all students in Study I whose pre-test scores were greater than 0. As can be seen from these statistics, the McRAT group initially scored lower than the comparison group on all four essays. The t-tests comparing pre-test means revealed statistically significant differences between the two groups of classrooms on three of the four measures: Analysis (t=3.2, p=.0035); Comparison, (t=0.947, p=.1056); Inference (t=2.2536, p=.0336); and Evaluation (t=3.020, p = .0055).

Table 1
Mean Ratings of McRAT and Comparison Students

Skill	McRAT students			Comparison students		
	N	Pre	Post	N	Pre	Post
Analysis	157	35.7	59.3	99	44.9	50.8
Comparison	119	24.4	51.5	83	26.8	35.5
Inference	76	24.6	45.5	65	31.9	32.1
Evaluation	114	35.8	55.3	99	45.5	44.0

NOTE: These are means for students with scoreable essays for both pre- and post-administrations. Results for students who were off-task on the pre-test (0 total score) were computed separately. The variations in number of students (N) reflect this separation.

The post-test means demonstrate a clear difference between McRAT and comparison students. McRAT classes significantly exceed comparison classes on all four thinking skills: Analysis (t=3.27, p = .003); Comparison (t=4.59, p = .0001); Inference (t=3.40, p = .0023); and Evaluation (t=3.19; p = .0037). Perhaps the most dramatic is Evaluation, where initially, comparison students exceeded McRAT students overall by almost ten points. On the post-test,

comparison students had remained virtually the same while McRAT students had gained over 20 points on the thinking skill that is taught last in the McRAT sequence because it encompasses elements of the three others.

As stated earlier, a considerable proportion (about 30%) of students' pre-test essays were "off-task," and were given a total score of 0 (zero). Table 2 shows that many more McRAT students were included in this group. However on the post-test essays, far more comparison students were "off-task" than McRAT students. Further examination of the "off-task" group revealed that students with one or more "off-task" essays were more likely to be Chapter 1 students. The clear implication of this analysis is that educationally disadvantaged students are less likely to write connected text without explicit instruction such as that provided in McRAT classrooms.

Table 2
Number of McRAT and Comparison Students Off-Task on Pre-test

	PRE-TEST		POST-TEST	
Skill	McRAT	Comparison	McRAT	Comparison
Analysis	73	6	1	27
Comparison	52	13	1	19
Inference	68	37	10	37
Evaluation	49	5	7	10

Table 3 displays the post-test means of McRAT and comparison students who were off-task on the pre-test. As can be seen by comparing these means to those in Table 1, these students were comparable to their peers after McRAT instruction. The meaning of this improvement is illustrated by the case of Jonathon, an average fourth grader. His responses to pre- and post-assessments for Analysis administered in August and October of 1989 are included in Appendix A. Jonathon's pre-test received a score of 0 (zero) while his post-test was at the mean (54.4) for students with pre-tests of 0.

Table 3
Post-test Means - McRAT and Comparison Students Off-Task on Pre-test

		McRAT	Comparison	
Skill	N	Mean	N	Mean
Analysis	72	54.4	2	39.0
Comparison	51	43.2	5	26.0
Inference	58	39.7	15	32.5
Evaluation	45	49.6	2	20.0

The final analyses in Study I examined the potentially confounding effects of students' gender, ethnicity and grade level. No statistically significant differences were found for boys and girls, white and minority students, and Grades 4, 5, and 6.

Study II (1990-91) focused on ascertaining the persistence of the effects of McRAT over a second year. Table 4 displays the pre- and post-test means for students in the second year study who wrote scoreable essays for the pre-tests.

Table 4
Comparison of Mean Pre- & Post- Rating of Year I and II McRAT students

Skill	1st year (N=53)				2nd year (N=53)			
	N	Pre	N	Post	N	Pre	N	Post
Analysis	22	39.3	42	61.8	48	52.1	50	63.6
Comparison	21	30.6	41	62.9	46	41.7	51	56.5
Inference	16	28.5	41	53.0	44	42.7	48	58.9
Evaluation	42	39.6	45	70.1	49	47.7	50	72.8

The differences between the means were confirmed by the pre- and post-test hypothesis testing. On each of the pre-tests the second year McRAT students significantly exceeded students that had not begun the intervention. The first-year McRAT pre-tests were very similar to the pre-test scores of both groups in Study I. The second year pre-test means were slightly lower than the post-test means in Study I, but the gains in writing and thinking skills were still evident after summer vacation. The differences between the post-test means were less dramatic than in Study I; however, the second-year McRAT students did display a slight advantage over their first year counterparts.

A second indication of the persistence of the effects of McRAT is the small number of second year students who were "off-task" on the pre-test measures at the beginning of the second year. The pattern of decreased "off-task" responses was also evident in Study II. Finally, analysis of the scores of Grade 5 and 6 students (the two grades enrolling both 1st and second year McRAT students) were not differentiated by gender, prior achievement (Chapter 1, "regular" and gifted), or race.

These two studies show that McRAT students demonstrate significant increases in higher order thinking. Further, these effects are independent of gender, prior achievement level or ethnic background.

Discussion

McRAT is a part of the major shift in states' efforts in educational reform, focusing on the "core technology" of the school, classroom instruction. It further embodies the movement toward explicit linkages between instructional programs and "alternative assessment." Moreover, the assessment techniques used by McRAT are notable for their rigorous technical quality. The program is consistent with national goals for education in that students clearly demonstrate the ability to reason, solve problems, apply knowledge, write and communicate effectively. The program is beneficial to all student groups, including the educationally disadvantaged, and it promotes students' understanding of the diverse cultural heritage of the United States and the world.

For at least the last decade, both the press and the American public have regularly bemoaned the inferiority of American public education and education policy-makers have responded with calls for "restructuring" schools. Despite many such restructuring efforts (some as well-conceived and implemented as is reasonable to expect), there remains ample evidence that regular classroom instruction is still dominated by textbooks, teacher lectures, and short answer worksheets (Mullis, Owen & Phillips, 1990). In his recent article in Educational Researcher, Newmann (1993) argues that "new organizational structures [in schools] may be necessary, but [they are] not sufficient" for real changes. He further states that restructured schools need to make a commitment to "powerful content." The Multicultural Reading and Thinking Program is demonstrably just such content.

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