Augmenting Recruit Training using Game-Based Training Systems

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Recruit Training Command
Great Lakes, IL

- 40,000 recruits per year → 46,400 by 2011
- 8 week curriculum
- Battle Stations 21
  - 10 hour capstone evaluation event
  - 17 training scenarios in physical simulation
Challenges Addressed

- Adapt training to the changing demographics of the recruit population
- Enhance recruit preparation for Battle Stations 21 capstone assessment
- Prepare recruits to complete rating-specific training efficiently and effectively
- Create agile Sailors with enhanced cognitive readiness
BS21 Performance Measurement Execution Analysis Report

- Identified barriers to effective evaluations in BS21, including:
  - "Recruits do not have an opportunity to adequately practice tasks/behaviors as necessary prior to performance evaluation"
- Recommendations to address these barriers included:
  - "Provide training during RTC for measures not currently supported by RTC curriculum"
  - "Provide recruits an ample opportunity to practice all performance measures identified for evaluation"
    - Develop computer simulations that allow recruits to practice each of the performance measures evaluated
    - Provide equipment in the compartment or ship that recruits can utilize to practice performance measures during RDC discretionary time"
Virtual Environments for Ship and Shore Experiential Learning (VESSEL)

- Game-based training in virtual ship environment
  - Guided training and performance analysis/assessment
  - Compelling storyline and relevant operational situations
  - Reinforce and augment knowledge and skills taught in class, lab and live exercises
  - Embedded didactic resources and job aids
## Project Goals

### Products

*Goal: Create training products for use in the Navy*
- Flooding Control Trainer
- Validated outcomes
- Open-source

### Technology

*Goal: Provide tools to support effective, reusable instruction in games*
- Instructional authoring tools
- Automated assessment and coaching
- Instructional game infrastructure

### Science

*Goal: Improve understanding of design and use of games for learning*
- Study effects of game features on learning outcomes
- Identify best practices and form a model for end-to-end development

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**Create compelling training for the millennial generation**

**Keep training current at low cost**

**Consistently create high-quality training products**
Project Team

Tools for Game-Based Training and Assessment of Human Performance

**Team**

- BBN Technologies
- University of Central Florida
- Intelligent Decision Systems, Inc.
- Alion Science and Technology
- CHI Systems
- i.d.e.a.s. Learning
- Potomac Institute for Policy Studies

**Customer**

- Naval Service Training Command
  - Dr. Rodney Chapman, Chief Learning Officer (N9)
- Office of Naval Research
  - Dr. Ray Perez
  - Dr. Amy Bolton
  - Dr. William Krebs

**Partner**

- UCLA National Center for Research on Evaluation, Standards & Student Testing
Instructional Methodology

- Optimally guided discovery within a game-based environment, progressing through levels of increasing challenge

**Training Session**

**Before**
- Priming
  - High-level framing

**During**
- Naturalistic interactions in a virtual world
  - Performance-based feedback & guidance
  - Consequences of actions reinforced
  - Access to information

**After**
- Performance summary
- Individual development plan
Instructional Progression

- Optimally guided discovery within a game-based environment, progressing through levels of increasing challenge

  Game levels (Missions)

  - Amount of scaffolding
  - Complexity of situations
  - Difficulty of learning objectives
  - Severity of consequences

- Tensions
  - Game play vs. Instruction
    - If and when to intervene instructionally
    - How much scaffolding?
  - Positive vs. Negative Feedback
  - Immediate vs. Delayed Feedback
  - Mastery vs. Performance
  - How much narrative?
Usability Study

● What question were we trying to answer?
  – Can recruits of all backgrounds use the game?

● How did we study it?
  – We conducted a usability study with 72 recruits at RTC Great Lakes. We used standardized usability measures to assess several aspects of game play.

● What did we find?
  – Usability results were very positive. There were no differences associated with any background variable.
### Usability Study Comments

- **“In Battle Stations, you don’t get to navigate unless you are team leader so this really helps to learn that.”**
- **“I re-tried the mission 2-3 times and the debrief summary really helped me figure out where I screwed up.”**
- **“I think I learned to reiterate and understand more about communication, safety, and equipment. This gave me insight into what is expected of you.”**
- **“We would have been more prepared for Battle Stations 21.”**
- **“When I was in Battle Stations, I forgot certain things and this helped me learn to pay attention to details.”**
- **“It put a smile on my face. It was pretty fun.”**
- **“It would be fun to compete.”**
- **“You are having fun while learning.”**
- **“It made me want to try and do better.”**
- **“We had to do a lot of decision making.”**
- **“I would play this again because I could actually do it and I can’t play most video games.”**
Overall Evaluation

Evaluation (9 = Highest)
Usability Ratings

The game was stimulating

It was easy to play the game

The instructions were clear
Pre-training Intervention

- What question were we trying to answer?
  - Can an educational intervention before game play improve the perceived effectiveness of the game?

- How did we study it?
  - Using the same sample as 1a, we compared the learner’s perception of effectiveness in a group that received a pre-game “refresher” training session on ship navigation compared to those that did not.

- What did we find?
  - Participants that received training reported that the system was more usable, and more likely to be an effective training approach.
Pre-game training improved in-game performance
Training Transfer Study

● What question were we trying to answer?
  – *Do elements taught in the game transfer to the operational environment?*

● How did we study it?
  – *We conducted a study with 30 pre-BS21 recruits at RTC Great Lakes comparing 14 game-trained vs. 16 non-trained participants in a Battle Stations 21 scenario.*

● What did we find?
  – *Data indicates that participants who received the game…*
    1. Made fewer “critical errors”
    2. Made fewer communication errors
    3. Found the assigned compartment much faster
    4. Followed safety protocol much better
Next

- Limited installation and pilot training program at RTC
- Broad-based deployment at RTC
- Support additional training domains at RTC
- Extend use to Accessions Training across services
Publications


