



Expanding Domain Modeling in GIFT: 2018 Update

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Team Domains



Team Tutoring Concepts (Sinatra, Johnston & Sottolare)

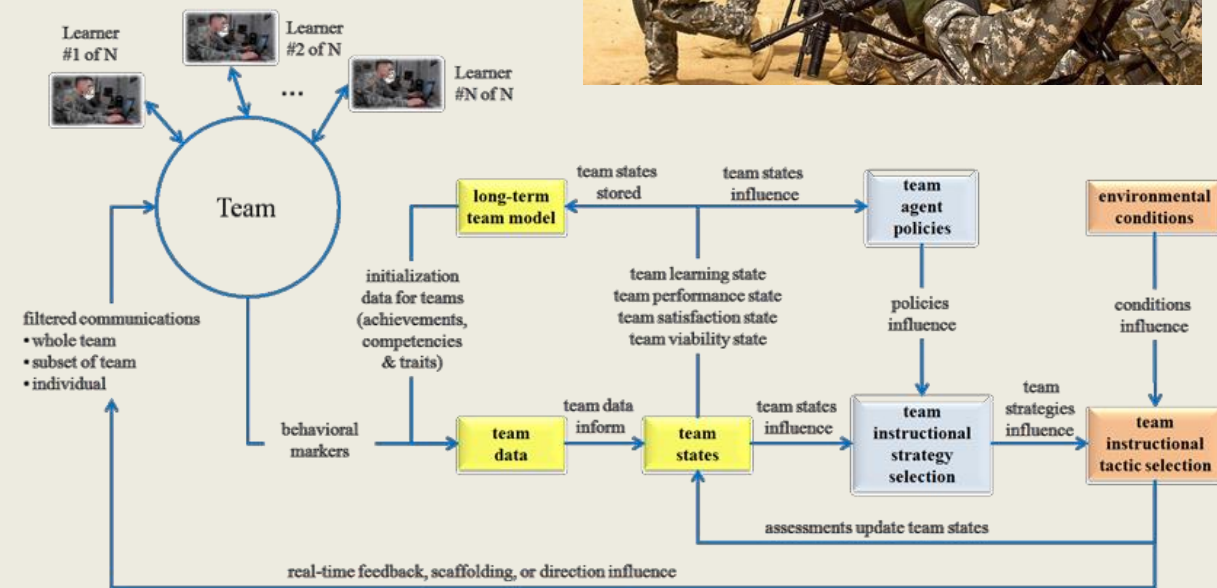
Purpose: Develop real-time, computer-based adaptive instruction for teams who are working collaboratively in virtual environments and provide feedback and automated after action reviews (AAR) to accelerate team learning and enhance performance.

Product:

- A prototype squad level team tutor using Virtual Battlespace scenarios in the domain of search and rescue
- Additional team level prototype tutors
- User-friendly authoring tools for team tasks

Payoff:

- Ability to support adaptive instruction for teams in:
 - collaborative problem solving scenarios
 - interdependent team taskwork scenarios
 - domain independent teamwork scenarios





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Psychomotor Domains



Adaptive Marksmanship Tutoring Testbed (Goldberg, Amburn & Brawner)

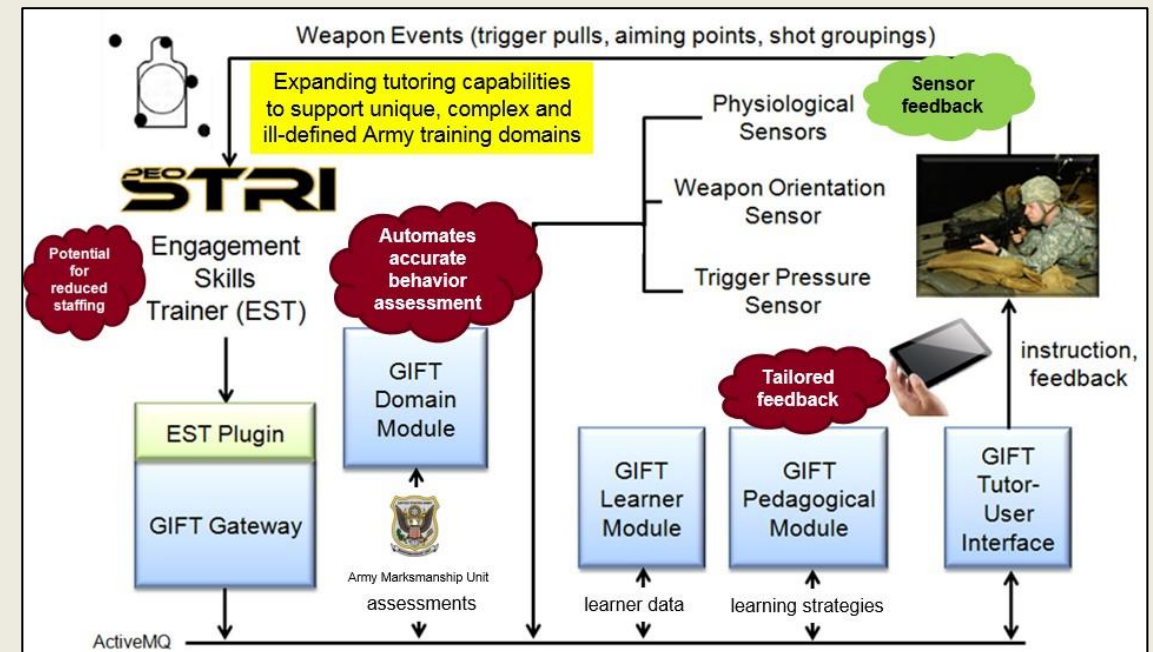
Purpose: Develop an adaptive training concept in the psychomotor domain of basic rifle marksmanship (BRM) using GIFT tools and methods to enhance existing or future marksmanship trainers

Products:

- Adaptive marksmanship testbed
- Expert model representations of ideal behavior and performance
- Model validation and training effectiveness evaluation assessing the efficacy of these approaches for training marksmanship psychomotor tasks

Payoff:

- Accelerated skill acquisition of BRM fundamentals
- Generalized workflows and model development methods for application across psychomotor domains





Adaptive Marksmanship Tutoring Testbed (Goldberg, Amburn & Brawner)

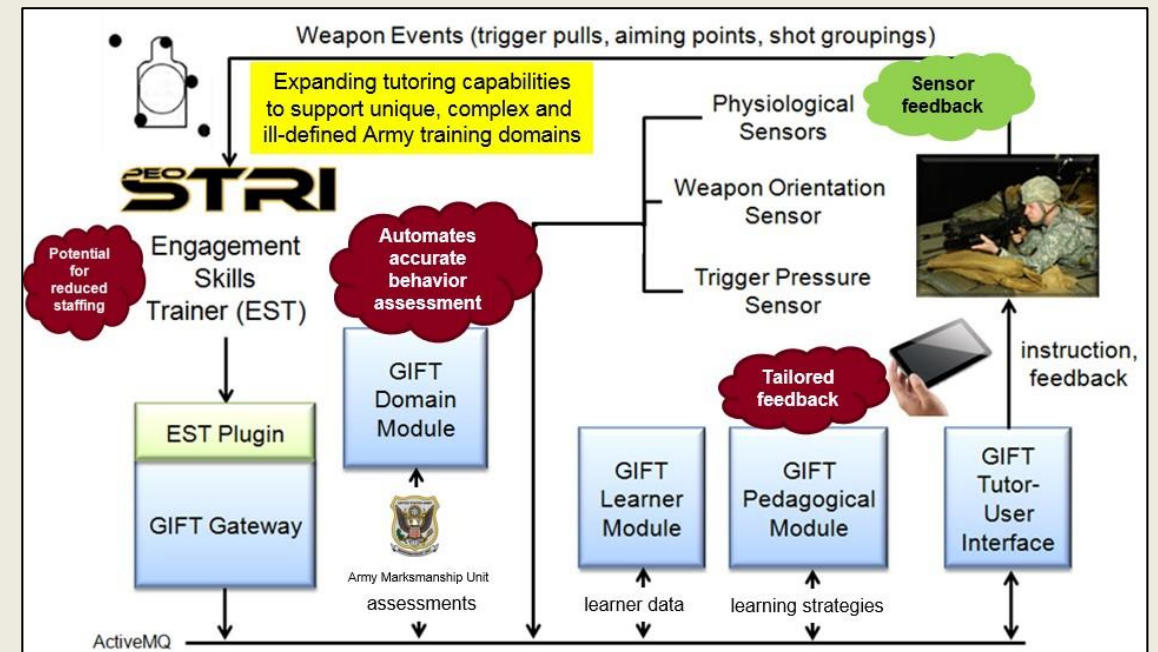
Relevant Publications:

Goldberg, B., Amburn, C., Ragusa, C., & Chen, D.W. (2017). Modeling Expert Behavior in a Psychomotor Task Environment: A Marksmanship Use Case. *International Journal of Artificial Intelligence in Education*. DOI: 10.1007/s40593-017-0155-y.

Brown, D., Goldberg, B., Bell, B., & Kelsey, E. (2018, *in press*). Incorporating psychomotor skills training into GIFT tutors: Supporting outside-the-box authoring. In *Proceedings of the 6th GIFT Users Symposium*. Orlando, Florida, May 2018.

Bell, B., Brown, D., Goldberg, B., & Goldberg, B. S. (2017, July). Focused authoring for building GIFT tutors in specialized domains: a case study of psychomotor skills training. In *Proceedings of the 5th Annual Generalized Intelligent Framework for Tutoring (GIFT) Users Symposium (GIFTSym5)*.

Goris, T., & Brawner, K. (2016). *Examining the Influence of Heartbeat on Expert Marksman Performance* (No. ARL-TN-0754). US Army Research Laboratory Aberdeen Proving Ground United States.





Land Navigation Course (Goldberg)

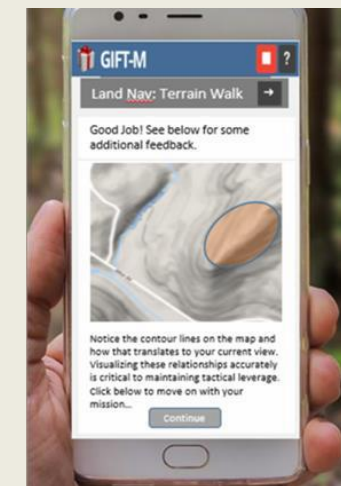
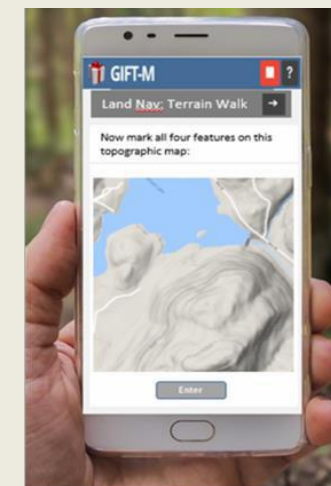
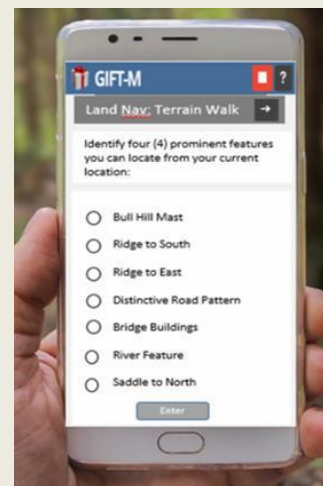
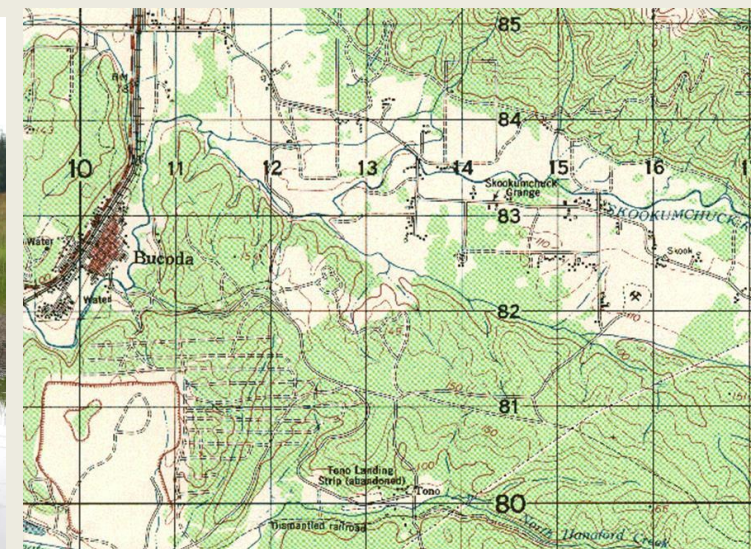
Purpose: develop an interactive mobile application to support remote adaptive instruction of land navigation principles in a live training environment

Product:

- GIFT-based tutor for land navigation in Virtual BattleSpace.
- GIFT-based tutor for land navigation on a mobile application

Payoff:

- Ability to support adaptive instruction via remote interaction with learners using GIFT through a mobile application
- Ability to assess learner progress toward objectives for a land navigation task (planning, map reading, compass use, dead reckoning).





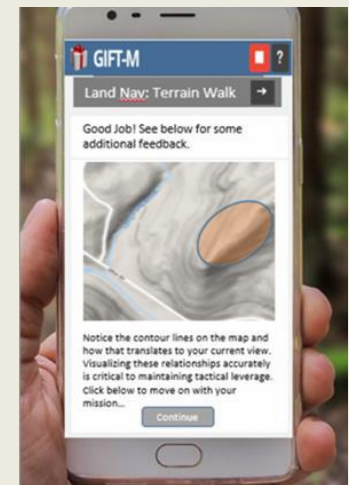
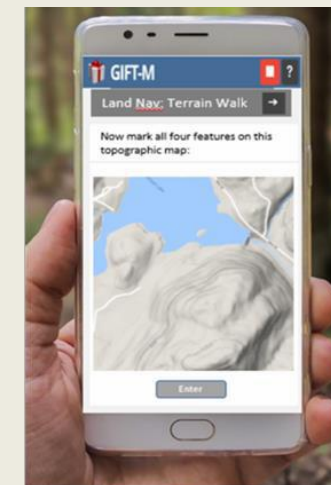
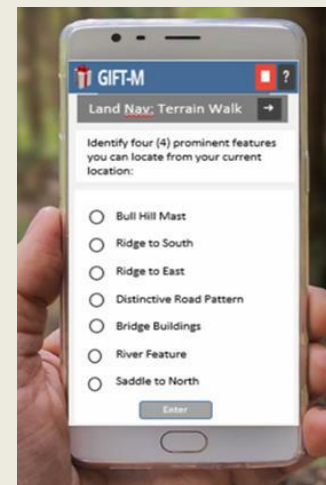
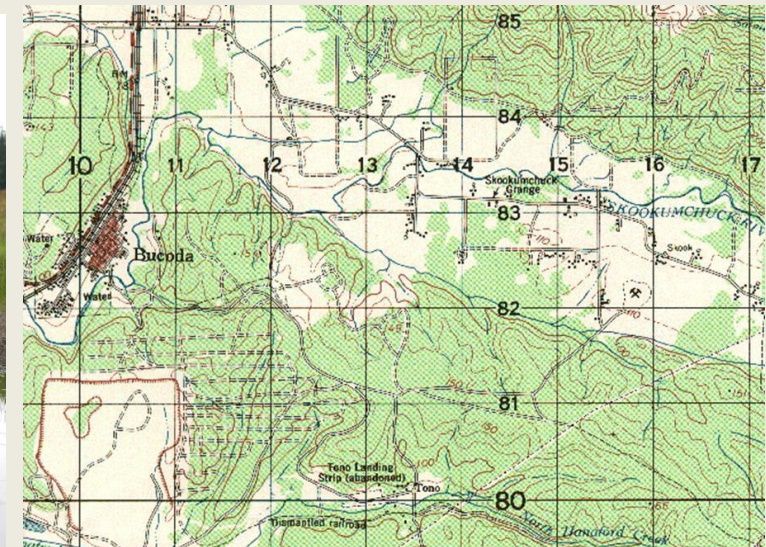
Land Navigation Course (Goldberg)

Relevant Publications:

Goldberg, B., Amburn, C., Ragusa, C., & Chen, D.W. (2017). Modeling Expert Behavior in a Psychomotor Task Environment: A Marksmanship Use Case. *International Journal of Artificial Intelligence in Education*. DOI: 10.1007/s40593-017-0155-y.

Sottolare, R. (2016, September). Representing Adaptive Course Navigation in the Generalized Intelligent Framework for Tutoring (GIFT). *International Defense & Homeland Security Simulation Workshop of the I3M Conference*. Larnaca, Cyprus, September 2016.

Sottolare, R. and LaViola, J. (2015, December). Extending Intelligent Tutoring Beyond the Desktop to the Psychomotor Domain: A survey of smart glass technologies. In *Proceedings of the Interservice/Industry Training Simulation & Education Conference*, Orlando, Florida, December 2015.





Tactical Breathing for Improved Performance during Psychomotor Tasks (Kim & Sottolare)

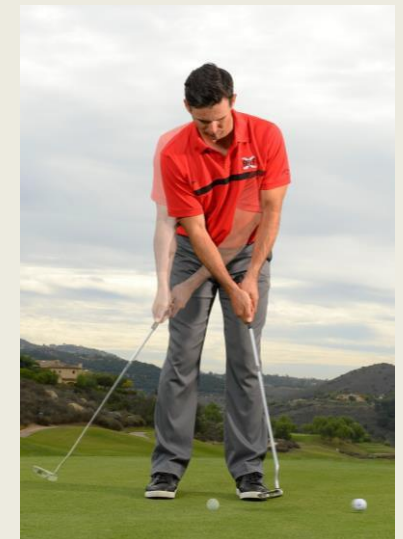
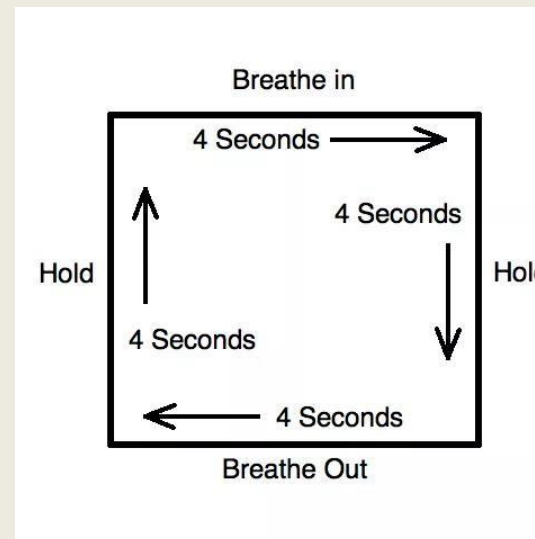
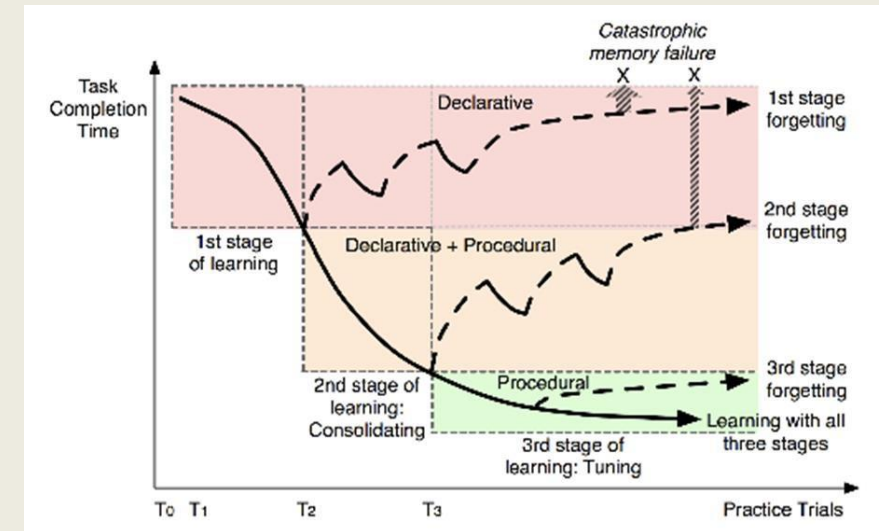
Purpose: Develop an adaptive training concept in the psychomotor domain of putting (golf) using GIFT tools and methods to enhance a variety of psychomotor tasks through tactical breathing

Products:

- Golf putting testbed
- Tactical breathing methods

Payoff:

- Methods to enhance psychomotor task performance





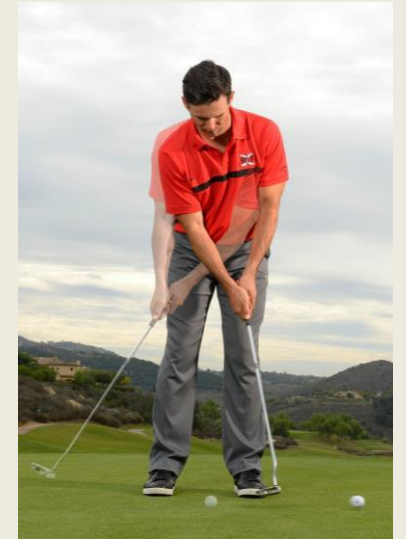
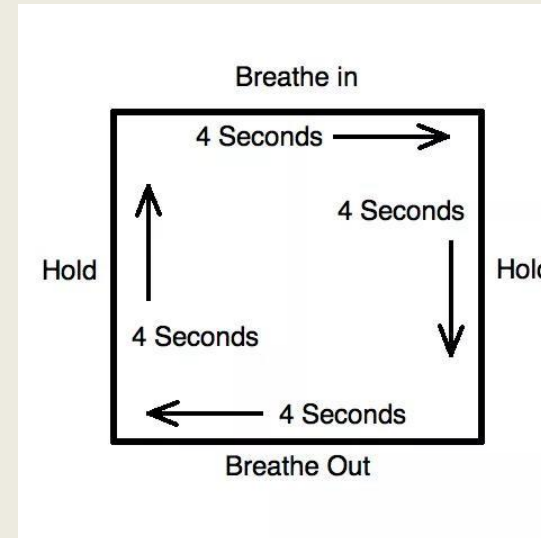
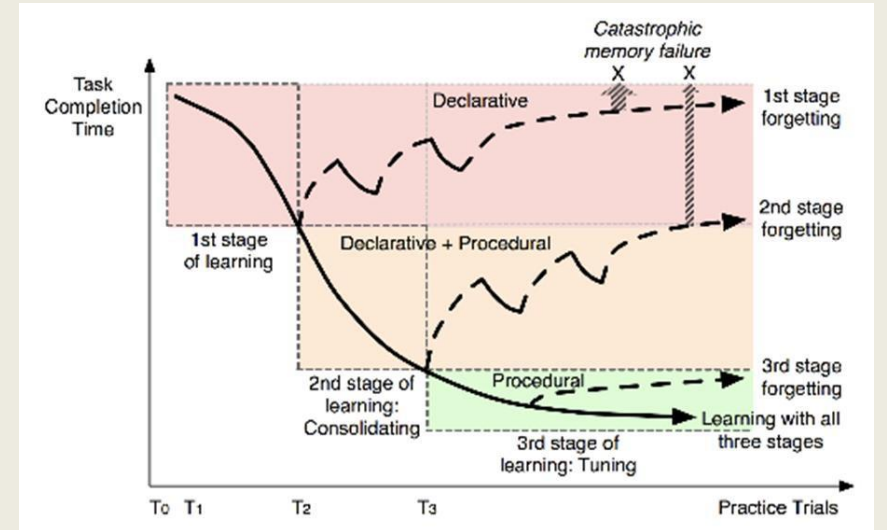
Tactical Breathing for Improved Performance during Psychomotor Tasks (Kim & Sottolare)

Relevant Publications:

Kim, J., Dancy, C., Goldberg, B., & Sottolare, R.A. (2017, July). A Cognitive Modeling Approach – Does Tactical Breathing in a Psychomotor Task Influence Skill Development during Adaptive Instruction? In *Foundations of Augmented Cognition*. Springer International Publishing.

Kim, J. W., Sottolare, R. A., Goodwin, G., & Hu, X. (2017). Assessment of Individual Learner Performance in Psychomotor Domains. *Design Recommendations for Intelligent Tutoring Systems*, 319.

Pavlik Jr, P. I., Maass, J. K., & Kim, J. W. (2017). Assessment of Forgetting. *Design Recommendations for Intelligent Tutoring Systems*, 203.





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Medical Domains



Adaptive Instruction in the Wild: Hemorrhage Control Concept (Sottolare, Hackett, Pike & LaViola)

Purpose: Develop an adaptive instructional concept to train psychomotor combat casualty care tasks (e.g., hemorrhage control)

Product:

- Adaptive hemorrhage control concept with pressure sensors and associated measures for the use of tourniquets and pressure bandages

Payoff:

- Accelerated skill acquisition of hemorrhage control fundamentals beyond knowledge assessment
- Generalized workflows and model development methods for application across hemorrhage control tasks for a variety of bleeding wounds
- Testbed for the development of adaptive instruction for other medic training tasks





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Adaptive Instruction in the Wild: Hemorrhage Control Concept (Sottilare, Hackett, Pike & LaViola)

Relevant Publications:

Sottilare, R., Hackett, M., Pike, W., & LaViola, J. (2016). Adaptive instruction for medical training in the psychomotor domain. *The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology*. <https://doi.org/10.1177/1548512916668680>.





Developing accelerated learning models in GIFT for medical military and civilian training (DeFalco, Sottolare & Hum)

Purpose: Investigate the relationship between reasoning, openness, and accelerated learning during medical training.

Product:

- GIFT-based tools and methods to help individuals learn faster and transfer skills more effectively
- Exemplar adaptive instructional concepts for medical tasks

Payoff:

- Tools and methods to accelerate learning during medical training
- Exemplar adaptive instruction for medical topics without the need for access to expert human users.
- Analytics to improve content and adaptive instructional methods over time.





Developing accelerated learning models in GIFT for medical military and civilian training (DeFalco, Sottolare & Hum)

Relevant Publications:

Sottolare, R. & DeFalco, J. (2018). Experimental Protocol (ARL 17-251) - Developing accelerated learning models in GIFT for medical military and civilian training. US Army Research Laboratory, Orlando, FL.





Pediatric Resident Courses (R. Stanley Hum, M.D.)

Purpose: Develop a set of GIFT courses to train pediatric residents

Product:

- GIFT tutor for adaptive instruction of concepts related to pediatric surgery

Payoff:

- Adaptive instruction for pediatric resident topics without the need for access to human experts (pediatric staff).
- Analytics to improve content and adaptive instructional methods over time.





Basic Surgical Robotics Course (Danielle Julian)

Purpose: develop an adaptive instructional concept to train physicians both the cognitive skills and basic knowledge needed to use the most commonly known robotic surgical system, Da Vinci.

Product:

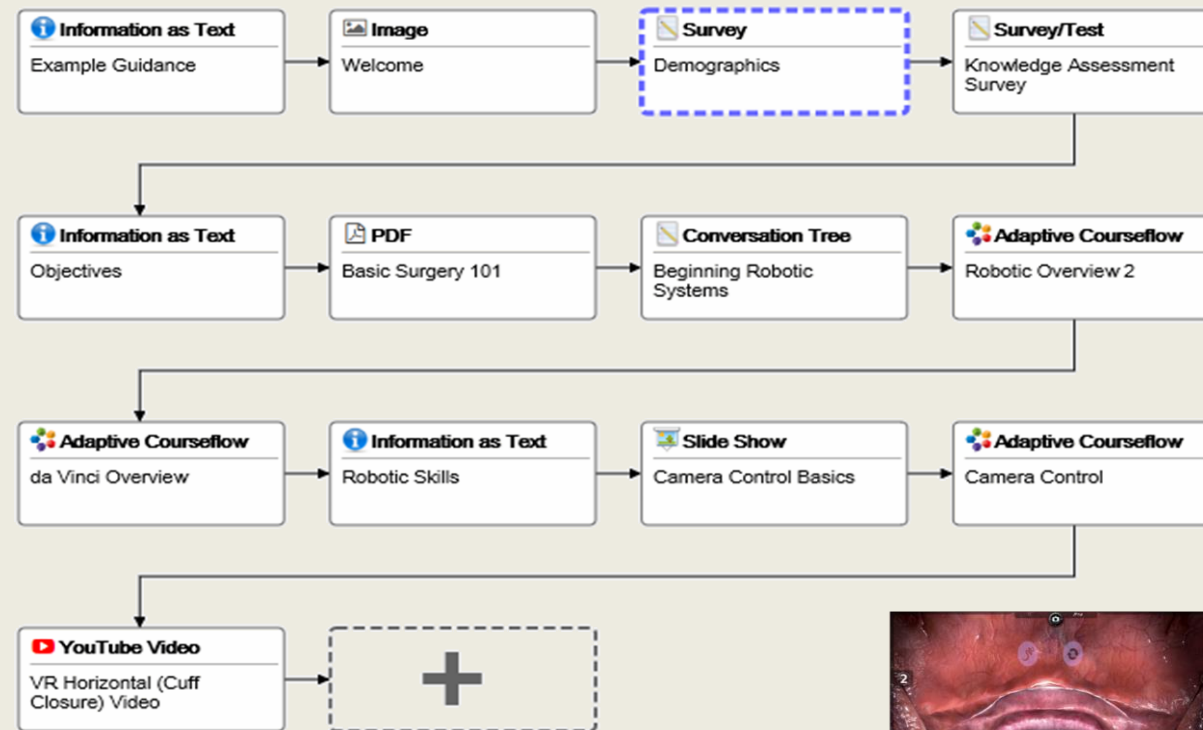
- GIFT tutor for adaptive instruction of concepts related to surgical robotics and focused on basic robotics concepts, overview of the Da Vinci robotic surgical system, camera control in Da Vinci, and basic suturing tasks in Da Vinci.

Payoff:

- Adaptive instruction for the complex Da Vinci robotic surgical tool without the need for access to human experts.
- Analytics to improve content and adaptive instructional methods over time.

Relevant Publication:

Julian, D. (2018). Final Report for IDS6938 – Intelligent Tutoring System Design: Basic Robotic Course. University of Central Florida, Orlando, FL.





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Thank you for your Attention... Questions?

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Acknowledgement

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