

Research Philosophy

The overarching theme of my research is the theoretical and practical application of methods to improve the training of junior leaders and equip them with the tools necessary for success on the battlefield.

Within this overarching framework, my research can be divided into two primary areas: (1) enhancing junior leaders' ability to think through complex problems and (2) developing more effective tools for leaders as they train and prepare for combat.

Preparing Future Army Leaders

Because we cannot predict the type of war or situation our country may face next, Army leaders must prepare for realistic eventualities. While some aspects of war evolve, such as the emergence of cyberattacks, others remain relatively constant, such as leveraging terrain and reflecting on past actions to improve future performance. Broadening junior leaders' horizons provides a significant advantage in navigating ambiguous situations—these "*known unknowns*" inspired my passion for research.

In Pyke et al. (2023), we identified a critical gap in our cadets' mental models of potential threats, particularly in their failure to consider non-kinetic attacks. Within this research, I primarily contributed to identifying gaps in inexperienced leaders' mental models and creating scenarios informed by my tactical experience. We found that even cadets with extensive IT backgrounds, such as West Point Cyber or IT majors, overlooked crucial vulnerabilities in their formations. Despite their specific academic backgrounds, we found that Cadets did not recognize potential cyber threats because they did not have explicit training that incorporated cyber into tactical operations. These efforts yielded valuable insights into improving leaders' preparation for future challenges; the bottom line is that all feasible threats should be included in training regiments because it creates a more robust mental model for them to draw from. Addressing these gaps and devising educational strategies for future leaders is vital to strengthening our military.

In Wetzler & Feltner (2021), we explored the concept of profection—reflecting for the purpose of future planning. This skill orients individuals toward desired outcomes by enabling them to anticipate

and plan for future transitions. Over a yearlong study involving 92 cadets, we tested the efficacy of structured profection exercises. These cadets progressed from first-year "plebes" to second-year team leaders responsible for one plebe. The systematic profection exercise incorporated metacognitive practices that align with the Army Officer Corps' emphasis on lifelong learning.

Effective Tools on the Battlefield

To achieve a decisive advantage on the battlefield, our small-unit leaders need access to the right tools. UAVs and robotic teammates are becoming integral to the Army's arsenal, and ensuring the right tools are in the right soldiers' hands is crucial.

All tools must be optimized to support soldiers on the ground. Their physical attributes, interface design, and interactions with soldiers are critical. Recognizing the increasing role of UAVs in military formations, we developed a framework and checklist for evaluating UAV interface designs based on established HCI principles (Zhang et al., 2016; Zhang et al., 2020; Zhang et al., 2021). I played a role in every stage of this research, from creating realistic military scenarios to coding UAV interface simulations and publishing our findings. Adherence to established design principles allows UAV pilots to focus their cognitive workload on the mission rather than grappling with poorly designed interfaces. Based on our findings, the Army Research Institute adopted the M-GEDIS-UAV tool to evaluate prospective UAV interfaces.

My experiences with UAV research and practical experience in the 82nd Airborne Division highlighted the need for a similar approach toward reconnaissance robots. While robotic teammates are an inevitable part of the Army's future, their design will determine their success. A well-designed robotic teammate builds trust through competence and transparent decision-making. By designing intuitive robotic systems, we can prepare our Army to deploy, fight, and win globally. While the technology for fielding robotic teammates is still under development, my future research will focus on studying leaders' implicit and explicit attitudes toward robotic teammates and how these attitudes influence their dependence on such tools in simulated combat scenarios.