Using the ‘Red Pill’ to Conceptualize Training Optimization; Insights on Future Learning Ecosystems from ‘The Matrix’

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Using the ‘Red Pill’ to Conceptualize Training Optimization

*Insights on Future Learning Ecosystems from ‘The Matrix’*

iFEST 22

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August 2022
What did Trinity “Learn”? (In less than 30 seconds!)

- Comprehensive technical skills training
- Start and operate a medium-lift twin engine helicopter, single pilot, day/VMC, high-rise urban environment, AIE, weapons employment, emergency procedures, high-performance tactical aircraft maneuvering
- Restructuring of neural networks and mental models to shift information processing from:

  **Conscious**
  Limited attentional resources, working memory capacity

  **Subconscious**
  Second nature, muscle memory

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Training Requirements

‘Matrix’ Example

- Clear statement of expectations and outcome ("a pilot program")
- What was Trinity’s prior aviation experience?
- Needs analysis and feedback

22nd Century Expectations

- Precise training on a specific skill or behavior at precisely the right time, at the precise level of knowledge for the stated requirement and student
- Detailed understanding of student’s previous knowledge and experience
- Training Needs Analyses (TNA) structured around refined requirements schedules and evaluation strategies, fully integrated into performance feedback loops
Methodology

‘Matrix’ Example

- Time to train is critical
- Receive, comprehend, and assimilate complex knowledge quickly
- Trinity did not view a PPT slide deck

22nd Century Expectations

- Time becomes the most precious training variable
- Rapid content delivery based on previous experience and knowledge
- ISD strategies and taxonomies to align approach and media (hyper-focused, individualized curriculum)
  - Neuroscience and behavioral psychology as ISD tools
  - ‘Bake in’ high levels of flexibility and adaptability
- Adaptation and improvisation, reflecting higher order cognition and synthesis skills
- Metacognitive and self-efficacy practices, competency-based learning frameworks, adaptive learning construct
Tools & Environment

‘Matrix’ Example

• Specific tool for specific outcome
• Injecting knowledge vs. acquiring it on demand
• Trinity did not rehearse in “The Construct”

22nd Century Expectations

• Media analysis to deliver ‘right tool, right outcome’
• Brick & Mortar to Metaverse
  • Distance Education / Distributed Learning
• Synthetic Environments for learning and rehearsal
• Understanding training needs for unknown or indeterminate variables
• Flight Training vs. Jujitsu
Trends for Future Learning Ecosystems

Technological and Methodological Changes for 22\textsuperscript{nd} Century Training System Design

- **Biometrics / Cognitive Load Structures**
  - Enhanced understanding of human performance limitations in learning

- **Human/Machine Teaming (HMT) / Brain-Computer Interface (BCI)**
  - Reassessing the interaction between human and machine

- **Blockchain**
  - Immutable, secure personal training records

- **Integrated Virtual Classrooms**
  - Integrating VR and experiential learning constructs
Thank you

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Elements of Adaptive Learning

Personalized learning journeys, integrating instructional methodology with education technology to improve outcomes and capacity.

- Monitoring user activities
- Interpreting domain-specific models
- Inferring requirements and preferences
- Model representation
- Dynamically facilitating the learning process

Learner Profile
- Demographics
- Previous Experience
- Individual Competencies

Learning Science
- Cognitive Load
- Biometrics
- Evaluation Strategies

Learning Management System
- Accessibility
- Integration
- Security

Distributed Instruction
- Security
- Platform Agnostic
- Social Connections

Technology
- VR/AR/XR
- Artificial Intelligence/Machine Learning
- Gamification
- LVC

Low-Cost Individual Training Devices
- Accessible
- Affordable
- Concurrency

Feedback Systems
- Student / Instructor
- Program
- End User

Data Analytics
- Structures to Collect / Analyze
- Security
- Exploitation Strategies

Future Trends in Learning Science

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Future Trends in Learning Science

• Micro-learning vs. Comprehensive Instruction
  • Student-focused standards in instructional design

• Credentialing / Badging
  • Reimagining competency-based approaches to evaluation and certification

• Increasing Emphasis in Environmental and Social Governance (ESG)/Diversity, Equity, and Inclusion (DEI)
  • Culturally-reflective education models