GAMIFIED EDUCATION AND TRAINING FOR DEFENSE ACQUISITION

LtCol Dan Finkenstadt, PhD
Naval Postgraduate School

Erik Helzer, PhD
Naval Postgraduate School

11 May 2022

THE TEAM

Captains Ian Larsson, Matt Marshall and Lee Whitworth |
Naval Postgraduate School, CA: MBA Class of '21

LtCol Daniel J. Finkenstadt, PhD | Assistant Professor |
Naval Postgraduate School, CA

Erik Helzer, PhD | Associate Professor | Naval Postgraduate School, CA

Robert Handfield, PhD | Executive Director of Supply Chain Resource Cooperative and Bank of America University Distinguished Professor of Operations and Supply Chain Management | NC State University, NC

Arnav Jhala, PhD, Associate Professor of Computer Science, Co-Director of Chancellor's Faculty Excellence Cluster in Visual Narrative, NC State University

Perry McDowell, MS (Computer Science) | Research Associate |
Naval Postgraduate School MOVES Institute

Derek Martin | Graduate Student (PhD Computer Science) |
NC State University, NC

PROBLEMS AND CHALLENGES

DA specialists operate in a **high-risk, tightly-regulated, zero-defect environment with acute public scrutiny**. Decades of research in organizational science caution that such environments, which offer little room for experimentation and put a high price on failure, instill a *performance orientation* and stifle learning.

This presents a paradox: How do organizations promote effective, deep, and lifelong learning in professional fields where the conditions most supportive of learning are perceived as a risk to ultimate mission?

WHY GAMES ARE IDEAL FOR DEFENSE ACQUISITION EDUCATION AND TRAINING

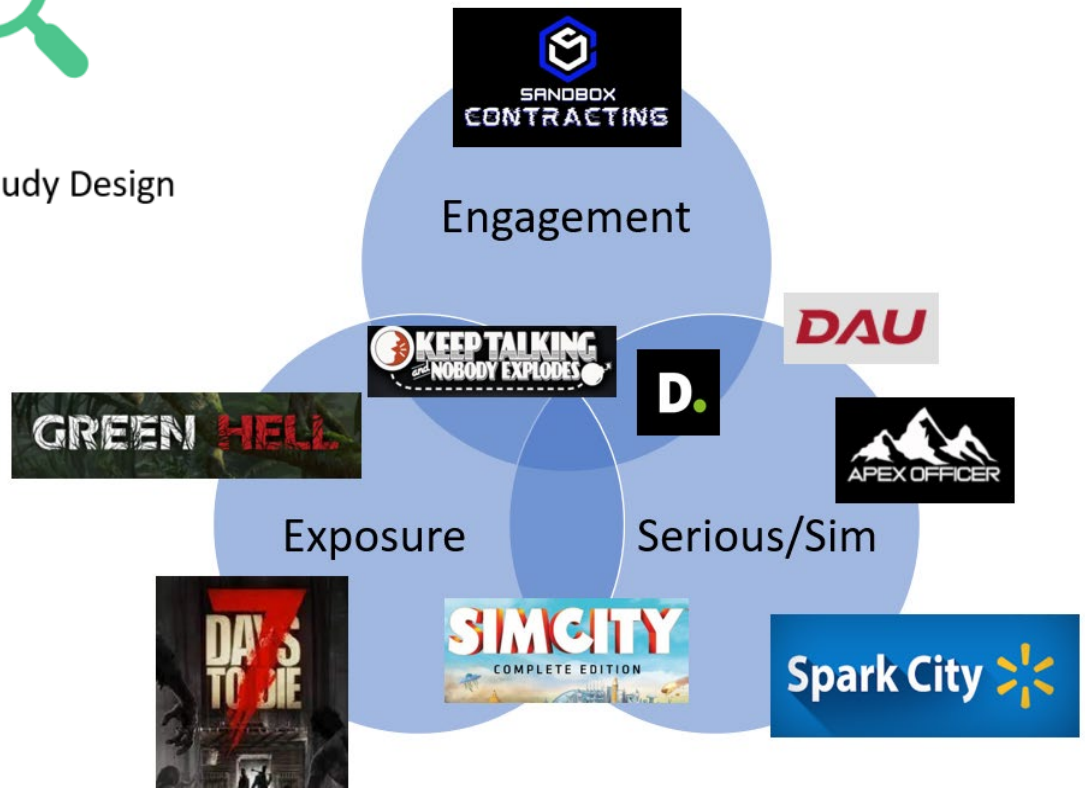
Features of Gamified Learning Environment	Interaction	Features of DA Operating Environment
Fantasy	Reduces	Objective realities with real consequences in litigious environments.
Challenges/Goals	Reinforces	Complex problems, levels of professional achievement, varied levels of problem difficulties
Representation	Reinforces	Evolving problems in highly variable environments.
Curiosity/Mystery	Reinforces	Heterogeneous requirements that require customer discovery and market research and intelligence gathering.
Feedback	Reinforces	Communications across networks. Interactions with public and private entities. Adverse consequences for poor performance or conflicts of interest.
Rules	Reinforces	Strong regulatory environment tha, in many cases, is based on procedural rules.
Voluntary Participation and Mulligans	Reduces	All decisions have consequences for one or more DA parties (costs, schedule, performance, reputation etc.). DA member roles are constrained by regulatory authorities and agency rules (only the contracting officer may obligate fiscal funds, etc.)

TYPES OF GAME STUDIES AND RESEARCH LINES OF EFFORT

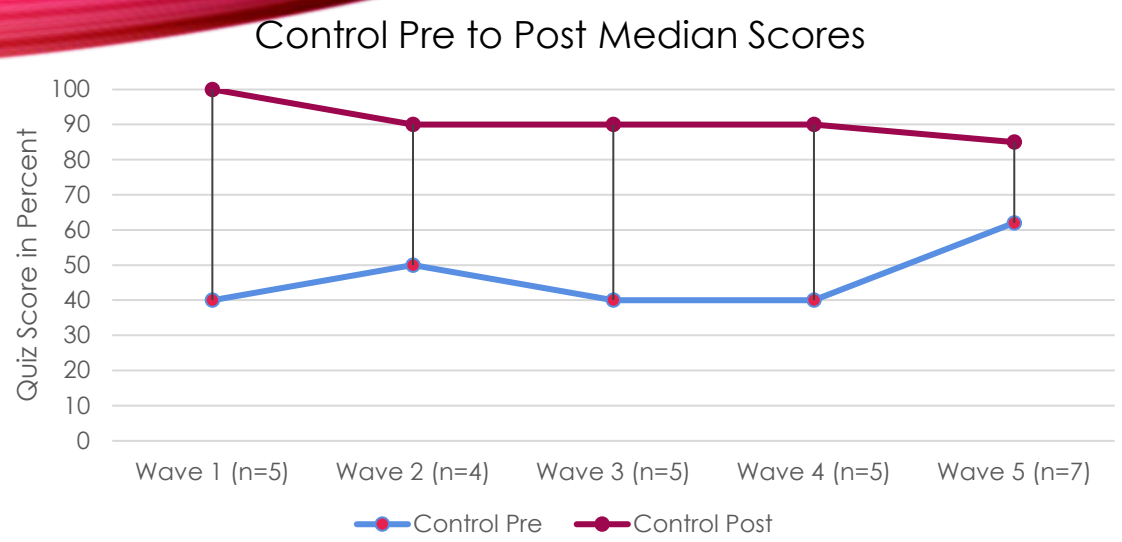
Curriculum Design and Learning Objectives

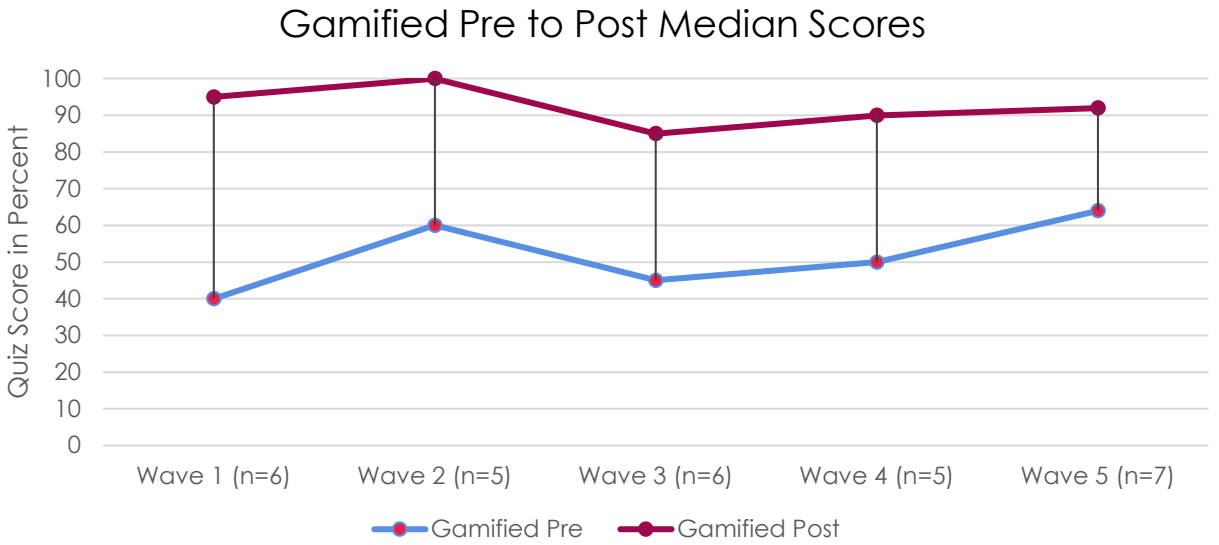
Game Design

Research Study Design



PERFORMANCE OUTCOMES

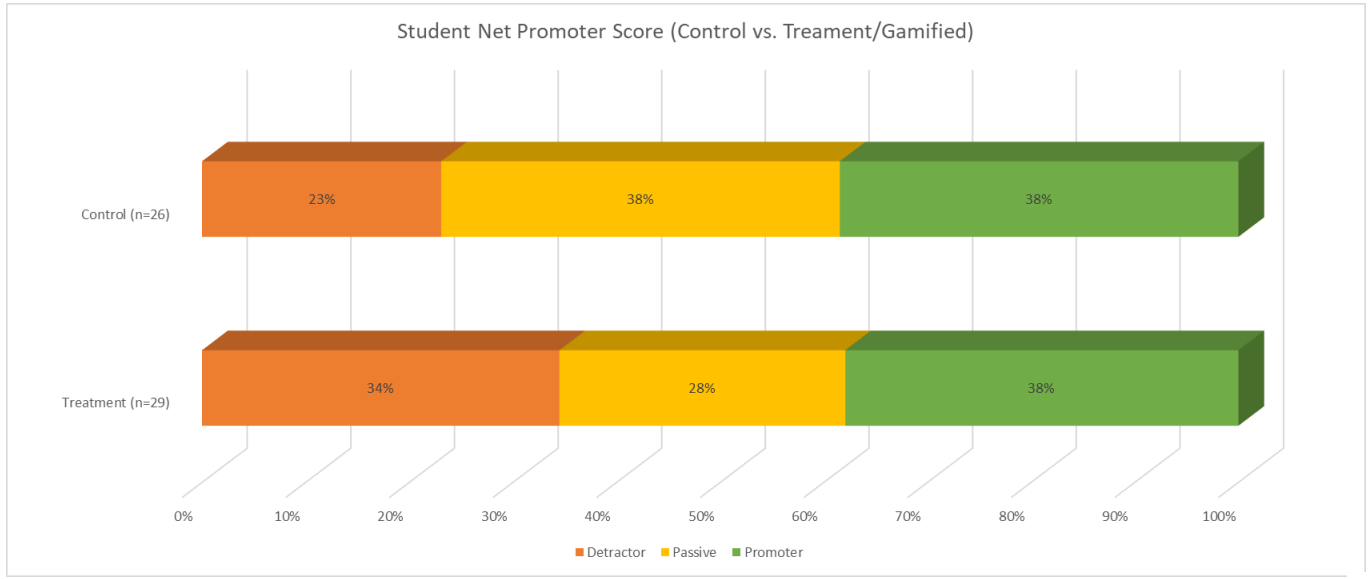




Wave	Curriculum	Treatment	Control	Question Type	Game Version	Game Hardware	Treatment Environment	Control Modality
344-A	FAR Part 8, Mandatory Sources of Supply	55%	60%	1-for-1	1.0	Chromebook	Instructor observed lab	In-person PPT and discussion
344-B	FAR Part 8, Mandatory Sources of Supply	40%	40%	1-for-1	2.0	Chromebook	Instructor observed lab	In-person PPT and discussion
344-C	FAR Part 8, Mandatory Sources of Supply	40%	50%	1-for-1	2.0	Chromebook	Instructor observed lab	In-person PPT and discussion
344-D	FAR Part 8, Mandatory Sources of Supply	40%	50%	1-for-1	2.0	Chromebook	Instructor observed lab	In-person PPT and discussion
NPS	OMB Category Management	30%	23%	Derivative	2.0	Gaming CPUs	SILAS gaming lab	Zoom PPT and discussion

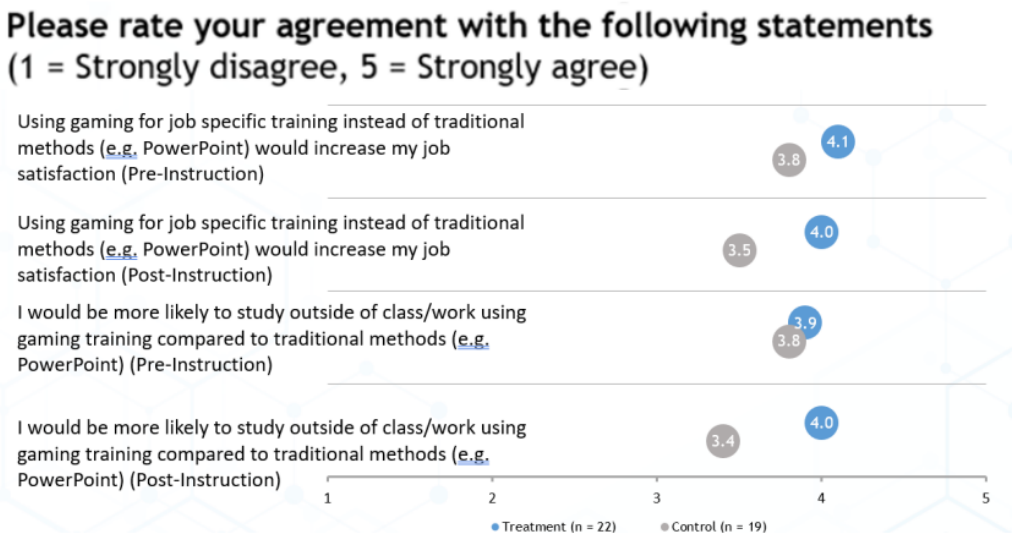
Wave	Game Version	Game Hardware	Treatment Environment	Control Modality
344-A	1.0	Chromebook	Individual play in instructor observed lab	In-person PPT and discussion
344-B	2.0	Chromebook	Individual play in instructor observed lab	In-person PPT and discussion
344-C	2.0	Chromebook	Individual play in instructor observed lab	In-person PPT and discussion
344-D	2.0	Chromebook	Individual play in instructor observed lab	In-person PPT and discussion
NPS	2.0	Gaming CPUs	Competitive play in SILAS gaming lab	Zoom PPT and discussion

PLAYER EXPERIENCES



Students in game condition seemed to fall more into either 'detractor' or 'promoter' whereas controls had more 'passive' experiences.

Students who played the game stated they would be more likely study outside of class with games.[1]



1. This chart only shows the first four 344th waves

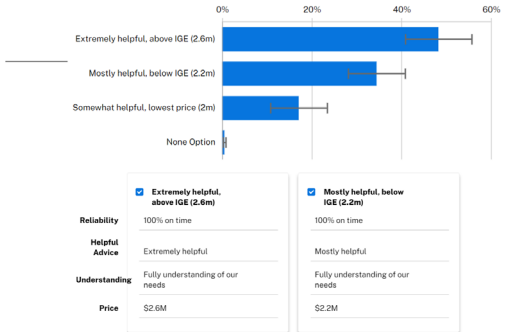
FUTURE GAMING & SIM STUDIES

Subject	Game Types					
	First Person Shooter	Escape Rooms	Arcade-style	Role-playing	Puzzles	Tycoon
Requirements Development						
Systems Engineering						
Mandatory Sources	x					
Market Research/Intelligence		x				
Category Management	x					
Acquisition Plans						
Solicitation Development						
Contractor Evaluations						
Negotiations						
Intellectual Property						
Contract Protests			x			
Contract Quality Management						
Contract Changes and Mods						
Closing Contracts						
Contingency Contracting/OCS						
DevSecOps / Software Acq						x

Subject	Game Types					
	Action-adventure	Sandbox	Real-time Strategy	Tower Defense	Base build	Simulation
Requirements Development						
Systems Engineering						
Mandatory Sources						
Market Research/Intelligence						
Category Management						
Acquisition Plans						
Solicitation Development						
Contractor Evaluations						x
Negotiations						
Intellectual Property						
Contract Protests						
Contract Quality Management						
Contract Changes and Mods						
Closing Contracts						
Contingency Contracting/OCS				x	x	
DevSecOps / Software Acq		x				

SILAS
WHAT IF?

Simulations



Supports decision to award above IGE (if affordable and supported) to get maximum value for money.