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VISUAL DISPLAY MESSAGE PROGRAM FOR DRIVERS LICENSE OFFICES

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I5. SUPPLEMENTARY NOTES

16. ABSTRACT

A television information display system was established to measure
the benefits of this method of transferring information to minimize
patron delay and waiting time at drivers licensing facilities in Arizona.
Such display systems were found to be helpful to the public but did
significantly improve the efficiency of the MVD licensing procedure.

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DRIVER LICENSING TELEVISION INFORMATION DISPLAY

EVALUATION PROJECT REPORT

I.   INTRODUCTION

   A.   Purpose

   The driver licensing television information display evaluation project was
   undertaken to assess the benefits of providing televised information to
   driver license applicants waiting in line. Typically, a citizen arriving
   at a major driver licensing facility will have to stand in line at the cashier
   counter (first processing position) in order to begin the application process.
   In some instances, applicants wait in line and are then "turned away" by the
   cashier because they lack proper identification, proof of age, guardianship
   signatures, etc. In theory, providing information regarding these requirements
   to applicants in line should minimize cases where people wait in line for some
   time only to be "turned away" by the cashier. Additionally, a significant
   amount of cashier time is spent answering applicant's questions. Providing
   routine information to applicants in line should decrease the number of
   questions asked, and improve over-all cashier efficiency. Finally, it is
   intuitively appealing to suppose that applicants will "suffer" the initial
   waiting queue better if they are being "served" by an informational process,
   rather than merely standing in line.   The purpose of this project was to
   evaluate the use of computer-generated television information displays as a
   means of providing these services to waiting applicants.

B.   Study Objectives

To fulfill its over-all purpose, the evaluation project had the following
specific objectives:

* Determine if the information displays were useful to the
  public.

* Determine if the information displays were beneficial to
  the cashiering operations (i.e., increased throughput).

* Determine if the information displays enhanced the Motor
  Vehicle Division's public image.

* Determine the appropriate types of hardware and software.

C.   Study Procedure

The evaluation effort was limited to two driver license facilities: Mesa
and Tucson Main. The equipment and display software selected for use at
the two sites differed in order to facilitate evaluating the need for
special display systems. At both facilities, information on procedures,
fees, requirements, etc. was displayed on wall-mounted, 25" color monitors.

At the Mesa site, a "MycroTek" MV 11000 MAX Character Generator" was used
to program a continuous information display with a 4.5-minute repeat
cycle time. Graphics and safety messages were interspersed throughout the
cycle to stimulate viewer attention. The major strong point of this system
was ease of use. Its high-level system software made message development
(and alteration) a relatively simple procedure.   This was considered to be
the "first class" approach to the problem.

At Tucson Main, an Apple IIe with a single disc drive was used. A BASIC
computer program was used to generate a 7.5-minute repeating display. This
program, along with a start-up routine, was stored on a floppy disc left in
the disc drive. When the system was switched on in the morning, the program
automatically "booted-up" and repeated the message cycle continuously through-
out the day. Like the Mesa display, graphics and safety messages were
interspersed with the prime messages to stimulate viewer attention. This
system was less expensive than the "MycroTek" MV 11000, but altering the dis-
plays required re-writing the BASIC programs involved. This was considered to
be the "mid-cost" approach.

Originally, it was intended to also evaluate a "minimum-cost" approach whereby
fixed display boards would be videotaped and shown for fixed periods.   This
alternative was abandoned early on due to its low-quality (poor image) aspects
and the need to re-film every time a message change was required.

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* MycroTek "Supra" System specifications are provided in Enclosure (1).

D.   Findings

The televised information displays proved to be popular with the applicants.
Most significantly, 79 percent of the applicants responding to the survey
thought that the information provided had helped them personally.

There appeared to be only marginal enhancements to the "cashiering" operation.
Examiner responses indicated that only 15 percent perceived a reduction in
the number of questions asked by applicants.

The extremely positive public response tends to indicate that the information
displays did enhance the Motor Vehicle Division's image. In response to the
question: "Do you think that the TV information display is a good idea?"-- 99
percent of the applicants responded "Yes".

As to system suitability, both the MycroTek (high-level language) and Apple IIe
(BASIC programs) systems proved to be adequate. The MycroTek System was, how-
ever, easier to use and update, and the Examiners appeared to be more favorably
impressed by that system.

The first three objectives, determining the system's usefulness to the public and MVD, and assessing their impact on the Division's public image had to be achieved through the use of surveys. Continuing operational procedure changes and the cost of time studies precluded the use of more definitive approaches.

Public opinion surveys were performed at both facilities. At each site, 200 questionnaires were given to applicants being processed at the cashier position. Each applicant was asked to complete the survey form and turn it in to the next Examiner along with their completed license application form. This procedure resulted in collection of 297 usable survey responses.

Employee opinion surveys were also conducted at both facilities. Employees were asked to fill out questionnaires, not sign them, seal them in unmarked envelopes and turn them in. Each employee was directed to refrain from discussing the survey with colleages. Twenty-seven of these questionnaires were collected and analyzed.

The final objective, determining appropriate types of hardware and software, was accomplished through 14 months of operational experience with the two different systems, coupled with the survey results.

II. PERFORMANCE OF STUDY

A. Equipment Selection

Research indicated that there were three levels of system capability available:

1. The "top-of-the-line" systems incorporated specialized hardware and "high-level" software which allowed the user to easily specify various types of display (scroll, bang, etc.) and text (character size, color, etc.)

2. The standard microcomputer system which allowed the user, through BASIC programming, the capability to create tailored display programs. The basic draw-back to this approach was the need to write and de-bug BASIC programs.

3. The VIDEOCAM approach which entailed videotaping message boards (or "announcers") and then playing the video tapes over television systems via a VCR.

For this effort, the decision was made to use one system representative of each of the first two capability levels. (The VIDEOCAM approach was abandoned due to anticipation of poor-image results and the difficulty of making message changes.) The following two systems were selected for the evaluation:

1. MycroTek Character Generator

   The MycroTek Character Generator is a "tailored" hardware/
   software system which permits the user to create displays
   on a CRT or T.V. screen with a minimum of keystrokes.
   Colors, scrolling or "bang" displays, and letter size are
   all selectable. It is relatively easy to create displays
   and then modify them to accommodate operational changes or
   seasonal messages. (Enclosure-1 contains system specifica-
   tions.)

   System costs are approximately as follows:

MycroTek Character Generator	$3,000
Video Display	700
Miscellaneous	200
	$3,900

2. Apple Microcomputer

   The Apple system used in this evaluation consisted of a
   standard Apple-IIe processor with a DOS 3.3 operating
   system and a single 5¼" floppy disc drive. The display
   program consisted of approximately 1800 lines of code
   BASIC.

   System costs are approximately as follows:

Apple IIe Microcomputer System	$1,200
Video Display	700
Miscellaneous	200
	$2,100

B.   Equipment Installation

The MycroTek Character Generator system was installed at the Mesa driver
license facility; the Apple IIe was placed at the Tucson Main driver
license office. In both cases, a 25" color television set was used as the
display device, and the rest of the system was located out of public view
through the use of extra-length cables.

The primary consideration for TV set location was to ensure that applicants
near the tail end of the initial waiting queue could see the device. This
led to placing the TV set about eight feet above floor line, with the screen
directed down the waiting line. Since the waiting line at Mesa proceeds
straight to the cashier counter, applicants there had the screen in sight
during the entire wait. At Tucson Main, the line turns right 90 degrees at
about the fourth-person-in-line position. Thus, all applicants in line
could see the TV, but the first few before the counter had to look left 90
degrees to view the display.

C. Equipment Operation

The Mycrotek system was turned on at the start of the evaluation, and was never turned off. Since the entire operation was electronic, there was no real requirement to turn the system off. This system operated with no problems for the entire 14-month test period. Information update was easily accomplished using the keyboard and high-level language.

The Apple system had to be handled differently because it required mechanical action of the floppy disc drive every few minutes. The DOS 3.3 operating system, a "bootstrap" program and the display programs were stored on the floppy disc. Every morning when electrical power was turned on, the system was activated, the first program was automatically loaded and the display sequence began. At night, the system was deactivated to reduce wear on the disc drive. This system developed an intermittant, high-frequency "whine" which annoyed some employees. Whenever this happened, the employees turned the system off for a while and then turned it back on. The only real problem encountered was that information updates required re-programming (and de-bugging) in BASIC. This proved to be a major inconvenience on two occasions.

D. __Method of Determining Results__

The two systems were used daily over a fourteen-month period. Operational/
system problems were observed and noted as above.

At the end of this period, public opinion surveys were performed at both
test facilities. At each site, 200 questionnaires were given to applicants
being processed at the cashier position. Each applicant was asked to complete
the survey form and turn it in to the next Examiner along with their completed
license application form. This procedure resulted in collection of 297 usable
survey responses.

Employee opinion surveys were also conducted at both facilities. Employees
were asked to fill out questionnaires, __not__ sign them, seal them in unmarked
envelopes and turn them in. Each employee was directed to refrain from
discussing the survey with colleages. Twenty-seven of these questionnaires
were collected and analyzed

III. FINDINGS

A.   Public Opinion

Figure-1 is the applicant questionnaire with percentage figures entered
which reflect the opinions marked on 297 returned survey forms. The results
indicate that the televised displays were highly popular with the public.
Most significant, perhaps, is the public's response to Question #6, which
indicates that 79 percent of the respondees thought that the information
provided had helped them personally.

MOTOR VEHICLE DIVISION QUESTIONNAIRE

The Motor Vehicle Division is trying to find out if the TV information display in the lobby is a help to you, our customer. We need your help. If you can spare the time, please answer the questions below and turn this sheet in to the examiner along with your application. Thank you.

1. Did you notice the TV set displaying information?
   72% Yes
   28% No. (If you answered "No", stop. You do not need to answer any more questions.)

2. Did you watch the TV display?
   38% All of it.
   55% Some of it.
   7% None of it. (If you answered "None", stop. You do not need to answer any more questions.)

3. Was the information displayed easy to see?
   96% Yes
   4% No.

4. Was the information displayed easy to understand?
   97% Yes
   3% No.

5. Was the TV set located in a good place?
   98% Yes
   2% No.

6. Did the information you saw on the TV help you in any way?
   79% Yes
   21% No.

7. Do you think that the TV information display helps people?
   45% Many people.
   53% Some people.
   2% Very few people.

8. Do you think that the TV information display is a good idea?
   99% Yes
   1% No.

Thank you again for your help. Please give this sheet to the examiner along with your application.

*** PERCENTAGES SHOWN REFLECT ALL COMPLETED APPLICANT QUESTIONNAIRES FROM BOTH TEST FACILITIES ***

FIGURE-1

Figure-2 shows the applicant questionnaire again, this time with
the response percentages split between Tucson and Mesa. There
are several significant points:

* The percent of applicants noticing the T.V. display
  (Question #1) was significantly lower in Tucson than
  in Mesa. This was most likely caused by the difference
  in queue arrangements. In Mesa, the T.V. is mounted above
  the cashier counter, and the entire waiting line has a
  clear view of the display. At Tucson Main, however, the
  waiting line takes a 90-degree turn to the cashier counter
  at about the fifth-person-in-line position. Applicants
  behind the fifth person are facing the T.V. display; those
  at the head of the line are facing the cashier counter
  instead. If the line is short (less than five), there is
  a reduced probability that the next applicant will see the
  T.V. screen.

* The percent of applicants watching all of the display
  (Question #2) is much higher at Mesa than at Tucson Main.
  This is probably due to the difference in total message
  cycle length. The message sequence at Mesa lasted 4.5
  minutes before repeating; the cycle length at Tucson Main
  was 7.5 minutes. The difference in percentages of applicants
  who saw the T.V., but watched none of the messages (17% in
  Tucson, 5% in Mesa) may be caused by several factors -- the
  right turn in the Tucson queue, a difference in presentation
  quality or average queue length.

* In all other areas (Questions 3-8), public response was
  slightly better at Mesa than in Tucson, but the differences
  are not large.

The Motor Vehicle Division is trying to find out if the TV information display in the lobby is a help to you, our customer. We need your help. If you can spare the time, please answer the questions below and turn this sheet in to the examiner along with your application. Thank you.

TUCSON-MESA

1. Did you notice the TV set displaying information?

39% - 93% Yes

61% - 7% No. (If you answered "No", stop. You do not need to answer any more questions.)

2. Did you watch the TV display?

13% - 44% All of it.

70% - 51% Some of it.

17% - 5% None of it. (If you answered "None", stop. You do not need to answer any more questions.)

3. Was the information displayed easy to see?

79% - 99% Yes

21% - 17% No.

4. Was the information displayed easy to understand?

95% - 98% Yes

5% - 2% No.

5. Was the TV set located in a good place?

92% - 99% Yes

8% - 1% No.

6. Did the information you saw on the TV help you in any way?

74% - 80% Yes

26% - 20% No.

7. Do you think that the TV information display helps people?

26% - 49% Many people.

71% - 49% Some people.

3% - 2% Very few people.

8. Do you think that the TV information display is a good idea?

95% -100% Yes

5% - 0% No.

Thank you again for your help. Please give this sheet to the examiner along with your application.

*** PERCENTAGES SHOWN REFLECT COMPLETED APPLICANT QUESTIONNAIRES AT TUCSON (LEFT COLUMN) AND AT MESA (RIGHT COLUMN)***

FIGURE-2

B. Employee Opinion

Figure-3 is the employee questionnaire, with percentage figures entered which reflect the opinions marked on all 27 employee survey forms. In general, the employees held a much lower opinion of the utility of these systems than did the applicants. However, the employee responses in Tucson and Mesa were significantly different. Mesa employees viewed their systems far more positively. (The next figure addresses this dichotomy.)

MVD DRIVER LICENSE

EMPLOYEE QUESTIONNAIRE

The purpose of this questionnaire is to help the MVD Field Services Group evaluate
the effectiveness of the television information displays at the Mesa and Tucson
Main facilities. Please answer all of the questions to the best of your ability.
You will not be asked to identify yourself. Do not discuss this questionnaire or
your answers with your fellow employees until the survey has been completed. When
you have finished answering the questions, place the questionnaire in the envelope
provided and return it to your Officer-in-Charge. Thank you for your assistance.

PLEASE CHECK THE RESPONSE WHICH BEST DESCRIBES YOUR OPINION

1. I work in the driver license facility in:

    41%   Mesa

    59%   Tucson.

2. I am able to observe applicants in a position to view the television display:

    11%   Almost all the time

    33%   Most of the time

    37%   Some of the time

    19%   Almost never.

3. Of all applicants, I think that:

    4%   Almost all notice the TV display

    30%   Most notice the TV display

    26%   Some notice the TV display

    41%   Only a few notice the TV display.

4. Of all applicants, I think that:

    0%   Almost all watch the information displayed

    18%   Most watch the information displayed

    30%   Some watch the information displayed

    52%   Only a few watch the information displayed.

***   PERCENTAGES SHOWN REFLECT ALL EMPLOYEE RESPONSES ***

FIGURE 3-1

5. One of the purposes of the TV information display is to reduce employee time
    required to answer questions. Since the TV information display system has
    been installed, I think that:

    __4%__ Applicants ask far fewer questions

    __11%__ Applicants ask fewer questions

    __81%__ Applicants ask about the same number of questions as before

    __4%__ Applicants ask more questions.

6. One of the purposes of the TV information display is to "weed out" applicants
    in line who are not eligible, do not have the necessary papers, etc. Based
    upon my observations, I think that:

    __4%__ Many people leave the line because of information they see on the display

    __15%__ Some people leave the line because of information they see on the display

    __81%__ Hardly any people leave the line because of information they see on the
             display.

7. I have personally:

    __72%__ Seen all of the display message

    __24%__ Seen some of the display message

    __4%__ Not seen the display message.

8. I think that the biggest problem with the TV display system in my facility is:

    __16%__ TV screen is too small

    __0%__ TV screen is too large

    __23%__ TV screen is in a poor location

    __13%__ TV messages are too hard to read

    __48%__ TV messages need to be re-done to be more effective.

9. I think that the TV information display system:

    __30%__ Is generally effective

    __70%__ Is generally not effective.

FIGURE 3-2

10. I think that the TV information display system:

    <u>40%</u>   Improves MVD's public image

    <u>60%</u>   Does not improve MVD's public image.

Again, thank you for your assistance. Remember -- do not discuss this question-naire, or your answers, with your fellow employees until the survey has been completed.

FIGURE 3-3

Figure-4 depicts employee response percentages separately. Tucson
data are in the left-hand column; Mesa data are in the right-hand
column. In all areas, Mesa responses indicate a more positive
view of their (MycroTek) system than Tucson employees held regard-
ing their (Apple) system. Key points are:

* More Mesa employees were able to observe the applicant
  queue (Question #2) leading to the cashier counter.
  (Note: Exposure did not appear to lead to a more
  positive attitude at either facility.)

* Mesa employee perceptions (Question 3-4) of applicant
  viewing were more closely aligned with applicant
  responses. Tucson felt that only a "few" noticed or
  watched the display.

* About a third of Mesa employees felt that their system
  decreased applicant questions and "weeded" people out of
  the line. In Tucson, only six percent reported such
  positive results.

* Similarly, Mesa employees were about evenly split on the
  effectiveness and image enhancement of their system. Tucson
  employees were more negative.

MVD DRIVER LICENSE

EMPLOYEE QUESTIONNAIRE

The purpose of this questionnaire is to help the MVD Field Services Group evaluate the effectiveness of the television information displays at the Mesa and Tucson Main facilities. Please answer all of the questions to the best of your ability. You will not be asked to identify yourself. Do not discuss this questionnaire or your answers with your fellow employees until the survey has been completed. When you have finished answering the questions, place the questionnaire in the envelope provided and return it to your Officer-in-Charge. Thank you for your assistance.

PLEASE CHECK THE RESPONSE WHICH BEST DESCRIBES YOUR OPINION
TUCSON-MESA

1. I work in the driver license facility in:

  - 41% Mesa

59% -____ Tucson.

2. I am able to observe applicants in a position to view the television display:

19% - 0% Almost all the time

19% - 55% Most of the time

43% - 27% Some of the time

19% - 18% Almost never.

3. Of all applicants, I think that:

0% - 9% Almost all notice the TV display

13% - 55% Most notice the TV display

25% - 27% Some notice the TV display

63% - 9% Only a few notice the TV display.

4. Of all applicants, I think that:

0% - 0% Almost all watch the information displayed

6% - 36% Most watch the information displayed

13% - 55% Some watch the information displayed

81% - 9% Only a few watch the information displayed.

***   PERCENTAGES SHOWN ARE EMPLOYEE RESPONSES FROM TUCSON (LEFT COLUMN)
        AND MESA (RIGHT COLUMN).

FIGURE 4-1

5. One of the purposes of the TV information display is to reduce employee time required to answer questions. Since the TV information display system has been installed, I think that:

0% - 9% Applicants ask far fewer questions

6% - 18% Applicants ask fewer questions

94% - 64% Applicants ask about the same number of questions as before

0% - 9% Applicants ask more questions.

6. One of the purposes of the TV information display is to "weed out" applicants in line who are not eligible, do not have the necessary papers, etc. Based upon my observations, I think that:

0% - 9% Many people leave the line because of information they see on the display

6% - 27% Some people leave the line because of information they see on the display

94% - 64% Hardly any people leave the line because of information they see on the display.

7. I have personally:

75% - 67% Seen all of the display message

25% - 22% Seen some of the display message

0% - 11% Not seen the display message.

8. I think that the biggest problem with the TV display system in my facility is:

6% - 29% TV screen is too small

0% - 0% TV screen is too large

29% - 14% TV screen is in a poor location

18% - 7% TV messages are too hard to read

47% - 50% TV messages need to be re-done to be more effective.

9. I think that the TV information display system:

13% - 55% Is generally effective

87% - 45% Is generally not effective.

FIGURE 4-2

10. I think that the TV information display system:

31% - 55% Improves MVD's public image

69% - 45% Does not improve MVD's public image.

Again, thank you for your assistance. Remember -- do not discuss this question-
naire, or your answers, with your fellow employees until the survey has been
completed.

FIGURE 4-3

C. <u>Systems Experience</u>

    (1)   <u>MycroTek Character Generator</u>

The MycroTek Character Generator is a "tailored" hardware/software system which permits the user to create displays on a CRT or T.V. screen with a minimum of keystrokes. Colors, scrolling or "bang" displays, and letter size are all selectable. It was relatively easy to create displays and then modify them to accommodate operational changes or seasonal messages. (Enclosure-1 contains system specifications.) <u>No</u> problems were encountered with this system during the 14-month trial period.

System costs are approximately as follows:

MycroTek Charactor Generator	$3,000
Video Display	700
Miscellaneous	200
	$3,900

    (2)   <u>Apple Microcomputer</u>

The Apple system used in this evaluation consisted of a standard Apple-IIe processor with a DOS 3.3 operating system, a single floppy disc drive and a 25-inch color T.V. unit. The display program consisted of approximately 1800 lines of code in BASIC. The DOS 3.3 operating system, a start-up routine and the display programs were stored on a 5¼" floppy disc. As soon as the master electric power switch for the over-all system was turned on, the programs were automatically loaded and the display began.

Functionally, the displays created by this system were restricted by the amount of coding necessary to create graphic-type displays (Some were used.) And, changing the wording displayed required re-programming (in BASIC). This proved to be a major problem on two occassions. The system also developed an intermittant, high-frequency whine which annoyed employees working in the vicinity. (Whenever this manifested itself, the employees turned off the system for a while.)

System costs are approximately as follows:

Apple IIe Microcomputer System	$1,200
Video Display	700
Miscellaneous	200
	$2,100

IV.   CONCLUSIONS

   A.   Television Information displays significantly assist the public.

   B.   Such systems are only marginally beneficial to the efficiency of the "cashiering" process.

   C.   Such systems do enhance the Motor Vehicle Division's public image.

   D.   Both character-generator and microcomputer systems provide satisfactory informational displays. A high-level language, character-generator system is significantly easier to program and update.