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EVALUATION OF AN IMPROVED DRIVER EDUCATION PROGRAM
FOR THE ANN ARBOR PUBLIC SCHOOLS

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INTRODUCTION

In the spring of 1972 the Highway Safety Research Institute began to evaluate the effectiveness of a Driver Education Simulator to be installed at Pioneer and Huron High Schools, Ann Arbor, Michigan.

R.W. Bishop has provided a definition of a driving simulator:

What is a driving simulator?

'Simulator' according to the dictionary means: 'one that simulates, a laboratory device that enables the operator to reproduce under test conditions phenomena likely to occur in actual performance.' To be effective, the device should confront the learner with situations which are similar to those of the actual task, and should require him to make responses applicable to the task.

Driving simulators are similar in principle to the flight trainers long used for aviators, and the simulators more recently developed for training astronauts. They are electro-mechanical devices designed to represent the driver's compartment of the automobile. Students operate the units just as they would a real car on the highway and react to driving conditions shown by full-color motion pictures on a wide screen at the front of the classroom. Various types of driving conditions are projected by films especially designed for this kind of instruction. This laboratory equipment can be placed either in a classroom or it can be installed in a trailer and moved from school to school.*

The purpose of installing such a device in Ann Arbor was manifold. Major reasons included: the ability to present portions of the Behind-the-Wheel (BTW) experience in a controlled environment in the classroom and hence be able to repeat and/or discuss desirable and/or needed portions of the experience; a reduction in the number of hours on the road and hence a cost savings to the school district by increasing the student ratio from 3:1 to 16:1 for a portion of the time required for the Behind-the-Wheel (BTW) instruc-

* Quoted from a Safety Education, December 1964 article by R.W. Bishop entitled "Questions and Answers About Driving Simulators."

tion; enrichment of the curriculum by expanding the range of driving experience and situations available to the student; -- i.e., night driving, snow, emergency situations, etc., and providing an opportunity for all students to share equally in these experiences. All of the above were aimed at improving the educational efficiency of the program.

With the installation of such a device, two questions were of interest: (1) has a cost savings been realized by the school district, and (2) has the educational efficiency of the program increased (are the students learning more)? The first of these questions has not been directly addressed by the HSRI study, but may be answered by the records of the school district. The second of these questions is the subject of this report.

METHODOLOGY OF THE STUDY

Design

A satisfactory evaluation plan was devised whereby the students would be tested for written knowledge of driving using a test of general driving knowledge in a pre-post test design--testing students both before the simulator installation and after. Also those students receiving simulator instruction would be given a pre-post simulator skills test. The design appears as follows.

		SIMULATOR INSTALLATION		
			Before	After
Knowledge Test	Test Phase	Pre-Test	Group A	Group C
		Post-Test	Group B	Group D
Simulator Skills Test	Test Phase	Pre-Test		Group C
		Post-Test		Group D

Such a design allows one to make several comparisons between groups to determine the knowledge and skills gained as a result of the simulation. Valid comparisons of the knowledge test and expected results are shown on the next page.

Knowledge Test

<u>Valid Comparisons</u>	<u>Expected Results</u>	<u>Comments</u>
A & B	Significant change in test scores.	If the test is to measure a knowledge gain then it must detect a difference here.
C & D	Significant change in test scores.	Above comment applies.
A & C	No significant difference in test scores.	Both pre-test groups should be identical.
B & D	Significant difference in test scores.	This is the main comparison.

There is only one comparison possible for the Simulator Skills.

<u>Valid Comparisons</u>	<u>Expected Results</u>	<u>Comments</u>
C & D	Significant change in test score.	The only comparison.

The major comparison is between the students who have completed Driver Education without the benefit of the simulator (Group B) and those who have completed Driver Education with the benefit of the simulator (Group D). A significant change here could be construed to mean that the simulator has helped the students through a gain in traffic knowledge.

Likewise, if the simulator test scores show a significant improvement, the tentative conclusion can be drawn that the students have learned how to manipulate the controls in the simulator, and had ostensibly learned how to "drive on the celluloid road."

A large question remains unanswered and cannot be answered in the context of this project--namely, while test scores, both written knowledge and simulator skills, show a gain and hence may reflect a gain of knowledge or skill on the part of the student, what is the transference of this knowledge and skill to the task of operating a

vehicle on the road? Intuition says that they will be better prepared drivers, however no valid scientific research is available to support this contention. It should be pointed out that this problem is not unique to driver education but pervades the whole of education.

Test Instruments--General Traffic Knowledge

The Highway Safety Research Institute was in the process of expecting a contract from the NHTSA entitled "Development of a Test Item Bank for Tests of Driving Knowledge."¹ The thrust of this contract was the development of and psychometric evaluation of several hundred multiple-choice test items covering the range of driving tasks and knowledge as specified in HumRRO,² the UVC,³ and MUTCD.⁴ As a part of this study, seven 40-item multiple-choice tests were extracted from the above mentioned pool of items. These tests were assembled in such a manner as to be psychometrically parallel, general in content, and uniform in difficulty. These seven tests, were administered to thousands of original and renewal Michigan Drivers as a part of a knowledge test demonstration program. Therefore, in addition to the psychometrically derived statistics, test performance data on drivers much like the driver education students in Ann Arbor were available and confirmed that the tasks were indeed parallel in all respects. Two of these 40-item tests were chosen to be combined into one 75-item test (each of the seven test forms contained five identical items covering general traffic knowledge). Nine additional items of personal identification and information were also added. The test, entitled "CARLMAC A Test of Driving Knowledge" (see attachment), would then be administered to the students in the pre-post test design described earlier. A copy of the test is attached to this report.

Test Instrument--Simulator Skills Test

Two basic functions of the simulator are: (1) the imparting of traffic knowledge under simulated road and driving conditions, and (2) the development of skills associated with handling a vehicle. The knowledge portion of the simulator program would, of course, be tested in the General Knowledge test. Therefore, a skill test was devised whereby skills acquired as a part of the simulator could be measured. There is a contaminating factor involved here, however, as all of the skills needed for driving are acquired by two means--the simulator and the BTW training (as both are conducted simultaneously). This is not a serious problem, however.

The best measure available within the constraints of the project was the showing of one of the films in the library of films for use in the simulator. The film "Drive in Review" which is normally the last film seen by the students was selected to be shown twice--once near the beginning of the simulator session and again as the last film of the session. Since driving a car in "traffic" requires some training in manipulation of the controls of the vehicle, the first showing of "Drive in Review" was scheduled to be the third film of the series. The first two films--"Introduction to the Simulator" and "Art of Turning"--were used to acquaint the students with the simulator and driving.

The data on five measures (turn signals, acceleration, speed control, braking and steering) plus an average score, as generated by the simulator and reported by the computer, serve as the data output for analysis.

The Testing Program

While the model described earlier would be followed in the collection of the data, certain modifications were necessary to accommodate the terms and conditions of the contract. The data collection design is repeated below with the actual dates of testing inserted.

		Simulator Installation	
		Before	After
Knowledge Test	Test Phase	Pre-Test Group A Sept. 72	Group C Feb. 73
	Test Phase	Post-Test Group B June 72	Group D June 73
Simulator Skills Test	Test Phase	Pre-Test	Group C Feb. 73
	Test Phase	Post-Test	Group D April-May 73

It can be seen from an examination of this table that the post-test (Group B) was given in June 1972 before the pre-test (Group A). Due to the lateness of beginning the project in the spring 1972 semester it was necessary to arrange the schedule in this manner. This change in schedule had no effect on the testing.

The test was administered to all students then enrolled in Driver Education (Group B) and the score sheets and scores analyzed. The results of this analysis are appended to this report. Briefly, the scores of the students in both schools were identical. However, an analysis of individual items (not reported here) showed some content differences between the schools indicating that the respective programs may have stressed different aspects of driving.

The test was then administered to selected groups of Driver Education students entering the program in the fall 1972 semester (Group A). These students would serve as the pre-test group for the June 1972 post-test. While this represented an unconventional means of obtaining pre-post test scores, it was felt that students entering a Driver Education program separated only by a semester would not be significantly different. Also, since the simulators were in the process of being installed and used during the fall 1972 semester, this became a period of transition for the Driver Education programs. While the simulators were to be installed during the summer, they were not fully operational until sometime

during the Fall 1972 semester and the students would not have the benefit for a full semester of their operation. Also this gave the staff time to get used to them and work out their curriculum. The next testing program was scheduled for the spring 1973 semester.

The testing during the spring 1973 semester consisted of both the written knowledge test and the simulator skills test. During the first week of driver education classes in both high schools, all students enrolled in Driver Education (Group C) were given the knowledge test. At the appropriate time in the simulator, all Driver Education students (also Group C) were shown the skills test film "Driver in Review" and their score printed out by the simulator computer. All scores from both testings were saved for future use.

During late April and early May, the simulator instruction was completed and the skill test film was shown to the student (Group D) as the last film in the series. Again the scores were recorded and saved.

During the last week of classes and final exam time in June 1973 all students in the classroom portion of Driver Education (also Group D) were again given the knowledge test.

This completed the testing phase of the project and the data analysis was begun.

DATA ANALYSIS AND RESULTS

Knowledge Test

The knowledge test was administered to students as enrolled in the regular Driver Education classes during the normal class time. In all there were 1602 valid test scores available for analysis distributed as follows:

	Before Simulation		After Simulation	
	Group A Pre '72	Group B Post '72	Group C Pre '73	Group D Post '73
N=	144	578	440	440

Approximately 1300 students participated in the testing. After those students' score sheets which were unusable due to mis-marking or other problems were eliminated, 1162 answer sheets were scored. A total score (number correct) was computed for each. A distribution of total scores was made for each of the comparison groups. This distribution is shown on the next page.

Each of the score distribution pairs appropriate for comparison were compared to determine if a significant difference existed between the means of the distributions. The Student T-test was employed to make this comparison. The results are given below:

SIMULATOR INSTALLATION

	Before	After
	Group A	Group C
Pre-test	Mean = 54.549	Mean = 53.723
	SD = 63.284	SD = 75.982
	N = 144	N = 440

Knowledge Test

	Group B	Group D
Post-test	Mean = 58.971	Mean = 60.766
	SD = 63.709	SD = 49.196
	N = 578	N = 440

<u>Comparison</u>	<u>T</u>	<u>Sig.</u>	<u>Level</u>
Groups A-B	- 5.88	yes	.0000
C-D	-13.205	yes	.0000
B-D	- 3.8561	yes	.0000
A-C	1.0078	no	.3140

The comparison between groups A & B (before simulation; pre-post test) showed a significant gain in knowledge as measured by this test. This result is expected and supports the general contention that students experienced a gain in knowledge from taking this course. While there was no control for the effect of maturation on the part of the students, it can be safely assumed that exposure to the course content was largely responsible for this gain in knowledge.

The comparison between groups C & D (after simulation; pre-post test) likewise showed a significant gain in knowledge, with all the above comments applying. A very important point here is that the introduction of simulation did not detract from the content of the course.

The comparison between groups A and C (pre-test; before and after simulation) showed that there was no significant difference between students entering the driver education course. Thus both groups of students (before simulation and after simulation) began with essentially the same knowledge level.

The comparison between groups B and D (post-test; before and after simulation) is the major comparison. There was a significant difference in the post-test scores between the two groups - with those students exposed to the simulator showing a marked gain in knowledge over those not receiving the addition of the simulator instruction. While it is tempting to attribute all the success to the simulator, one must be careful, since a change in the curriculum (undocumented) occurred also. However, it can be assumed that the use of the simulator may have had a significant and positive effect on the knowledge gain of the students.

Nine questions of information were attached to the test (see attached test booklet) as information and control items. A summary of these for the first test administration is attached. While all nine items were considered in all the analysis, the individual values are not reported here.

Simulator Skill Test

The students comprising Groups C and D (after simulation; pre- and post-test) were subjected to a showing of a film selected to be used as the pre-post test as described earlier. The simulator accumulates the errors made by the students on five variables and prints out their score on each of the five variables plus an average score. The five variables are:

Distribution of Total Score

N <u>Correct</u>	<u>Group A</u> Sept. '72	<u>Group B</u> June '72	<u>Group C</u> Feb '73	<u>Group D</u> June '73
10				
11				
12				
13				
14		1		
15		0		
16		0	1	
17		0	0	
18		2	0	
19		1	0	
20		0	0	
21		0	0	
22		0	0	
23		1	0	
24		0	0	
25		0	1	
26		0	0	
27		0	1	
28		1	0	1
29		1	1	0
30	1	0	1	0
31	0	0	1	0
32	0	1	3	1
33	3	1	3	0
34	0	0	1	0
35	0	1	1	1
36	1	1	6	0
37	0	4	2	0
38	1	1	4	3
39	1	1	7	0
40	0	2	3	2
41	3	1	5	3
42	2	2	11	2
43	3	6	10	1
44	2	2	5	5
45	4	4	10	1
46	2	7	8	1
47	2	3	12	5
48	4	6	11	1
49	4	4	19	2
50	2	9	15	3
51	4	15	10	5
52	9	10	16	6
53	8	16	12	9
54	7	19	22	12
55	8	20	24	16

<u>N</u> <u>Correct</u>	<u>Group A</u> <u>Sept. '72</u>	<u>Group B</u> <u>June '72</u>	<u>Group C</u> <u>Feb '73</u>	<u>Group D</u> <u>June '73</u>
56	5	28	18	17
57	13	21	30	10
58	10	22	23	23
59	7	27	19	22
60	6	27	22	25
61	7	43	22	25
62	4	51	19	33
63	8	51	14	31
64	1	34	14	24
65	5	39	8	35
66	0	36	10	24
67	3	20	7	31
68	1	18	5	14
69	2	9	3	19
70	0	7		11
71	0	1		8
72	1	1		4
73				0
74				1
75				
\bar{X}	54.5	58.9	53.7	60.8
SD	7.9	8.0	8.7	7.01
n=	144	578	440	440

Use of turn signals
 Steering
 Use of Brake
 Speed control
 Accelerator control

Two problems became apparent over the course of the simulator data collection: (1) the simulator was subject to considerable down time and hence scores for several groups of students were lost either due to total malfunction of the machine or to the machine failing to record accurately the scores of some of the students; (2) there was a fairly high attrition rate among the students making the matching of subjects' scores between the pre- and post-test difficult.

The test scores as printed out by the simulator's computer had to be transformed from the number wrong to a percent correct score. A Student T-test was then applied to the distribution of these scores for the five variables plus the average score. The following table summarizes the results of this exercise.

<u>Variable</u>	<u>Pre-test</u>	<u>Post-test</u>	<u>Test-Statistic</u>	<u>Sig.</u>
Use of turn Signals (percent correct)	Mean 61.939 Var. 001.46 Size 440	77.414 154.65 442	T=16.716	.0000
Steering (percent correct)	Mean 47.920 Var. 295.71 Size 440	62.312 410.41 442	T=11.371	.0000
Use of Brake (percent correct)	Mean 45.743 Var. 269.47 Size 440	62.131 171.20	T=16.398	.0000
Speed Control (percent correct)	Mean 75.527 Var. 347.36 Size 440	79.887 413.79 442	T=3.3181	.0009
Use of Accelerator (percent correct)	Mean 73.259 Var. 108.73 Size 440	84.495 75.298 442	T=17.398	.0000
Average Score (percent correct)	Mean 60.914 Var. 108.28 Size 440	73.249 105.64 442	T=17.711	.0000

All variables showed a significant change between the pre- and post-test, indicating that the students became more adept at operating the controls in each car in the simulator.

SUMMARY AND CONCLUSIONS

Two testing programs were undertaken to answer the question of whether or not the introduction of a driving simulator into the driver education curriculum of the Ann Arbor public schools has resulted in a change in the knowledge and skills of the students participating in such a program.

A general test of driving knowledge (pencil and paper) was administered in a pre-post test design to students who had the experience of simulator instruction and to students who did not have simulator instruction.

A test of simulator driving skill was also given in a pre-post test design to the students who received the simulator instruction.

In both testing programs, the results showed a statistically significant change in driving knowledge and simulator skills.

The data and results support the following conclusions:

(1) the inclusion of the simulator in the course did not detract from the course, and may, in fact, have improved it.

(2) the students did learn how to manipulate the vehicle in the simulator and were able to respond to the film.

The data, results, and study design will not permit an extrapolation of the results to the following:

(1) no statements can be made and supported that the students are better drivers on the road as a result of the simulation experience.

(2) no statements can be made and supported that the students are safer drivers as a result of the use of simulator.

The inclusion and use of the simulator in the driver education Curriculum should be considered a success and continued as a desirable part of the course offering.

References

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2. McKnight, A.J., et al. Driver Education Task Analysis I-IV, Alexandria, Virginia: Human Resources Research Organization, (Final Report on NHTSA Contract FH-11-7336), March 1971.
3. Uniform Vehicle Code and Model Traffic Ordinance, Washington D.C.: National Committee on Uniform Traffic Laws and Ordinances, Revised, 1968 (including supplements).
4. Manual of Uniform Traffic Control Devices for Streets and Highways, U.S. Department of Transportation, Federal Highway Administration (Washington, D.C.: U.S. Government Printing Office, 1970).

RESULTS OF KNOWLEDGE TESTING OF
ANN ARBOR DRIVER EDUCATION STUDENTS
CONDUCTED DURING JUNE 1972

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The following tables summarize the results of the testing of Ann Arbor driver education students conducted during the period June 7 through June 12. Table 1 indicates which of the initial control questions resulted in statistically significant ($\alpha \leq 0.05$) differences in test results. Tables 2-10 present the average number of correct and incorrect responses for sub-groups defined by the initial group of personal questions. The purpose of these questions was to determine whether or not groups of students could be identified who have different test results. By doing this more precise, conclusions can be made concerning differences in education programs.

The ability of these questions to define different sub-groups was tested using a one-way multivariate analysis of variance technique. The technique has the advantage of performing a joint comparison of both the number of correct and the number of incorrect responses to the test question. Therefore, differences between student performance on the tests can be more adequately measured than would be the case if less sophisticated procedures were used. For example, a student who works fast and gets a high number correct but also a large number wrong is identified differently than a student working slower who achieves the same ratio of correct to incorrect answers. A score such as percent correct handles alternate scores in one manner. Multivariate analysis handles the results in a more general fashion. Specific Conclusions are as follows:

1. There is no difference in the knowledge measured by this test between the two high schools. (Table 2).
2. There were differences between various classes. However, these are not reported here.
3. The best test performance was achieved by 15 year-old students. Older students had significantly worse scores. (Table 3).
4. Male and female students scored the same. (Table 4).

5. The four percent of the students not in the 10th grade scored significantly worse on the test. This is consistent with the age result in (3) above. (Table 5).
6. Student preference for a particular high school and actual school attended did not indicate differences in test scores. (Tables 6 & 7).
7. Involvement in extra curricular activities did not result in different test scores (Table 8).
8. Students who did not expect to have a car of their own during the next year scored better on the test. (Table 9).
9. Students who spend 5 hours or more per week working on cars performed significantly worse on the test. (Table 10).
10. Students who rated their fathers as "almost always safe drivers" performed significantly better on the test. (Table 11).
11. Test scores were not related to student grade point average.

T A B L E 1

Driver Education Test

SUMMARY OF MANOVA RESULTS FOR ANN ARBOR SCHOOLS

Variable	Both Schools (1)	Pioneer (1)	Huron (2)
1 School	2.51 (2,591) 0.08		
2 Section No.	1.78 (20,1164) $\alpha = .019$	1.13 (20,574) .315	2.36 (14,572) .004 *
3 GPA	N O T S I G N I F I C A N T		
4 Age	9.62 (6,1178) .000	3.23 (6,588) .004	7.64 (6,580) .000 *
5 Sex	1.59 (6,1178) .15	1.05 (2,296) .351	1.27 (6,580) .267
6 Grade	4.11 (6,1178) .000	4.038 (6,588) .001	3.04 (6,580) .006 *
7 H.S. Choice	1.60 (8,1176) .121	.87 (8,586) .541	2.92 (8,578) .003
8 H.S. Will	1.56 (8,1172) .132	.895 (6,584) .498	2.99 (8,578) .003
9 Extra Curricular	1.76 (2,590) .172	1.459 (2,295) .234	.638 (2,292) 529
10 Car Own	9.52 (4,1180) .000	1.74 (2,296) .178	9.62 (4,582) .000 *
11 Car Work	2.78 (8,1172) .005	2.54 (8,584) .010	.837 (8,576) .57 *
12 Father's Driving	2.26 (8,1166) .022	.746 (8,580) .651	5.25 (8,574) .000 *

(1) $F(N_1, N_2)$

α

* Statistically significant predictors of test performance.

T A B L E 2

High School	N	# Correct	# Wrong
Pioneer	299	58.45	15.31
Huron	295	58.34	15.98

T A B L E 3

STUDENT AGE

BOTH SCHOOLS

AGE	N	# Correct	# Wrong
15 or Younger	458	59.07	14.96
16	123	57.45	16.75
17	11	44.82	27.55
18 or Older	2	37.00	38.00

BOTH

PIONEER & HURON SCHOOLS

AGE	N	# Correct	# Wrong
15 or Younger	245	58.97	14.75
16	47	57.43	16.79
17	6	46.33	24.83
18 or Older	---	---	---
15 or Younger	213	59.17	15.20
16	76	57.47	16.72
17	5	43.00	30.80
18 or Older	---	---	---

PIONEER

HURON

T A B L E 4

Student Sex

BOTH SCHOOLS

	N	# Correct	# Wrong
BOTH Male	293	58.63	15.11
Female	299	58.11	16.21

PIONEER & HURON SCHOOLS

	N	# Correct	# Wrong
PIONEER Male	160	58.29	15.16
Female	139	58.63	15.48
HURON Male	133	59.04	15.04
Female	160	57.66	16.86

T A B L E 5

Grade

BOTH SCHOOLS

Grade	N	# Correct	# Wrong
9th	3	50.67	20.00
10th	569	58.73	15.39
11th	19	50.00	22.63
12th	3	56.00	15.33

BOTH

PIONEER & HURON SCHOOLS

Grade	N	# Correct	# Wrong
9th	2	45.50	23.00
10th	287	58.86	15.03
11th	8	46.38	23.50
12th	2	60.00	15.00
9th	---	---	---
10th	282	58.59	15.75
11th	11	52.64	22.00
12th	---	---	---

PIONEER

HURON

T A B L E 6

BOTH SCHOOLS

If you had a choice, which school would you like to attend next year?

School	N	# Correct	# Wrong
Pioneer	234	57.95	15.86
Pioneer II	12	59.67	15.00
Huron High	238	58.64	15.76
Community High	79	59.98	14.10
Other	31	55.36	17.29

BOTH

PIONEER & HURON SCHOOLS

School	N	# Correct	# Wrong
Pioneer	231	58.12	15.68
Pioneer II	6	61.67	13.33
Huron High	9	57.00	16.78
Community High	37	60.46	12.89
Other	16	58.12	15.44
Pioneer	3	44.67	29.67
Pioneer II	6	57.67	16.67
Huron High	229	58.70	15.72
Community High	42	59.55	15.17
Other	15	52.40	19.27

PIONEER

HURON

T A B L E 7

BOTH SCHOOLS

Which school will you be attending next year?

School	N	# Correct	# Wrong
Pioneer	263	58.32	15.57
Pioneer II	4	53.00	21.50
Huron High	253	58.85	15.45
Community High	45	58.93	14.33
Other	27	55.37	18.04

BOTH

PIONEER & HURON SCHOOLS

School	N	# Correct	# Wrong
Pioneer	261	58.42	15.46
Pioneer II	2	64.50	10.50
Huron High	---	---	--
Community High	20	59.75	13.05
Other	14	57.43	15.43
Pioneer	2	44.50	30.50
Pioneer II	2	41.50	32.50
Huron High	253	58.85	15.54
Community High	25	58.28	15.36
Other	13	53.15	20.85

PIONEER

HURON

T A B L E 8

BOTH SCHOOLS

Involved in Extra Curricular Activities?

		N	# Correct	# Wrong
BOTH	Yes	262	59.10	15.24
	No	331	57.94	15.97

PIONEER & HURON SCHOOLS

		N	# Correct	# Wrong
PIONEER	Yes	120	59.54	14.58
	No	178	57.90	15.82
HURON	Yes	142	58.73	15.80
	No	153	57.97	16.15

T A B L E 9

BOTH SCHOOLS

Do you plan to have a car of your own
within the next year?

		N	# Correct	# Wrong
BOTH	Yes	175	56.50	17.37
	No	418	59.28	14.85

PIONEER & HURON SCHOOLS

		N	# Correct	# Wrong
PIONEER	Yes	91	57.09	16.32
	No	208	59.04	14.86
HURON	Yes	84	55.86	18.50
	No	210	59.52	14.83

T A B L E 10

BOTH SCHOOLS

How much time per week do you spend working working on cars?

Time	N	# Correct	# Wrong
None	278	57.68	16.14
Less than 1 hour per week	187	60.01	14.67
1-2 hours per week	78	58.42	15.76
3-5 hours per week	30	59.23	14.00
More than 5 hours per week	19	52.90	20.16

PIONEER SCHOOL

Time	N	# Correct	# Wrong
None	128	57.76	15.62
Less than 1 hour per week	106	60.12	14.47
1-2 hours per week	36	58.28	15.61
3-5 hours per week	19	58.21	14.00
More than 5 hours per week	9	50.11	22.33

T A B L E 10
Continued . .

HURON SCHOOL

Time	N	# Correct	# Wrong
None	150	57.61	16.58
Less than 1 hour per week	81	59.86	14.94
1-2 hours per week	42	58.55	15.88
3-5 hours per week	11	61.00	14.00
More than 5 hours per week	10	55.40	18.20

T A B L E 11

BOTH SCHOOLS

How would you rate your father as a safe driver?

	N	# Correct	# Wrong	
BOTH	Very safe	174	57.88	16.07
	Almost always safe	191	60.00	14.32
	Average	171	58.07	16.05
	Unsafe	25	57.32	17.32
	No Comment	28	54.61	17.75

PIONEER & HURON SCHOOLS

	N	# Correct	# Wrong	
PIONEER	Very safe	97	58.28	14.95
	Almost always safe	101	59.32	14.96
	Average	83	57.43	16.06
	Unsafe	7	60.00	15.00
	No Comment	8	59.12	15.62
HURON	Very safe	77	57.38	17.48
	Almost always safe	90	60.76	13.60
	Average	88	58.67	16.03
	Unsafe	18	56.28	18.22
	No Comment	20	52.80	18.60

carlmac

A Test of Driving Knowledge

Instructions:

This booklet contains a series of questions designed to help us find out how much you know about driving.

Using a PENCIL, fill out the top 2 lines on your answer sheet by printing your Name, Today's Date, Your Age, Sex, Date of Birth, School, City, Class (1st, 2nd, 3rd hour, etc.) and the name of your Instructor. DO NOT write anything in the space for the identification number.

Consider each question by itself. Read the question carefully and then try to answer it the best you can. Please answer EVERY question. Select the ONE best answer and record it in the appropriate space opposite the question number. Mark your answer with a heavy black mark between the dashed lines. See the example below.

	a	b	c	d
1	<input checked="" type="checkbox"/>

If you change your mind, erase the mark completely before marking the new choice.

DO NOT make any marks in this booklet.

When answering these questions you should assume that the road and weather conditions are good unless otherwise stated in the question.

Now turn to the next page and begin with question 1 making sure that you place the answer to question 1 next to the "1" on your answer sheet.

On your answer sheet mark the answer to the following questions about yourself.

1. How old are you?
 - a) 15 years or younger
 - b) 16 years
 - c) 17 years
 - d) 18 years or older
2. What is your sex?
 - a) Male
 - b) Female
3. What grade are you in school?
 - a) 9th
 - b) 10th
 - c) 11th
 - d) 12th
4. If you had a choice, which school would you like to attend next year?
 - a) Pioneer High
 - b) Pioneer II
 - c) Huron High
 - d) Community High
 - e) Other
5. Which school will you be attending next year?
 - a) Pioneer High
 - b) Pioneer II
 - c) Huron High
 - d) Community High
 - e) Other
6. Were you involved this year in any extra curricular activities at school such as varsity sports (football, etc.), debate, drama, student government, etc.?
 - a) Yes
 - b) No
7. Do you plan to have a car of your own within the next year?
 - a) Yes
 - b) No
8. How much time per week do you spend working on cars (mechanical, washing, waxing, etc.) either your own, parents, or friends?
 - a) None
 - b) Less than 1 hour per week
 - c) 1-2 hours per week
 - d) 3-5 hours per week
 - e) more than 5 hours per week
9. Based upon what you have learned in Driver Education, how would you rate your father as a safe driver,
 - a) very safe
 - b) almost always safe
 - c) average
 - d) unsafe
 - e) no comment

10. This traffic signal means:

- A. Slow down and continue with caution through the intersection.
- B. Speed up and continue through the intersection before the light changes to red.
- C. Stop before entering the intersection if you can safely do so.
- D. Stop immediately; do not continue through the intersection.



YELLOW (STEADY)

11. This sign means:

- A. Slow down to 35 mph and prepare to enter a curve.
- B. Exit ahead, exit speed 35 mph.
- C. Construction area, slow down to 35 mph and use the right lane only.
- D. Vehicles turning right must reduce speed to 35 mph.



12. It is illegal to:

- A. Drive a motor vehicle registered in another state.
- B. Keep your registration in your vehicle.
- C. Drive or permit someone else to drive a non-registered vehicle.
- D. Give your registration to another when he is using your vehicle.

13. If you see a sign warning of poor road conditions ahead:

- A. Slow down before you get to the problem area.
- B. Brake quickly and stop.
- C. Pull off the road and check the area on foot.
- D. Move toward the center of the road and continue at the same speed.

14. When approaching a railroad crossing that does not have a signal on it:

- A. Stop and look both ways before crossing.
- B. Continue across at normal speed.
- C. Blow the horn while driving over the tracks.
- D. Slow down and look both ways.

15. Under normal conditions the top speed limit for driving in a business district is:

- A. 15 mph.
- B. 20 mph.
- C. 25 mph.
- D. 30 mph.

16. After moving into a new lane you should drive near the:

- A. Left side of the lane
- B. Center of the lane.
- C. Right side of the lane.
- D. Shoulder or median.

17. You must turn your headlights on:

- A. After 7 p.m. and keep them on until 7 a.m.
- B. At night when the road does not have any street lights.
- C. 1/2 hour after sunset and during other times when visibility is bad.
- D. When the sun or bright lights create a glare.

18. For turning, you should signal:

- A. Just before the turn so you will not cause confusion.
- B. After you begin to slow down.
- C. Only if there are vehicles behind you.
- D. At least 100 feet before the intersection.

19. Passing results in:

- A. Many fatal accidents per year.
- B. Many accidents but few deaths per year.
- C. Relatively few serious accidents per year.
- D. Relatively few problems of any type.

Continue to next page. . .

20. You should drive in the right lane of a 6-lane highway when:
- A. Driving slower than the traffic in the other lanes.
 - B. You are preparing to exit on the left.
 - C. When you see traffic entering the highway from the right.
 - D. You want to pass other vehicles on the highway.
21. An order or direction given by a police officer directing traffic:
- A. May be disregarded if you are in a hurry.
 - B. Must be obeyed.
 - C. May be ignored in an emergency.
 - D. Should not be obeyed if it is in conflict with a traffic signal.
22. If you are towing a trailer and want to pass another vehicle you should not:
- A. Check to see if there is room to pass.
 - B. Make a wider swing around the vehicle than usual.
 - C. Check to see that you will not block traffic behind you.
 - D. Turn sharply when you are changing lanes.
23. When passing a vehicle going in the opposite direction you must:
- A. Decrease your speed by at least 10 mph.
 - B. Blow your horn.
 - C. Stay to the right.
 - D. Drive onto the shoulder to provide more room.

24. You should expect this sign on a:

- A. Bridge or in a tunnel.
- B. Country road or highway.
- C. Traffic circle.
- D. Highway entrance or exit.



25. If you cannot avoid driving through a sand or snow drift in the road you should:
- A. Speed up before entering it.
 - B. Drive in a zig-zag pattern through it.
 - C. Shift to a higher gear before entering it.
 - D. Try to keep your vehicle in motion.
26. You should not drive over a fire hose on the road:
- A. Under any circumstances.
 - B. If it is being used.
 - C. Unless instructed to by a fire department official.
 - D. Unless traffic is heavy in both directions.
27. To help a seriously injured person after an accident you should:
- A. Try to reset any broken bones and then call for help.
 - B. Rush him to the hospital.
 - C. Cover him and try to control any bleeding.
 - D. Move him to a warm place.
28. If you often have trouble seeing things when driving you should:
- A. Get more rest before driving.
 - B. Go to an eye doctor.
 - C. Not drive alone.
 - D. Squint your eyes when driving.
29. When entering a traffic circle you should always:
- A. Stop before entering the circle.
 - B. Go to the right when entering the circle.
 - C. Speed up to go faster than the other traffic.
 - D. Drive to the center of the circle.
30. When entering a freeway from an entrance with an acceleration lane, you should:
- A. Stop to check for traffic at the end of the entrance.
 - B. Enter the freeway at top speed and slow down to the speed limit afterward.
 - C. Use the acceleration lane to get up to the speed of the freeway traffic.
 - D. Use the shoulder to gain speed before you enter.

31. This sign means:

- A. Watch for cross traffic ahead.
- B. Stop sign or signal ahead.
- C. No through traffic; prepare to turn.
- D. Prepare to change routes.



32. If a speed limit is not posted before a curve:
- A. Continue at the same speed.
 - B. Assume that it is better to take this curve at a higher speed.
 - C. Slow down to 35 to 40 mph.
 - D. Judge how sharp the curve is and change your speed accordingly.

33. When backing up you should:
- A. Allow less distance to stop than if going forward.
 - B. Pump the gas pedal to gain speed.
 - C. Avoid making quick steering changes.
 - D. Speed up slightly when turning.

34. When you see this sign you should:
- A. Avoid blowing your horn, quiet zone.
 - B. Reduce speed and watch for persons stepping from between parked cars.
 - C. Avoid driving in this area unless you are attending church services.
 - D. Not park in this area.



35. When you see this sign you should:
- A. Drive between 70 mph and 60 mph if you are driving a truck.
 - B. Not drive slower than 60 mph unless you are driving a truck.
 - C. Not drive faster than 70 mph if you are driving a car.
 - D. Not drive faster than 70 mph during the day and 60 mph at night.



36. Windshield wipers in good working condition are:
- A. Required equipment on all motor vehicles.
 - B. Required only on commercial motor vehicles.
 - C. Required equipment on only American-made vehicles.
 - D. Not required, but strongly suggested.
38. If your license or registration has been suspended or your insurance has been canceled:
- A. Continue to drive until you receive a second notice from the Department.
 - B. You may drive, but there must always be someone in the vehicle with you.
 - C. You should still use your license as a form of identification.
 - D. Your license or registration must be sent back to the Department immediately.

37. After passing an oncoming vehicle that had its bright lights on you should:
- A. Continue at a slower speed for a short time.
 - B. Continue at your normal speed.
 - C. Speed up slightly.
 - D. Turn on your inside lights.

40. When driving you should stay at least:
- A. 1/2 of a second behind the vehicle in front of you.
 - B. 3/4 of a second behind the vehicle in front of you.
 - C. 1 second behind the vehicle in front of you.
 - D. 2 seconds behind the vehicle in front of you.

39. When driving through fog at night, you should use your:
- A. High beam headlights.
 - B. Parking lights.
 - C. Low beam headlights.
 - D. 4-way flashers.
41. In making a left turn, you should not:
- A. Pull halfway into the intersection and edge into cross traffic.
 - B. Signal before you arrive at the intersection.
 - C. Slow down to a stop if traffic is heavy.
 - D. Stay in one lane while turning.

Continue to next page. . .

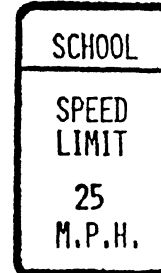
42. This sign found on top of another vehicle is used where it is necessary to:

- A. Lead vehicles through a construction area.
- B. Guide vehicles during civil defense emergencies.
- C. Warn people that the driver is a learner.
- D. Restrict the area to classified personnel.



43. This sign means:

- A. School buses must not exceed this speed limit.
- B. Any vehicles transporting children to school must not exceed this speed limit.
- C. This speed limit should be observed only when children are seen walking.
- D. Vehicles must not exceed this speed limit.



44. When passing another vehicle you can tell how fast it is going by:

- A. Looking at your speedometer.
- B. Looking at the side of the road.
- C. Seeing how fast you are getting closer to the other vehicle.
- D. Checking your speedometer and the speed with which you are approaching the other vehicle.

45. It is illegal to:

- A. Forge or alter a certificate of title with intent to commit fraud.
- B. Unknowingly borrow a registration card which has been altered.
- C. Borrow someone else's vehicle with his consent and become involved in an accident.
- D. Forget to take the title for your vehicle when driving.

46. If you are taking medicine for a cold you should:

- A. Know the effects of the medicine before you drive.
- B. Not drive with anyone else in the vehicle.
- C. Not drive at night or just after taking the medicine.
- D. Only drive if it is an emergency.

47. When there is oncoming traffic you should:

- A. Move closer to the center line.
- B. Move as far to the right as possible.
- C. Slow down until it has passed.
- D. Pass at your own risk.

48. If a vehicle approaches you quickly from the right while you are crossing an intersection:

- A. Stop in the path of the vehicle.
- B. Put your vehicle in reverse and back up.
- C. Speed up to get out of the way.
- D. Blow the horn and continue at the same speed.

49. If you know that you will soon be making a turn you should:

- A. Look well ahead to locate the turning point.
- B. Blow the horn several hundred feet before the turn.
- C. Flash your bright lights to warn other traffic.
- D. Speed up so as to avoid making other vehicles wait.

50. In an emergency stop you should not:

- A. Grasp the steering wheel firmly.
- B. Apply brakes as soon as possible.
- C. Turn off the engine.
- D. Signal the vehicles behind you.

51. It is legal to:

- A. Lend your driver's license to someone else.
- B. Refuse to turn over your license to the Department.
- C. Lend your registration to someone using your vehicle.
- D. Use a false name when applying for a license.

52. When about to pass you should generally:
- A. Move up very close to the lead vehicle, then change lanes.
 - B. Drop back and change lanes far behind the lead vehicle.
 - C. Maintain usual following distance until you change lanes.
 - D. Move up close to the lead vehicle and drop back to warn him you are about to pass.

54. Before going down a long, steep hill:
- A. Shift into neutral.
 - B. Turn on your headlights or blow your horn.
 - C. Tighten your seat belt and sit well back on the seat.
 - D. Test your brakes and shift into a lower gear.

56. This sign means:

- A. Prepare to merge with traffic ahead.
- B. Slow down, side road ahead.
- C. Prepare to detour.
- D. Slow down and prepare to turn right or left.



57. If your tires are badly worn you should:
- A. Replace them.
 - B. Rotate them.
 - C. Let out some air.
 - D. Put in new inner tubes.

59. When passing another vehicle you should:
- A. Return to the right lane as soon as you clear its front bumper.
 - B. Drive as close beside the vehicle as possible.
 - C. Not go over the speed limit unless necessary.
 - D. Flash your brake lights several times before turning to the right lane.

61. If you see that your exit is on the left side of the road:
- A. Move smoothly into the left lane well before the exit.
 - B. Move into the left lane and increase your speed to passing speed.
 - C. Stay in the middle lane and move over when next to your exit.
 - D. Stay in the right lane until you are going slow enough to exit.

53. If you pass pedestrians near the road at night you should:

- A. Turn off your headlights if there are lights on the street.
- B. Use your high beam headlights if there are no oncoming vehicles.
- C. Only use your parking lights.
- D. Keep your headlights on low beam.

55. If the rear of your vehicle is skidding to the left you should:

- A. Move the steering wheel back and forth in a zig-zag pattern.
- B. Turn the top of your steering wheel to the left.
- C. Hold your steering wheel from moving until out of the skid.
- D. Turn the top of your steering wheel to the right.

58. When possible, pedestrians walking along the road should walk:

- A. On the left side facing traffic.
- B. On the right side with traffic.
- C. On the edge of the road rather than on the shoulder.
- D. On the side with the least traffic.

60. In most situations bicycle riders:

- A. Have the right-of-way over all other vehicles.
- B. May not travel on a heavily traveled road.
- C. Are subject to the same rules as motor vehicles.
- D. Must ride against the flow of traffic so they can see and be seen.

62. When approaching a traffic accident or fire you should:

- A. Stop and offer your help to the police.
- B. Turn on your emergency flashers before you drive by.
- C. Drive closer than usual to the vehicle in front of you.
- D. Slow down and watch for people near the scene.

Continue to next page. . .

63. If you come to a sand or snow drift on the road it is best to:
- A. Speed up and drive through it.
 - B. Drive around it if possible.
 - C. Decrease your speed and go through it.
 - D. Shift to a lower gear and drive through it.

65. To avoid spinning the tires on a slippery surface you should:
- A. Alternately use the brake and gas.
 - B. Increase speed slowly.
 - C. Shift from drive to neutral.
 - D. Start in second gear with fast but steady power.

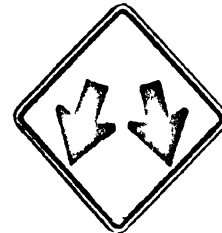
67. Before making a turn you should:
- A. Use hand signals first and then mechanical signals.
 - B. Look to see if other vehicles will be in your way.
 - C. Stop before the turn to inspect the area.
 - D. Move slightly to the left when turning right and slightly to the right when turning left.

64. When driving on a slippery road you should:
- A. Hit your brakes harder to stop.
 - B. Not make quick turns.
 - C. Change speeds often.
 - D. Slow down and stop at every intersection.

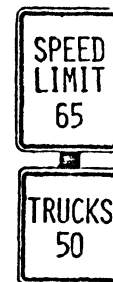
66. The driver of an emergency vehicle may:
- A. Ignore certain traffic laws when responding to an alarm.
 - B. Take the right-of-way when returning from an emergency.
 - C. Endanger the lives of pedestrians to reach his destination.
 - D. Violate traffic signals any time his vehicle is on the road.

68. If you are on a freeway entrance and notice that there is no traffic on the freeway:
- A. Stop before entering the freeway.
 - B. Slow down before entering the freeway.
 - C. Continue smoothly onto the freeway.
 - D. Drive several miles above the legal limit before entering the freeway.

69. This sign means:
- A. Divided road ahead, keep right.
 - B. Obstruction ahead, move to the right or left.
 - C. Road ends ahead, detour.
 - D. Prepare to merge with the traffic ahead.



70. When you see this sign you should:
- A. Drive between 50 mph and 65 mph if you are driving a truck.
 - B. Not drive slower than 65 mph unless you are driving a truck.
 - C. Not drive faster than 50 mph if you are driving a truck.
 - D. Not drive faster than 65 mph during the day and 50 mph at night.



71. When clearing the windshield of frost or ice in extremely cold weather you should avoid using:
- A. Your windshield washer even with anti-freeze.
 - B. The heater.
 - C. The defroster.
 - D. A plastic or rubber scraper on the windshield.

72. The most important reason for passing a truck traveling at 45 miles per hour in a 55 miles per hour zone is:
- A. To improve your ability to see.
 - B. To advance your position in traffic.
 - C. To reduce your travel time.
 - D. To avoid exhaust fumes.

73. To turn on the right turn signal, you:
- A. Press the lever down.
 - B. Push the lever in.
 - C. Pull the lever out.
 - D. Lift the lever up.

74. If, after leaving the road, it is necessary to return to the road without stopping:
- A. Shift to neutral and keep your foot on the brake.
 - B. Speed up to get back on the road quickly.
 - C. Gradually steer back towards the road.
 - D. Hold the steering wheel loosely.

75. If you are backing to the right out of a driveway, you should:
- A. Check only the traffic coming from the left.
 - B. Start forward quickly once you are in the traffic lane.
 - C. Cause traffic to stop by slowly backing out of the driveway.
 - D. Back into the lane nearest the curb.

76. A vehicle generally does not have to be registered in this State if it is:
- A. Regularly used for the commercial transportation of property.
 - B. Used for personal transportation by a non-resident.
 - C. Frequently used for business within this State.
 - D. Used for transporting persons for a fee.

77. You are most likely to see this sign:
- A. In a restricted area.
 - B. On a bridge or tunnel.
 - C. In a parking lot or service area.
 - D. On a country road.



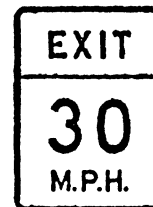
78. Minimum speed limits are:
- A. 15 mph lower than the maximum posted speed limits.
 - B. Not legal and need not be observed.
 - C. The slowest you should drive except when necessary for safety.
 - D. Speed limits between the daytime and nighttime legal speed.

79. If you damage the highway when illegally operating someone else's vehicle with the owner's permission:
- A. You and the owner are both held responsible.
 - B. The highway department is held responsible.
 - C. The owner is the only one held responsible.
 - D. You are the only one held responsible.

80. Having 1 or 2 drinks before driving:
- A. Improves your driving ability.
 - B. Has little or no effect on your driving ability.
 - C. Will affect your reactions and judgment.
 - D. Is illegal.

81. If you are about to drive away from the curb, you should:
- A. Sound your horn and go ahead.
 - B. Signal and pull into the street.
 - C. Signal, yield right-of-way and pull into the street.
 - D. Signal, wait for the first vehicle to pass and pull into the street.

82. This sign means you should:
- A. Slow down to 30 mph on this exit.
 - B. Go no faster than 30 mph before leaving the main road.
 - C. Reduce your speed to 30 mph even if you are not going to exit.
 - D. Expect to go 30 mph after exiting.



83. When turning left at an intersection:
- A. You have the right-of-way over oncoming traffic.
 - B. You should blow your horn and proceed with caution.
 - C. Check cross traffic from both directions.
 - D. Pull halfway into the intersection and edge into cross traffic.

84. Every motor vehicle must be equipped with:
- A. A muffler.
 - B. 4-ply tires.
 - C. A rear window defroster.
 - D. A trunk light.

END OF TEST * * read below

Go back and answer any question you may have skipped over.

Check your answer sheet to make sure all your answers are clearly marked and that any erasures are completely done.