COE TTHP Third Annual Technical Meeting

Explore Use of Gamification for Training

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Center of Excellence for Technical Training & Human Performance

Project Overview

Abstract:

This project will model the application and impact of gamification, game-based learning (GBL), and simulation/virtual and augmented working environments (VR) to provide state-of-the-art training solutions to Aviation Safety Training.

Expected Project Outcomes:

1. Complete a comprehensive review of current use of gaming/VR, virtual environments, task trainers and simulators in aviation safety training, in the civilian and military environments.
2. Determine successful/unsuccessful components of gaming/VR use in training.
3. Develop a prototype of a simulated work environment for a common training task.
4. Develop assessment methods and outcomes for the prototype and for future gaming/VR training environments.
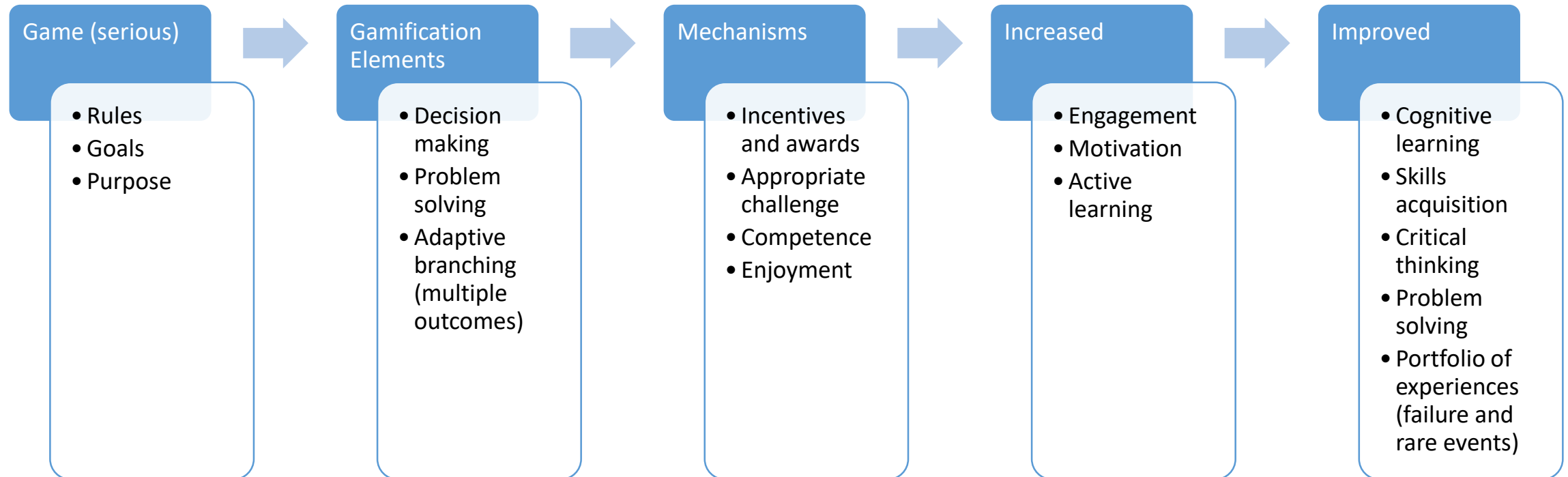
Research Design

The Process:

1. Literature review
2. Collect data
   - Field trips to ATL Tower, ATL ARTCC, Army Gaming Studio (AGS)
   - FAA Academy course library
   - Wittman Regional Airport (KOSH)
3. Cooperative Research and Development Agreement (CRADA) with Army Aviation and Missile Research Development and Engineering Center (AGS parent organization)
4. Develop story board (FAA, UND, AGS)
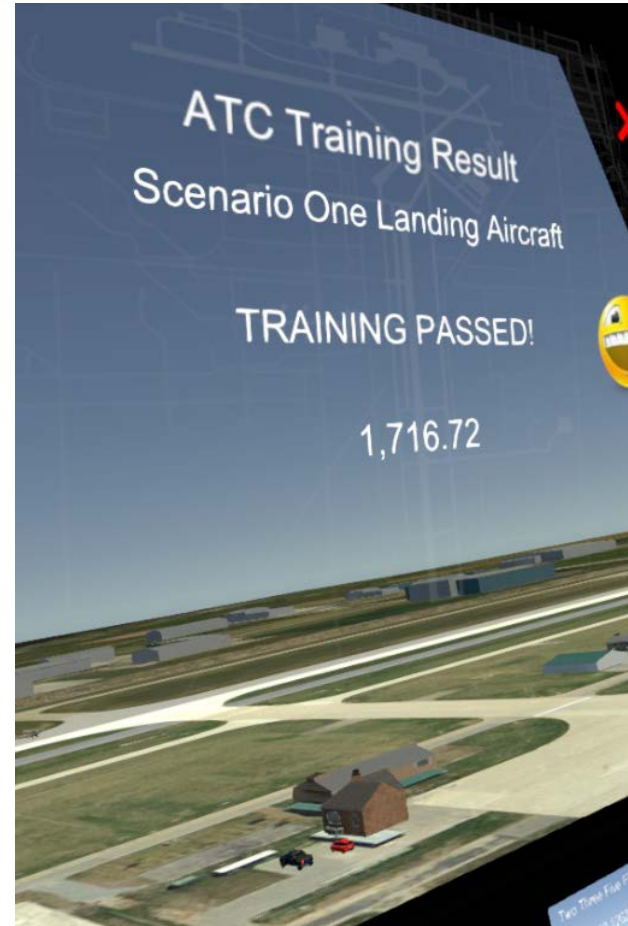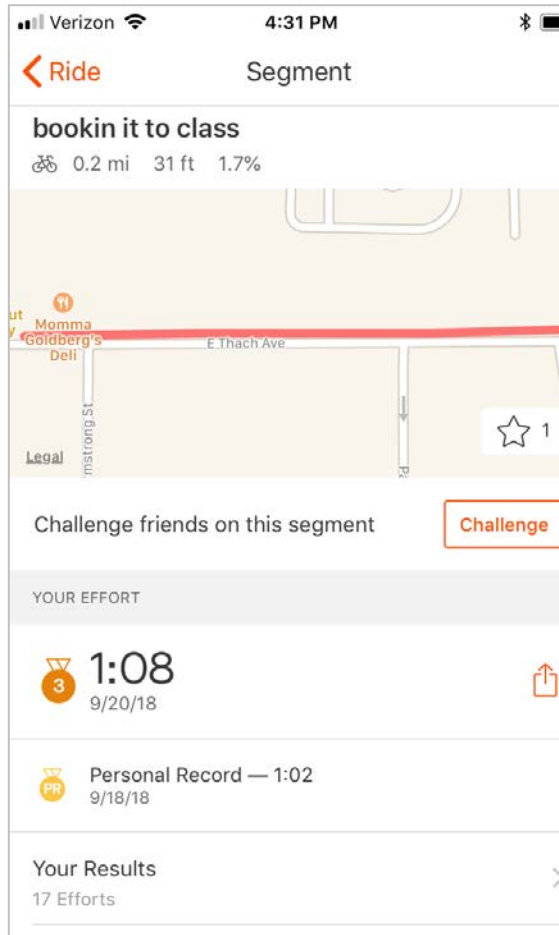5. Develop and evaluate VR prototype

Preliminary Findings

Lit Review Key Takeaways

Game (serious) →	Gamification Elements →	Mechanisms →	Increased →	Improved
• Rules • Goals • Purpose	• Decision making • Problem solving • Adaptive branching (multiple outcomes)	• Incentives and awards • Appropriate challenge • Competence • Enjoyment	• Engagement • Motivation • Active learning	• Cognitive learning • Skills acquisition • Critical thinking • Problem solving • Portfolio of experiences (failure and rare events)

Preliminary Findings

Preliminary Findings

Workforce Development:

- Near-future issues in training management, delivery, technology, and safety
- Gamification is becoming an increasingly popular approach to education and training in many disciplines, to include aviation
  - Parallel efforts by other federal organizations – USAF, USA, USN
- Digital workspace (IE Next Gen) requires a digital workforce (which is in great supply)
  - Millennials (ages 21-36) makeup more than 1/3 of labor force (Pew Institute, 2018)
  - Post-millennial (born after 1996) now of working age
- Perfect opportunity to rethink workforce development and employ new teaching methodologies and technologies
  - Applicable to ATC, Tech Ops, pilots, and more

Attracting top talent is key

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DISCOVER A NEW ERA OF TRAINING

With air traffic expected to double by 2035, part of IATA's mission is to help the industry attract and develop a massive workforce to support that growth.

Preliminary Findings

Solutions Driving Critical Change:

1. Develop integrative, cutting edge training platform that can augment existing training and incorporate new training modules and technologies
2. Provide state of the art training, maximize resources, improve recruitment and job performance
3. Single platform that can be used for all aviation safety training
4. Incorporate outcomes from other COE TTHP projects (IE - weather)
5. Provide uniform, cost efficient training across multiple locations
   - Individualized focus on techniques students find challenging
   - Instructors insert new scenarios focused on student performance
6. Current professionals can use the product for recertification and training updates (on phones, tablets, laptops) with completion certification inserted into training files

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Preliminary Recommendations

Next Steps:

- Test the ATC prototype at the FAA Academy, collect feedback
- Develop final Phase I report
- Fund Phase II

Phase II (if funded) -- Develop the SafeSkies Prototype into a Full Product:

- Add more challenging scenarios
- Integrate with current curriculum
- Create versions for personal devices
- Incorporate Technical Operations training
- Add augmented reality (AR) modules for aircraft maintenance, safety inspection, etc.
- Use SafeSkies platform as a hub for any type of FAA training

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Preliminary Recommendations

Multiple delivery methods:

- ✓ VR
- ✓ Desktop
- ✓ Mobile devices

Anticipated Project End State

Value and Impact to the FAA

How this Research Project will Inform/Drive NAS Changes:

- Leadership through state-of-the-art training
- SafeSkies is nimble and adaptable, integrating with current training and compatible with other software, systems and technologies
- Dynamic, strategic training creates flexible, critical thinkers able to quickly respond, improving efficient use of airspace and improved safety
- SafeSkies platform can continue to be updated, with new scenarios added to address unforeseen circumstances and new challenges (e.g. UAS)
- As new systems and procedures are developed for NAS, they can be immediately implemented into training, decreasing time to full implementation
- The 'workforce' and training is the most critical piece of the NAS future

VR Demo at Wittman Regional Airport (KOSH)

Start in the ATC lounge

- Talk to a local ATC to learn more about the game
- Explore ATC learning resources
- Learn how to use the controller, change the scenario, visit the hangar, tower, or tarmac

Visit hangar

- Talk to 3 different pilots to learn aircraft specifications
- Ask questions about specific game aircraft

Join ATCs in the tower

- Take a quiz to demonstrate proficiency
- Take over from the ATC in charge
- Talk to aircraft in the pattern
- Land aircraft, interact with ground vehicles and test your skills
- Compete with yourself or classmates for the top of the leaderboard

Questions?