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Reconciling the Science and Practice of Extended Reality Training

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Ms. Janet Spruill
Vice President, Programs
Aptima, Inc.
Orlando, FL

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We Optimize Human Performance

Apply **Human Centered Engineering** methods and technologies to optimize the performance of humans in technology intensive, mission critical settings.

Performance Assessment Technologies | Improving organizational performance by optimizing individual and team performance

Intelligent Analytic Technologies | Combining data analytics with immersive, naturalistic user experiences to create seamless analyst-machine interfaces

Performance Augmentation Systems | Precisely addressing gaps in performance and forming true human-machine partnerships

Learning and Training Systems | Delivering the right experience at the right time to foster development both within single learning events and over time

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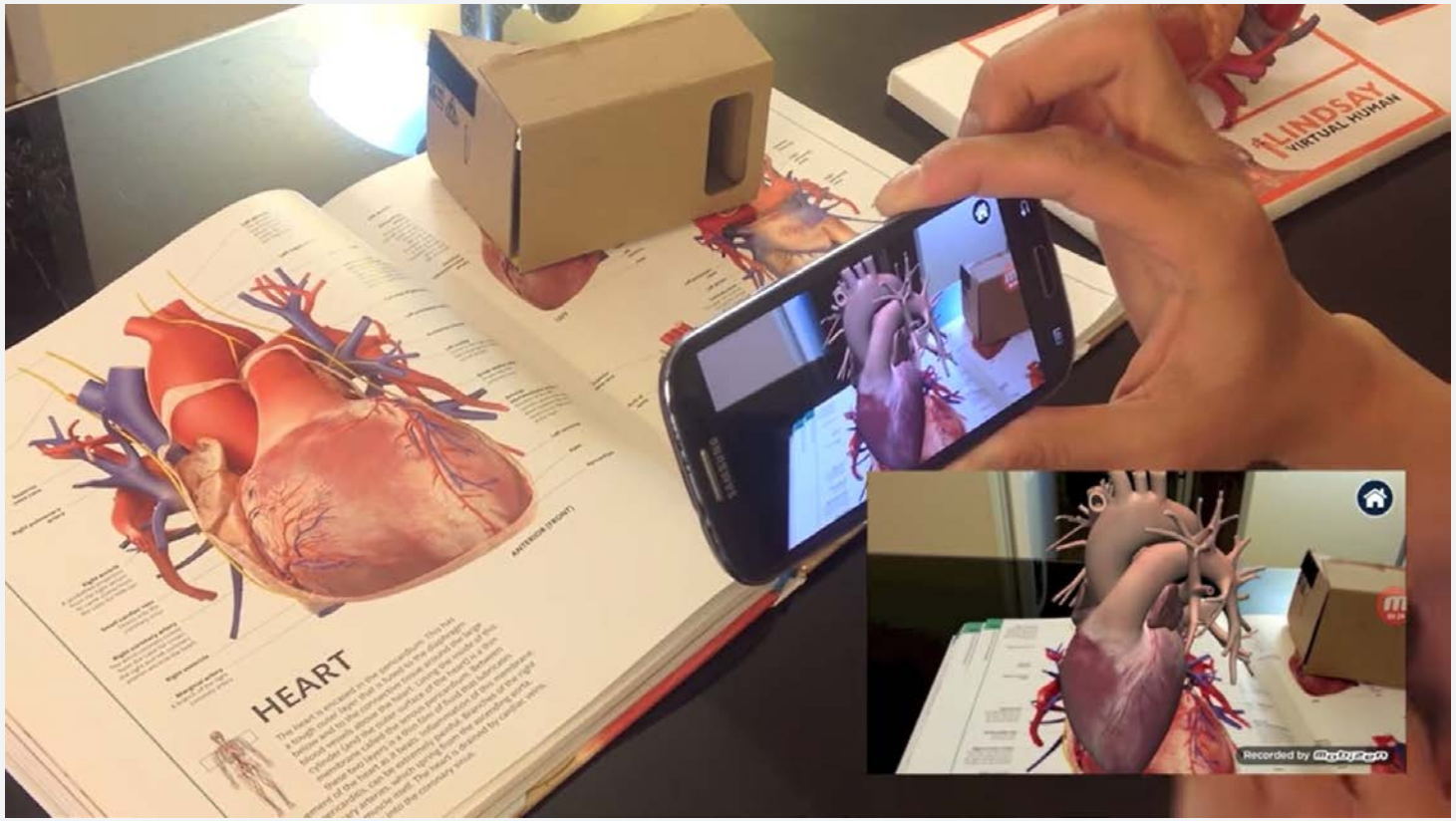
The AR *fit* for Training

A **constructivist** learning environment that allows learners to physically interact with the environment and discover new knowledge on their own.



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The AR *fit* for Training

Realistic models that help the learner to build mental models by “seeing” physical equipment and schematics in 3D.

Learner performance increases when *how-it works knowledge is* provided with *how-to-do-it knowledge.*

The AR *fit* for Training

Sensorimotor feedback allows learners to interact with equipment using their body, especially their hands - critical for maintenance-related tasks.

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The AR *fit* for Training

An **inquiry-based** learning environment that provides freedom and support to think critically through problems without requiring an instructor.

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Why Align with Science of Learning?

- Instructional designers are generally less familiar with the unique affordances and limitations associated with AR technologies.
- A considerable gap exists between the published literature on AR and the larger science of learning community.
- **The inappropriate selection or implementation of augmented reality can hinder learning.**

Use Case – Navy CVN 78 Training

- Selected instructional strategies aligned with objectives for military maintenance training
- Focused efforts on training using XR technologies
- Applied to training for davit operators and maintainers

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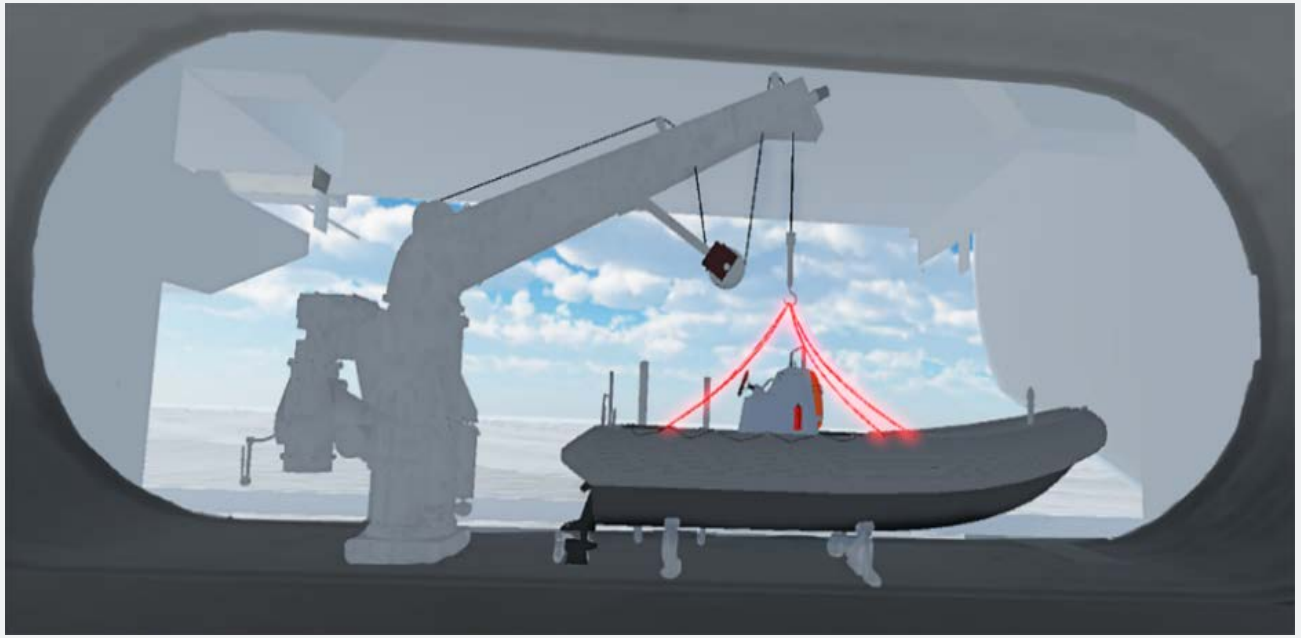
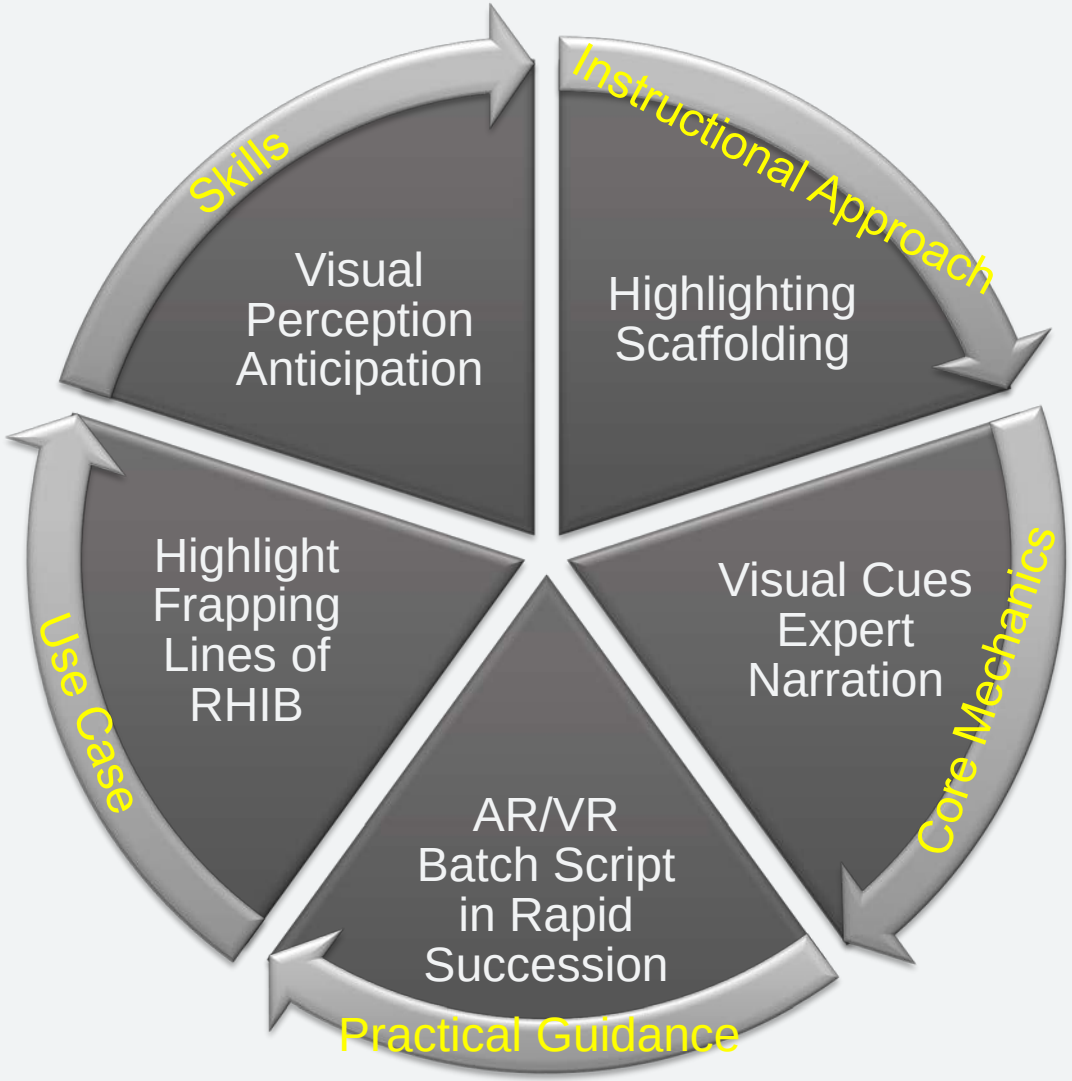
Strategy: Visual Orientation





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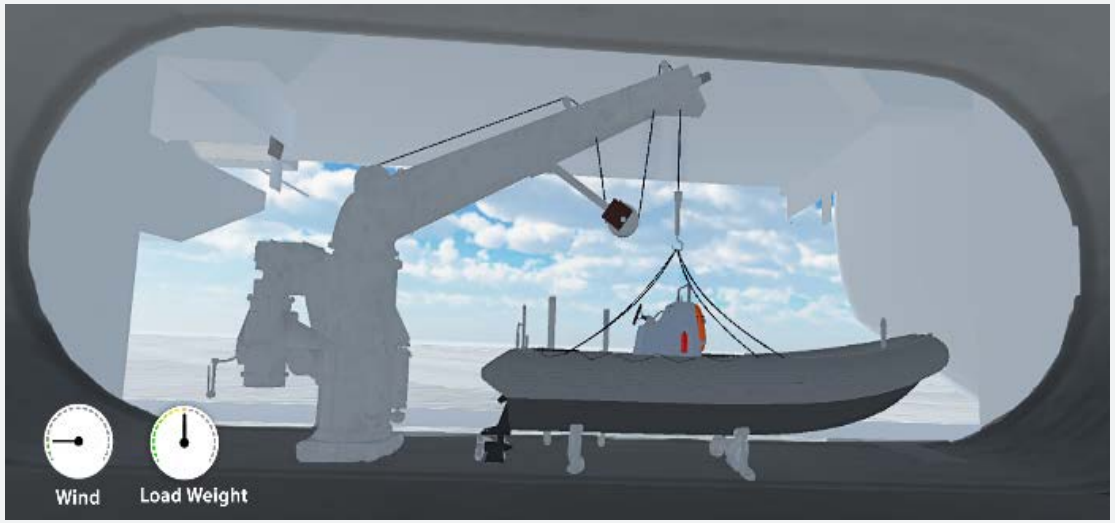
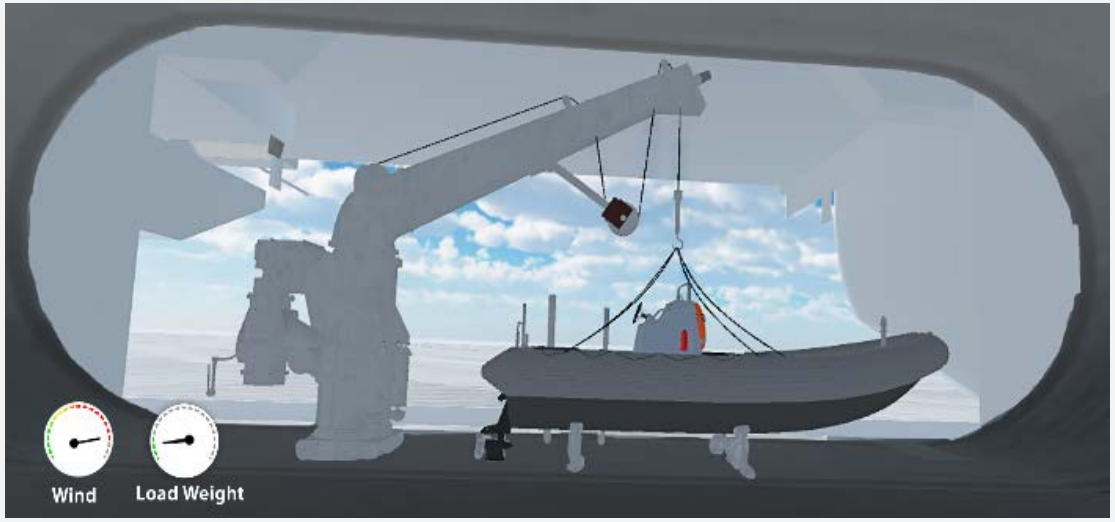
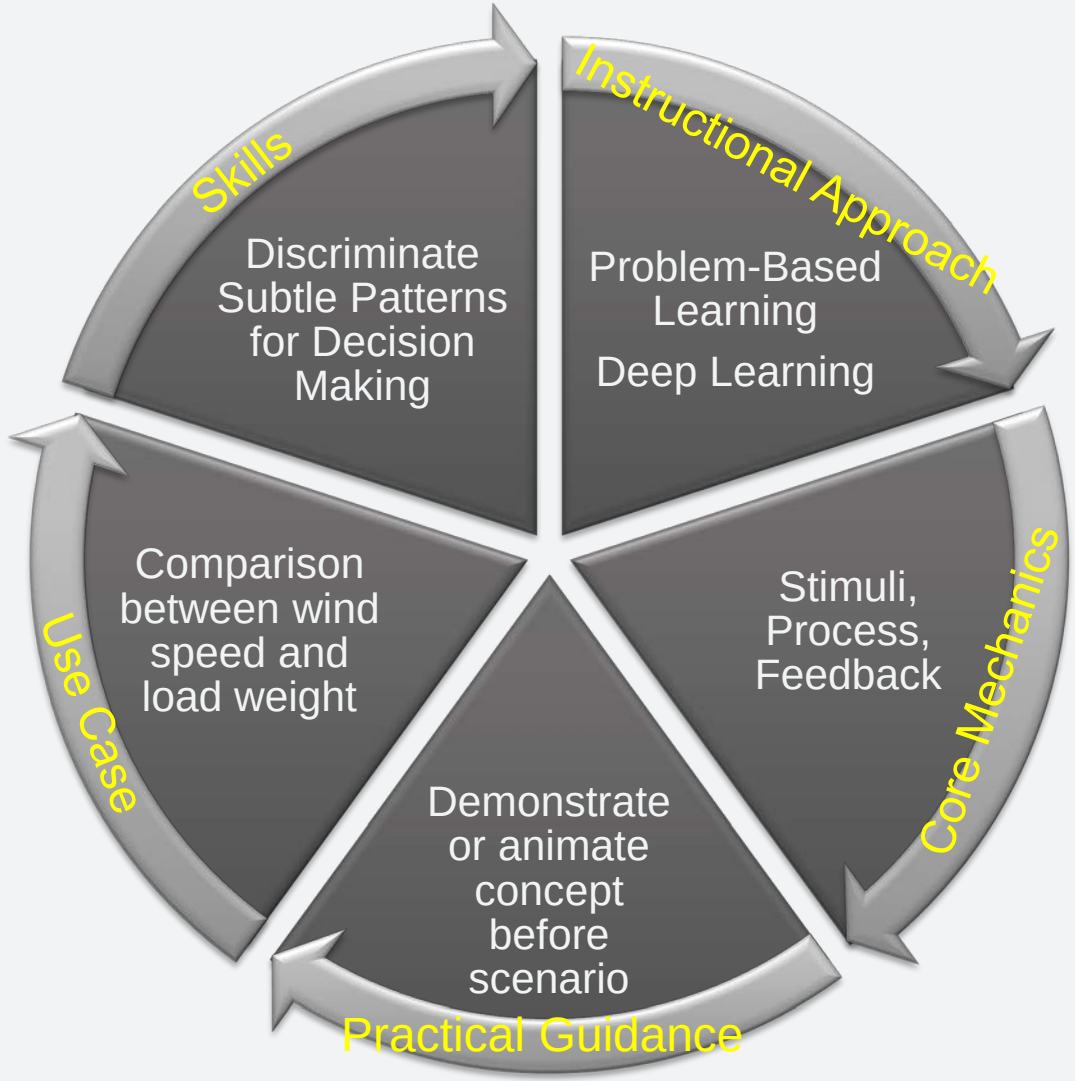
Strategy: Contrasting Cases







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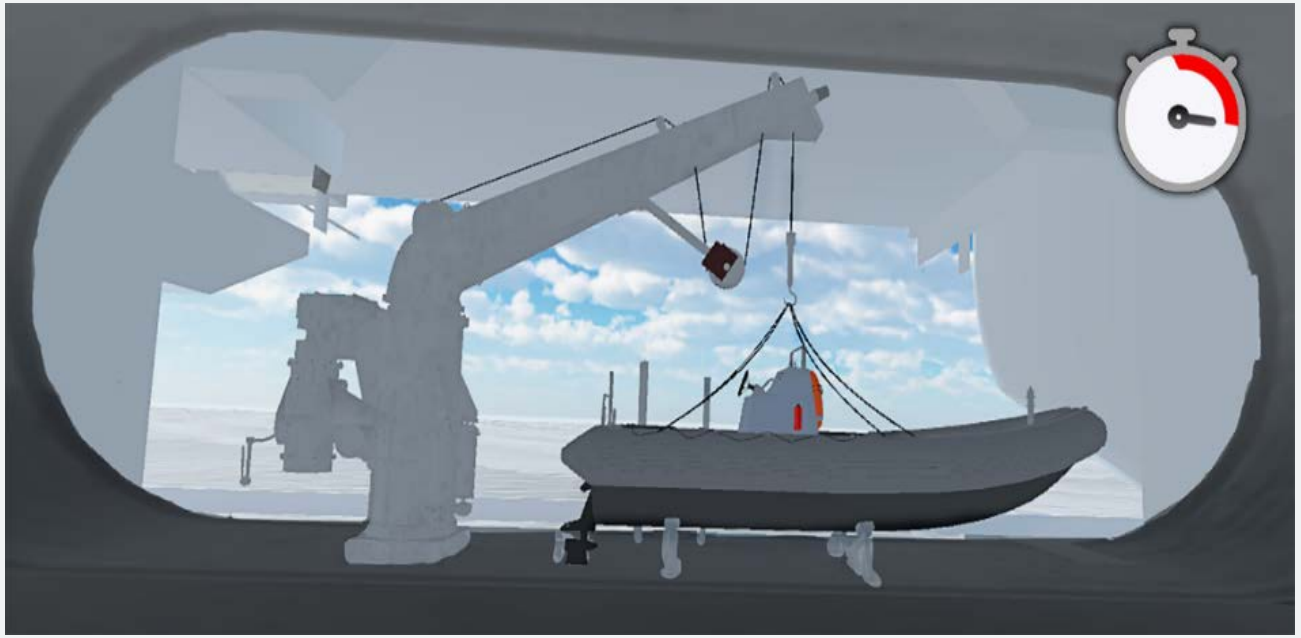
Strategy: Stress Exposure



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AR Learning Design Pitfalls

1. Distraction – extraneous information, clutter
2. Disruption – flow is impeded with unintended or jarring transitions
3. Seduction – enticing details inadvertently guide a learner in the wrong direction
4. Gratuitous Gamification – gamification elements that inadvertently shift learner motivation away from the training intent

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Janet Spruill, Vice President

321-710-3214

jspruill@aptima.com

1149 Science Drive, Suite 110

Orlando, FL 32826

www.aptima.com