

Marine Corps Operational Test & Evaluation Activity



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Impacts of the Learning Curve Operational Test and Evaluation

Operational Testing Challenges



NDIA Abstract (Agenda)

- In the conduct of operational testing MCOTEA often experiences operator learning curves.
- Operator learning curves can be a nuisance to distinguishing between true system operational performance and operator learning.
- How MCOTEA assesses the learning curve prior to commencement of the record test portion of operational testing.
- Application of the learning curve data as a means to evaluate new equipment training packages, training systems, and formal training programs.



MCOTEA Mission

MCOTEA provides operational testing and evaluation on behalf of the Marine Corps and conducts additional testing and evaluation as required to support the Marine Corps mission to man, train, equip and sustain a force in readiness.



Why Do We Care?

- MCOTEA evaluates the system...and the system includes the operators and training.
- Operational Test Readiness Review
 - Training documents have been provided to the OTA 30 days prior to the OTRR.
 - Training has been completed and is representative of that planned for fleet units.
 - The OT&E manning of the system is adequate in...experience level to simulate normal operating conditions.



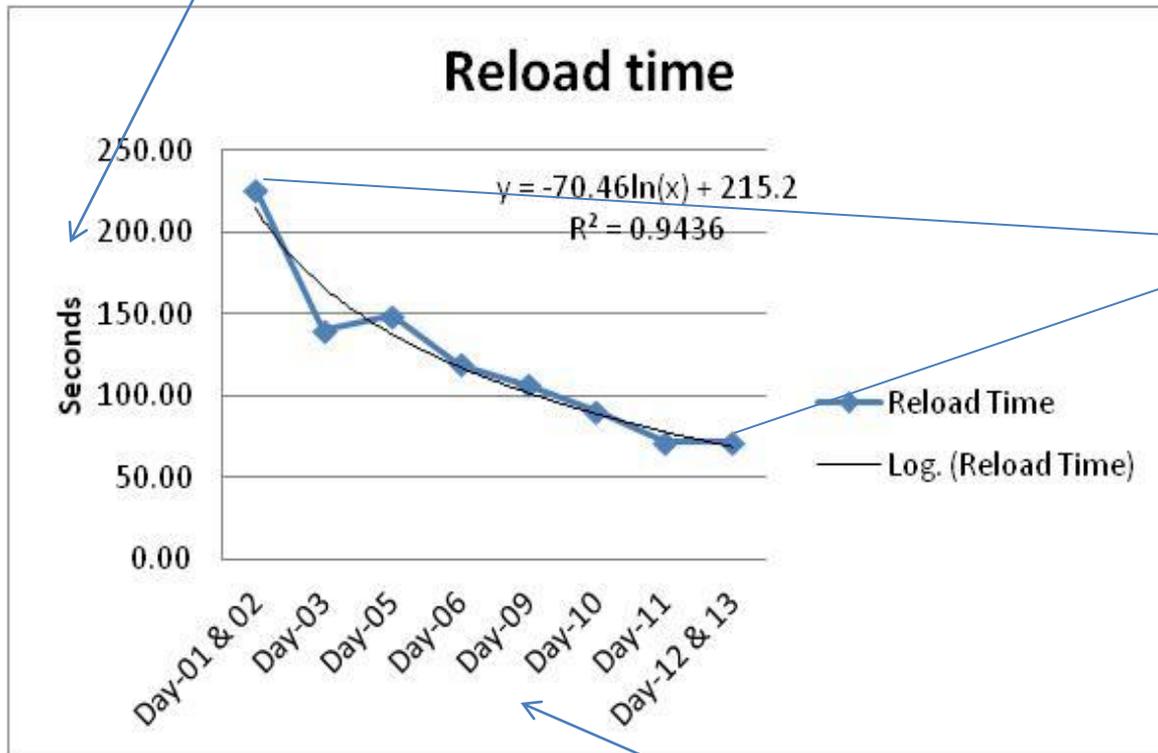
What is a Learning Curve?

- When several trials are given in an experiment and measures of learning or of retention are obtained, these measures may be plotted in the graphic form known as a learning curve, a graph which affords a comparison of the performance on each trial with a performance on other trials.¹



Learning Curve Example

Dependent Variable (reload time)



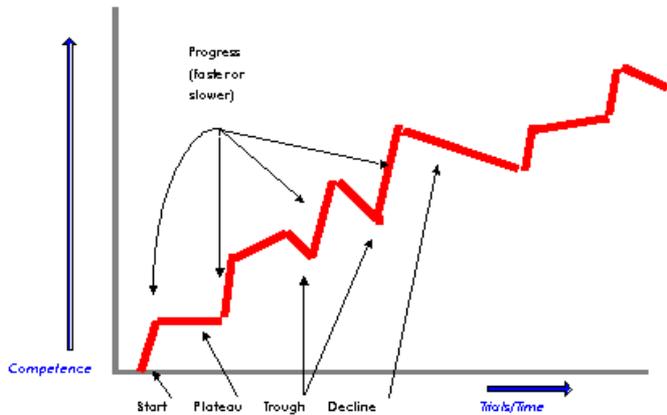
68.42% Improvement?

This example depicts a negative acceleration curve showing a decrease in the rate of gain.

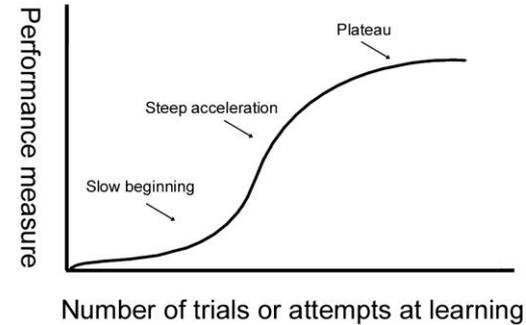
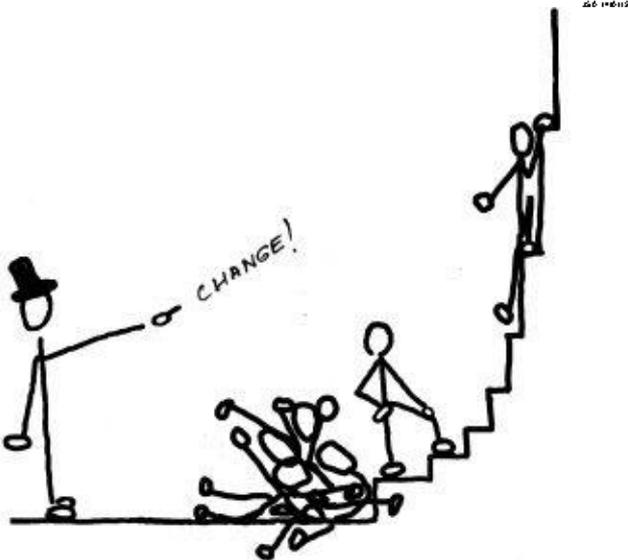
Independent Variable (trials)



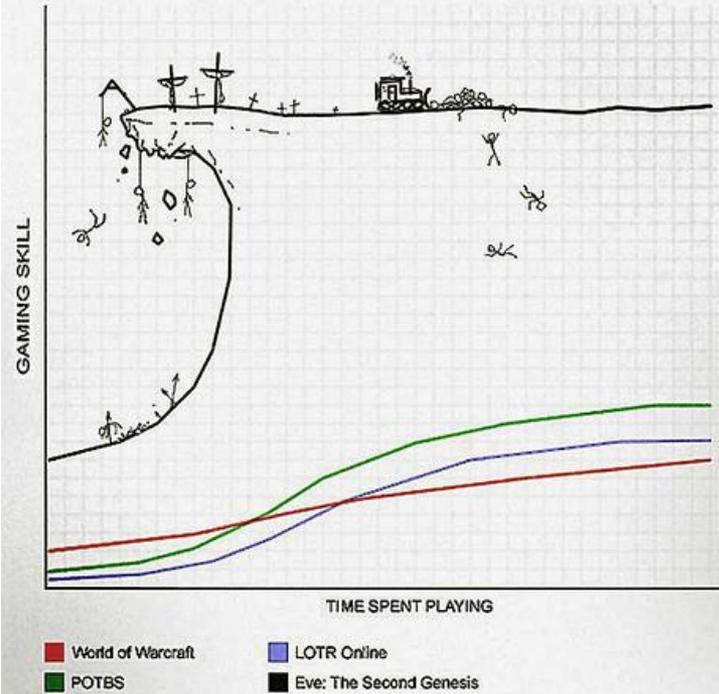
Other Learning Curves



A Learning "Curve" is far from a straight progression



LEARNING CURVES OF POPULAR MMORPGS





Why Learning Curves?

- Operational testing lessons learned
 - New systems
 - Discovery of training inadequacy
 - Structure of forces (cohesion)
- Distinguishing between true operational performance and operator learning
- Training and proficiency



Mitigation Prior to Record Test

- Test Design
 - Randomization
 - Control
 - Replication
- New Equipment Training evaluation
- Extended pilot test
- Training certification
- Continuous evaluation



Learning Curve Applications

- New Equipment Training packages
- Training systems
- Formal training programs



Questions?

Marine Corps Operational Test and Evaluation Activity
(MCOTEA)

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BACKUP SLIDES



References

1. Garry, R., and Kingsley, H.L. The Nature and Conditions of Learning, Prentice-Hall, Inc., New Jersey, 1970.



Potential Models

- Henderson's Law (power law function)
 - $C_n = C_1 n^{-a}$
 - Where
 - C_1 is the cost of the first unit of production
 - C_n is the cost of the nth unit of production
 - n is the cumulative volume of production
 - a is the elasticity of cost with regard to output
- Exponential Model



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