

Adaptive Tutoring



S&T Campaign: Human Sciences
Human Capability Enhancement

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Research Objective

- Develop tools and methods to deliver adaptive training solutions to the Soldier that optimize retention and transfer
- Develop instructional management technologies that account for real-time performance and emotional / cognitive states experienced during interaction
- Significantly lower the cost and skills needed to author effective adaptive tutoring systems for the U.S. Army

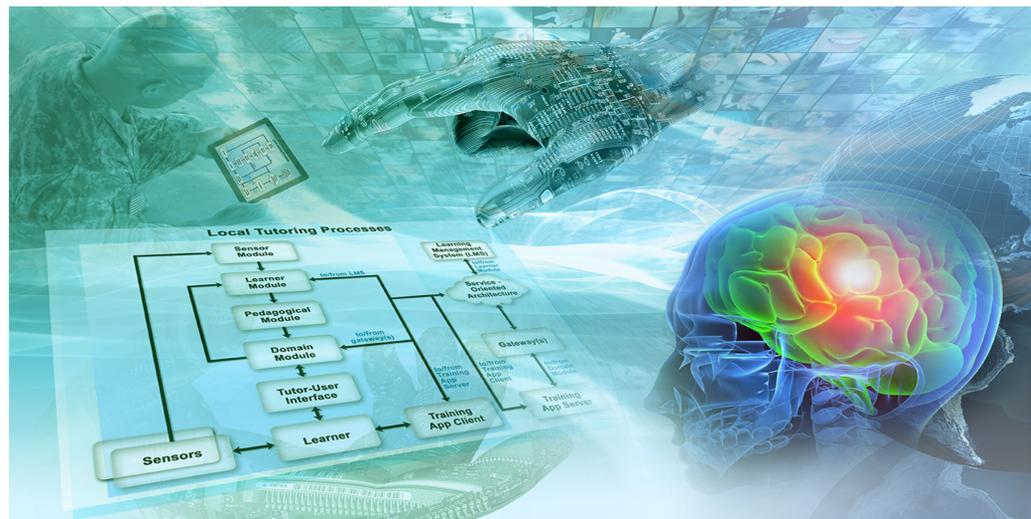


Figure 1. ARL Adaptive Tutoring Architecture

Challenges

- Persistent modeling capabilities that enable career long performance tracking for informing adaptation practices
- Development of authoring tools to enable instructional designers and training developers with minimal computer science skills to build adaptive courses using intelligent tutoring modeling and instruction principles
- Accurately predict a trainee's competency and affective response to inform instructional strategy selections

ARL Facilities and Capabilities Available to Support Collaborative Research

- ARL Human Research and Engineering Directorate, SFC Paul Ray Smith Learning in Intelligent Tutoring Environments (LITE) Laboratory, Orlando, Florida
- Suite of low-cost physiological and behavioral sensors used for real-time affective modeling research
- Generalized Intelligent Framework for Tutoring (GIFT), titled, GIFT2014-2, available for download on www.GIFTtutoring.org
- Pre-established use cases and model representations associated with multiple training environments
- Evolving design recommendations captured from leading experts in the adaptive tutoring field that define future directions for research and development (Text Book Series - "Design Recommendations for Intelligent Tutoring Systems" Volumes 1 & 2 available on www.GIFTtutoring.org)
- Early findings demonstrate personalized feedback delivered through GIFT significantly improves retention / transfer in combat medic training when compared to legacy solutions
- Sottolare, R.A. & Goldberg, B. (2013), Designing Adaptive Computer-Based Tutoring Systems to Accelerate Learning and Facilitate Retention, *International Journal of Cognitive Technology (Special Issue: Accelerated Learning)*, 17(1), 19-34

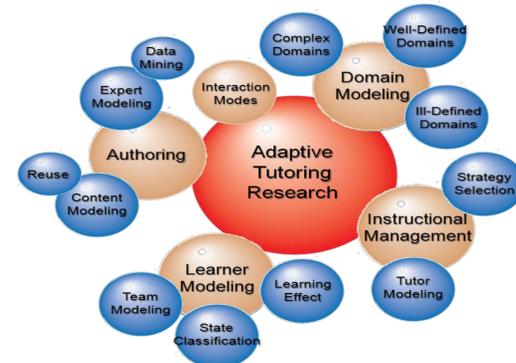


Figure 3. ARL Adaptive Tutoring Research Thrusts

Complementary Expertise/ Facilities/ Capabilities Sought in Collaboration

- Expertise in cognitive modeling techniques that account for data-driven knowledge and skill representations
- Expertise in Sensor technologies that provide unobtrusive assessment of individuals' affective and cognitive states in relation to performance and retention
- Expertise in instructional management and tutorial planning practices based on uncertainty and probabilistic modeling
- Expertise in domain modeling practices and ontologically driven architecture implementations
- Access to training developers and educators to experiment with authoring tools to inform future development

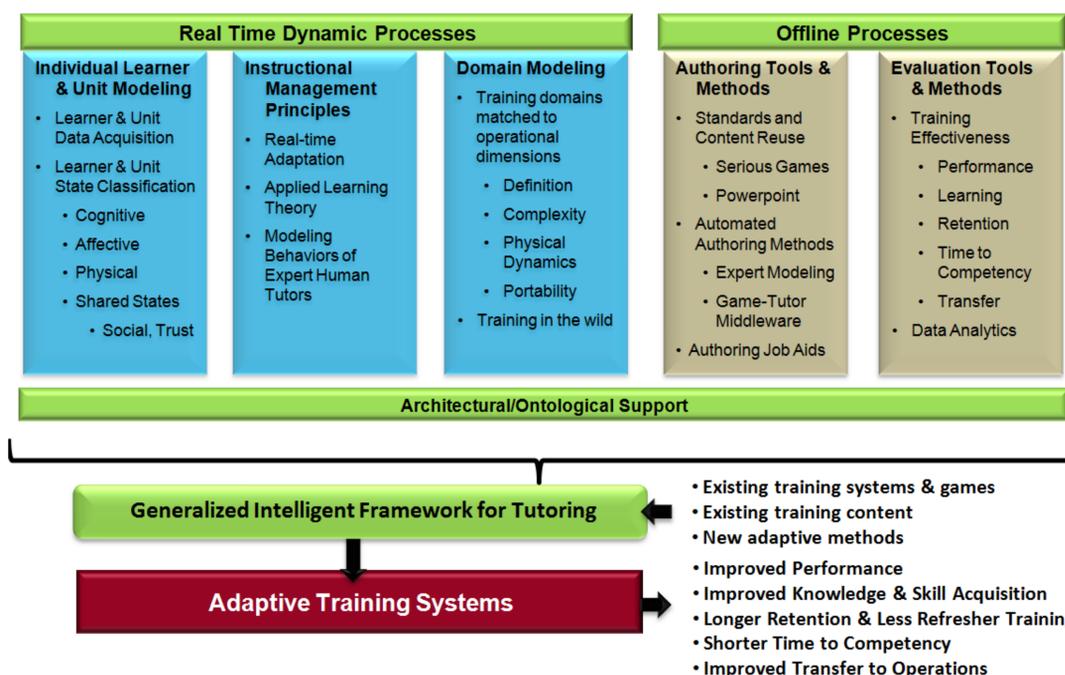


Figure 2. Adaptive Tutoring Research Vectors