Are They Really Ready for a Driver’s License?

Evaluating the Effectiveness of a Virtual Driving Test for Predicting Road Exam Readiness

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Ohio Department of Public Safety
Are they really ready?

March 22, 2018

Minnesota teen taking license test crashes through wall of driving exam building
Big picture: A Safer Ohio

OBMV’s objectives:
● During road exam:
  ○ Employee safety
  ○ Customer safety
  ○ Safety of others sharing the road

How do we get there?
● A reliable screening tool to extend our road exam
Why? A picture is worth a thousand words
Crash rate per 10000 licensed novice drivers

Motor vehicle crashes in Ohio

<table>
<thead>
<tr>
<th>Fact</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3</strong> fatal crashes per day</td>
</tr>
<tr>
<td><strong>212</strong> injury crashes per day</td>
</tr>
<tr>
<td><strong>20%</strong> of all fatal crashes had a driver 16-25 y.o.</td>
</tr>
<tr>
<td><strong>26%</strong> of all injury crashes had a driver 16-25 y.o.</td>
</tr>
</tbody>
</table>

*Source: Ohio Traffic Crash Facts, 2016*
Public safety at our core
Trying to close the safety gap

Ohio’s solution:
Virtual driving test as a pre-screen to ensure adequate skills before road exam

✓ Safety of our examiners
✓ Safety of our new drivers
✓ Safety of those who share our roads
Background

1. Driver training
2. Driver testing
3. Driver safety
Traditional OH testing process

< 18 y.o.

Written test

18 y.o. and older

Driver’s Ed + 50 hours

Nothing

Road exam
OH testing process with VDT

- **< 18 y.o.**
  - Written test
  - Driver’s Ed + 50 hours

- **18 y.o. and older**
  - Written test
  - Nothing

- Road exam
Partnering with CHOP

Preparing to partner:
- Bid process
- Finalizing contract
- Let’s get to work

Working with CHOP:
- Design
- Role of SMEs
- CHOP spin-out → DD
Challenges

- Difference in focus
- Time constraints
- Acceptance
About the virtual driving test

- Standardized
- Validated
- Self-directed
- Plug-and-play in licensing workflow
  - Runs on common and inexpensive hardware
  - No complicated IT integration
- SaaS pricing model
Virtual driving test workflow

All self-directed workflow

Video orientation
- On-screen orientation

Introductory drive
- Acclimation drive + comprehension assessment

Assessment drive
- Randomly assigned from a bank of 10 scenarios reproducing central-Ohio driving environments
Virtual driving test metrics

(not a comprehensive list)

- **Operational**
  - Time to complete
  - Comprehension assessment
  - Customer feedback

- **Driving performance**
  - Collisions
  - Reaction time
  - Following distance
  - Speed management
  - Traffic lights
  - Stop signs
  - Missed directions
Development and implementation

- **Project kickoff**
  - Jan 2017: Iterative design and development of driving scenarios using feedback from OBMV SMEs
  - Feb 2017: Develop custom administrative features
  - Mar 2017: Alpha testing of complete VDT application obtaining feedback from OBMV SMEs
  - Apr 2017: Preparations for pilot testing in the field
  - May 2017: Train OBMV field staff on VDT
  - Jun 2017: UAT with key stakeholders
  - Jul 2017: Pilot testing begins

- **Jan 2017**
  - UAT with key stakeholders

- **Feb 2017**
  - Develop custom administrative features

- **Mar 2017**
  - Alpha testing of complete VDT application obtaining feedback from OBMV SMEs

- **Apr 2017**
  - Preparations for pilot testing in the field

- **May 2017**
  - Training OBMV field staff on VDT

- **Jun 2017**
  - Pilot testing begins
Pilot testing: July 2017-present
Pilot strategy

- **4 locations**: Columbus; Zanesville
- **During pilot**: All go on to Road Exam (RE); Results not shared
Defining success metrics for pilot

- **How we define success**
  - Scoring algorithm
  - Minimize false alarms

- **Ultimate definition:**
  - Acceptance by public and state policymakers as a legitimate gauge of customer readiness for a road exam
## Feasibility & reliability

### Feasible: Short & user-accepted
- Median duration (orientation, intro & VDT): 12.1 min
- Customer feedback:
  - I understood directions (provided in simulator): 4.1
  - I felt comfortable with driving controls: 3.4
  - I felt comfortable driving the simulator: 3.5

### Reliable: Few, minor tech issues
- Service level agreement (SLA) critical events: 0
- Non-critical technical events (resolved remotely): 3

### Summary
- 8089 VDTs administered (to date)
- 1728 hours of service operation

1. Scaled 1-5 (5=Strongly agree)
## Preliminary validation results

<table>
<thead>
<tr>
<th></th>
<th>All (N=2143)</th>
<th>Pass RE (N=1700)</th>
<th>Fail RE (N=443)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean VDT Error Score (0-28)</td>
<td>4.0</td>
<td>3.3</td>
<td>6.1</td>
<td>&lt;0.001</td>
</tr>
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### Success criteria

<table>
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<th>Success criteria</th>
<th>Result</th>
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<tr>
<td>Algorithm fail rate</td>
<td>6 out of 100 customers failed the VDT</td>
</tr>
<tr>
<td>False alarm</td>
<td>Of all customers, only 1 in 100 fail VDT but pass RE</td>
</tr>
<tr>
<td>Accuracy</td>
<td>VDT correctly categorizes 8 out of 10 customers’ RE results</td>
</tr>
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</table>
How to optimize scoring algorithm

- Evaluate event-specific performance
  - Critical zones
  - Vulnerable road users: crosswalks
  - Intersection conflicts
  - Merging challenges
  - Erratic lead vehicle
Next steps for OBMV

● Further refinement:
  ○ Optimize scoring algorithm
    ■ **Goal**: 85-90% accuracy while minimizing “false alarms”
● Expand across state
● Provide automated, personalized and actionable feedback
Test drive the VDT today!

Booth # 742
Thank you!

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