

UM-HSRI-78-30

Dickinson County Community
Schools Traffic Safety
Education Curriculum Evaluation

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July 15, 1978

Technical Report Documentation Page

1. Report No. UM -HSRI-78-30	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Dickinson County Community Schools Traffic Safety Education Curriculum		5. Report Date July 15, 1978	6. Performing Organization Code
		8. Performing Organization Report No.	
7. Author(s) Thomas L. McDole		10. Work Unit No.	
9. Performing Organization Name and Address The Highway Safety Research Institute The University of Michigan Ann Arbor, Michigan 48109		11. Contract or Grant No.	
		13. Type of Report and Period Covered July 1, 1977 - June 30, 1978	
12. Sponsoring Agency Name and Address Dickinson County Community Schools Kingsford, Michigan		14. Sponsoring Agency Code	
		15. Supplementary Notes	
16. Abstract <p>This report documents the continuation of the Dickinson County Community Schools Traffic Safety Education Project, begun in the Spring of 1976. Reported herein are the results of the second-year data collection and analysis. The results show significant changes (positive) in the post-test scores of the treatment group when compared to the pre-test scores. The control group test scores were unchanged. The first year's activities are reported in HSRI report no. UM -HSRI-77-34.</p>			
17. Key Words		18. Distribution Statement	
19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price

INTRODUCTION

The Highway Safety Research Institute (HSRI) has, for a second year, provided consultation and evaluation services to the Dickinson County Community Schools for evaluation of its Traffic Safety Education Project. Specifically, our efforts this second year have been directed at providing assistance in implementing the second phase of the testing and evaluation and in providing data analysis. This report details the results of the data analysis.

SUMMARY OF THE PROJECT AND FIRST YEAR (1976-77) EFFORT

The Dickinson County Community Schools began, in the spring of 1976, a three-year project to integrate a "Traffic Safety Education Curriculum Guide for Grades 7-9"* into its junior high school curriculum. The purpose of this project was to promote the use of traffic safety concepts in a variety of subject areas in the junior high school curriculum and to evaluate the effectiveness of this approach.

HSRI's assistance was sought in planning the evaluation design and in performing the analysis of the data, whereas Dickinson County's Junior High teachers planned and implemented the curriculum. Our assistance was concentrated in four areas: (1) establishing the overall research evaluation design and methodology; (2) offering guidance in the preparation of lesson outlines and tests; (3) reviewing teacher-prepared curricula; (4) reviewing and evaluating teacher-prepared tests.

HSRI's first year effort resulted in: (1) specification of a research strategy and evaluation procedures; (2) conduct of a workshop in preparing lesson plans and tests; (3) review of the curriculum; and (4) review and revision of tests suitable for evaluation purposes. There were reported in "Dickinson County Community Schools Traffic Safety Education Curriculum Evaluation," July 15, 1977 (report no. UM-HSRI-77-34).

*Traffic Safety Education Curriculum Guide, Grades 7-9. Michigan Department of Education, Lansing, Michigan, 1975.

REPORT OF THE 1977-78 TESTING

As stated earlier, our effort for this year was to be concentrated in evaluating the data collected as a result of the 1977-78 testing. The results of this testing are detailed below.

Evaluation Design: Three school districts comprised the data collection domain using a classical pre-post-test, treatment-control design. One school, Kingsford Junior High, was designated the treatment school, with two other schools--Iron Mountain and Norway-Vulcan Junior High Schools--comprising the control schools. Students in all schools were given the same pre-test and post-test separated in time by the two-week treatment given to the students in the treatment school. The testing and treatment occurred during February 1978. The treatment consisted of a specially designed two-week curriculum for each of the three grades (7th grade social studies, 8th grade English, and 9th grade health and physical education). The tests used for measurement were geared to each subject/grade level. Thus, three evaluations were conducted simultaneously. The design is pictured below for one subject area. It is replicated for the others.

<u>School</u>	<u>Testing</u>	<u>Type of School</u>
Kingsford	Pre Post	Treatment
Iron Mountain	Pre Post	Control
Norway-Vulcan	Pre Post	Control

In each school/grade level, the appropriate pre-test was administered, the treatment was given in Kingsford Junior High, and then the appropriate post-test was administered to all students.

Data Reduction: The answers were marked on answer sheets and reduced to punched cards by the Cooperative Occupational Education Program students in Dickinson County. Students taking only one test were eliminated from this data set. The punch cards were then forwarded to HSRI for processing.

Data Processing: The data cards were checked to assure that each student who took the pre-test also took the post-test and vice versa, resulting in a

matched pair data set. (Those students taking only one test [absent for the other] had been eliminated from the analysis.) Table 1 shows the number of students taking tests (which were available for analysis for each of the treatment and control schools). Also shown are the totals for the combined control sample.

Analysis: Two types of analyses were performed on the data: (1) descriptive measures to describe each data set; and (2) paired T test to determine if there existed a significant difference between the pre- and post-test scores (and hence learning).

The basic model used in the evaluation was a comparison of group means based on the design discussed earlier. This model takes the form:

TEST PHASE	GROUP	
	Treatment	Control
Pre	1*	3*
Post	2*	4*

where the following comparisons of group means (based on total correct answers for each test) are made to determine if significant differences exist between the groups by other than chance. If the treatment is successful, then the treatment group should perform better on the post-test (when compared to the pre-test) and the control group should perform essentially the same on the post-test as on the pre-test. Also the two groups should be virtually identical on the pre-test and perform significantly different on the post-test.

The comparisons of group differences and expected results are summarized below.

Comparison	Between Groups	Expected Difference	Type of Stat. Test
1*	1-2, Treatment, Pre-Test	Significant	Paired T
2*	3-4, Control, Pre-Post	Not Significant	Paired T
3*	2-4, Post-Test, Treatment-Control	Significant	Student T
4*	1-3, Pre-Test, Treatment-Control	Not Significant	Student T

*Reference numbers.

TABLE 1
 NUMBER OF STUDENTS TAKING BOTH
 THE PRE- AND POST-TESTS

School	Grade 7	Grade 8	Grade 9
1. Kingsford (Treatment)	124	159	166
2. Iron Mountain (Control)	96	94	82
3. Norway-Vulcan (Control)	49	61	70
TOTAL (All Schools)	269	314	318
COMBINED CONTROL SCHOOLS (Iron Mountain plus Norway-Vulcan)	145	155	152

Each grade is reported separately, as there were three separate treatments being conducted simultaneously. The descriptive measures for each grade are followed by the comparison for each grade.

7th grade -

Descriptive measures:

Total questions on pre or post-test - 36

	<u>Treatment (Kingsford)</u>	<u>Control Iron Mt. & Norway-Vulcan</u>
Pretest: n	124	145
Range of test scores	16-31	17-32
Mean	24.5	25.19
Std. deviation	3.08	3.43
Posttest: n	124	145
Range of test scores	21-36	14-33
Mean	29.35	24.57
Std. deviation	2.90	3.80

Comparison of Group Means using Student T test and Paired T test as appropriate:

<u>Comparison</u>	<u>Group</u>	<u>Result</u>	<u>Significant?</u>	<u>Probability**</u>
1*	1-2, treatment, pre-post test	T=19.48	yes	0.00%
2*	3-4, control, pre- post test	T=2.15	no	3.29%
3	2-4, post test, treat- ment - control	T=11.45	yes	0.00%
4	1-3, pre-test, treat- ment - control	T=1.73	no	8.43%

* Paired T test

** Probability of difference occurring by chance

In terms of the average test scores on each group, comparison 4 shows that the treatment and control groups were not significantly different prior to the treatment. Comparison 1 shows that the treatment group scored significantly better on their post-test and comparison 2 shows that the control group scored no better on the post-test than on the pre-test. Comparison 3 confirms that the treatment group scored significantly better on the post-test than on the pre-test. This suggests that the change in the treatment group test scores can be ascribed to the curriculum (treatment).

8th grade -

Descriptive measures:

Total questions on pre or post test = 25

	<u>Treatment (Kingsford)</u>	<u>Control (Iron Mt. & Norway-Vulcan)</u>
Pretest: n	159	155
Range of test scores	8-23	6-23
Mean	17.88	17.07
Std. deviation	3.42	3.02
Post test: n	159	155
Range of test scores	15-24	6-24
Mean	20.72	17.28
Std. deviation	1.86	3.16

Comparison of Group Means using Student T Test

<u>Comparison</u>	<u>Group</u>	<u>Result</u>	<u>Significant?</u>	<u>Probability**</u>
1*	1-2, treatment, pre-post test	T=13.33	Y	00.0%
2*	3-4, control, pre-post test	T=1.02	N	30.9%
3	2-4, post-test, treatment, control	T=11.79	Y	00.0%
4	1-3, pre-test, treatment, control	T=1.67	N	9.58%

* Paired T test

** Probability of difference occurring by chance

In terms of the average test scores on each group, comparison 4 shows that the treatment and control groups (schools) did not differ significantly in their performance on the test prior to the treatment. Comparison 1 shows that the treatment group scored significantly better on their post-test and comparison 2 shows that the control group scored no better on the post-test than on the pre-test. Comparison 3 confirms that the treatment group scored significantly better on the post-test than on the pre-test. This suggests that the change in the treatment group test scores can be ascribed to the curriculum (treatment).

9th grade -

Descriptive measures:

Total questions on pre or post test = 31

	<u>Treatment (Kingsford)</u>	<u>Control (Iron Mt. & Norway-Vulcan)</u>
Pretest: n	166	152
Range of test scores	12-30	11-30
Mean	23.81	23.34
Std. deviation	3.50	3.15
Post test: n	166	152
Range of test scores	13-31	10-31
Mean	28.53	23.93
Std. deviation	2.24	3.99

Comparison of Group Means using Student T test

<u>Comparison</u>	<u>Group</u>	<u>Result</u>	<u>Significant?</u>	<u>Probability**</u>
1*	1-2, treatment, pre-post test	T=21.23	Yes	00.0%
2*	3-4, control, pre-post test	T=1.99	No	4.8%
3	2-4, post-test, treatment, control	T=12.82	Yes	00.0%
4	1-3, pre-test, treatment control	T=1.24	No	21.6%

* Paired T test

** Probability of difference occurring by chance

In terms of the average test scores on each group, comparison 4 shows that the treatment and control groups (schools) did not differ significantly in their performance on the test prior to the treatment. Comparison 1 shows that the treatment group scored significantly better on their post-test and comparison 2 shows that the control group scored no better on the post-test than on the pre-test. Comparison 3 confirms that the treatment group scored significantly better on the post-test than on the pre-test. This suggests that the change in the treatment group test scores can be ascribed to the curriculum.

Conclusion

Based on the data analysis, the following conclusions can be drawn:

- (1) The treatment and control groups within each of the three grades did not differ significantly in performance on the respective pre-tests. That is, the performance of the students in Kingsford Junior High 7th grade (treatment school) was not significantly different than those in the Iron Mountain and Norway-Vulcan 7th grade (control) schools. This same statement applies equally to the 8th and 9th grades.
- (2) The treatment group within each grade level performed significantly better on the post-test than on the pre-test. In the measurement of the 7th grade treatment school the students performed substantially better on the post-test when compared to the pre-test. The same statement applies equally to the 8th and 9th grades.
- (3) The control group within each grade level performed virtually no better on the post-test than on the pre-test. In the measurement of the 7th grade control school the students performed about the same on the post-test when compared to the pre-test. The same statement applies equally to the 8th and 9th grades.

Thus it is reasonable to assume that the treatment program produced a measurable and significant change in the students participating in the programs, whereas the control students showed little or no gain. This can be summarized as follows.

Differences in Average Test Score Between Pre and Post Test

Grade	Treatment	Control
7	+4.85	-0.62
8	+3.06	+0.21
9	+4.72	+0.69

RECOMMENDATION

It is recommended that this project be continued for the third year as originally planned. It is probable that upon replication in the third year, similar results will be found.