

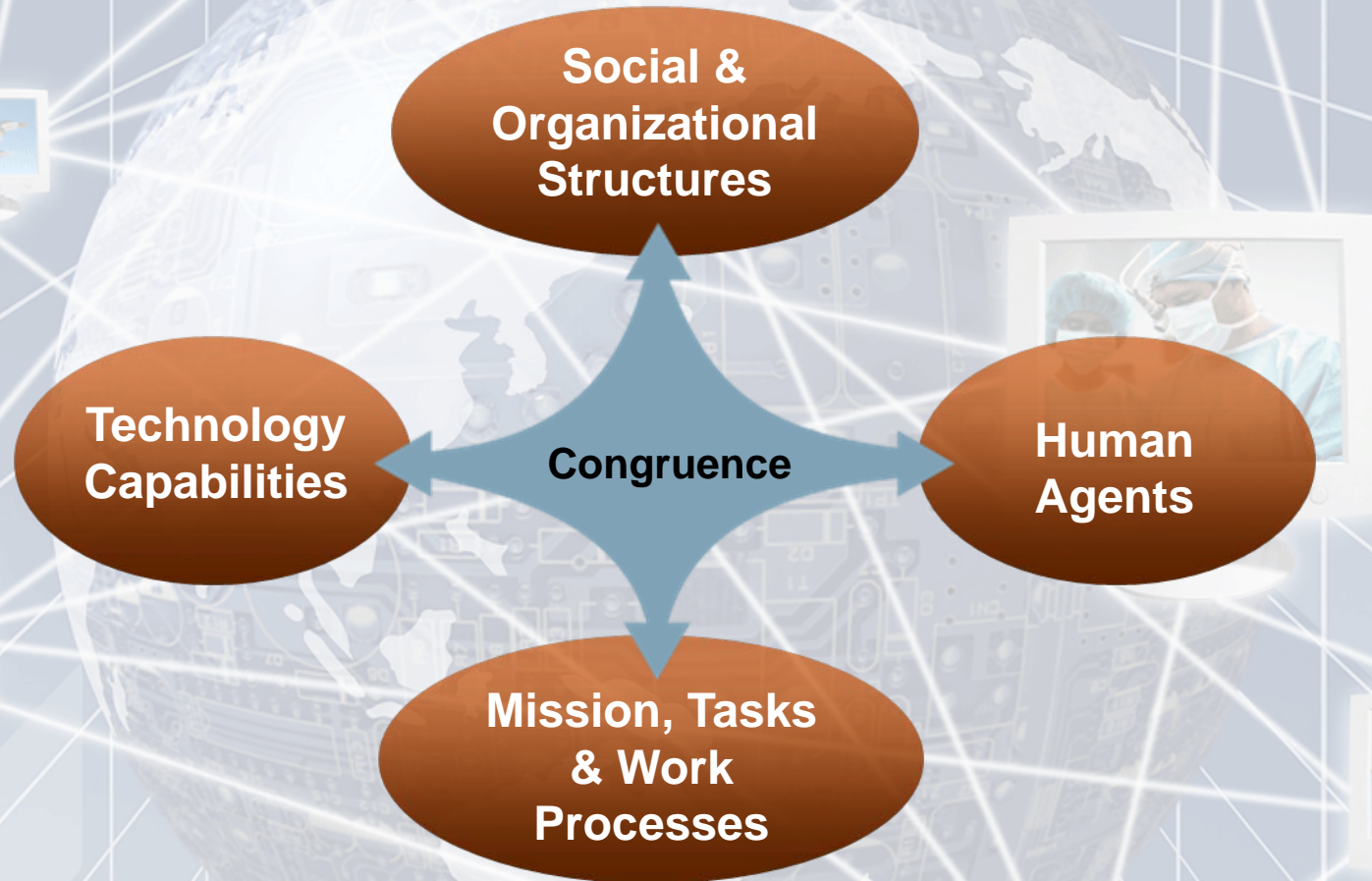
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HUMAN-CENTERED ENGINEERING

Can gaming technologies be a useful workplace accommodation?

Jason Sidman, PhD
Aptima, Inc.



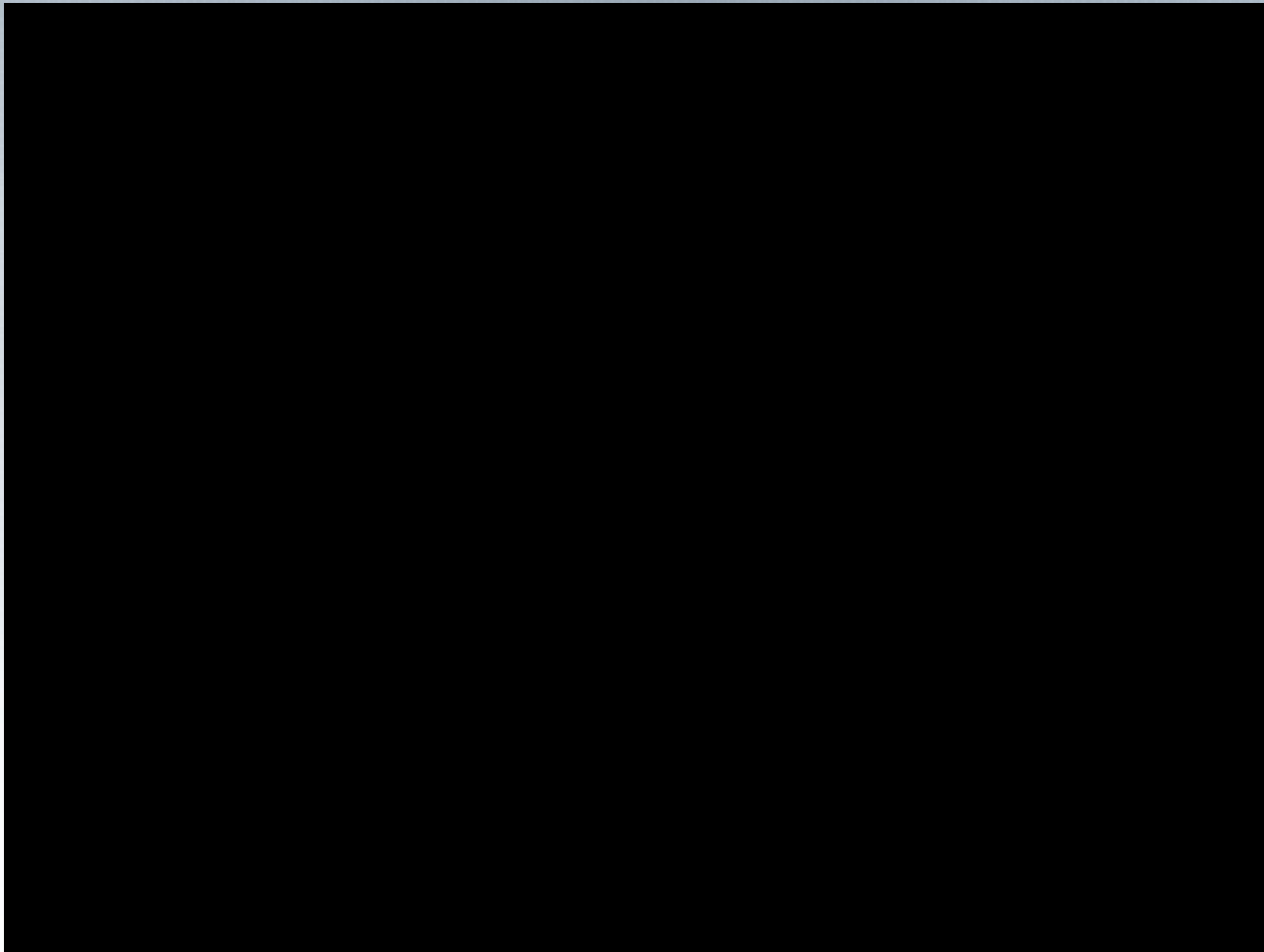
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Cognitive Rehabilitation

- Traumatic Brain Injury (TBI) has been called the signature wound of wars in Iraq and Afghanistan.
- Often show deficits in Memory, Attention, and Speed of Processing.
- These deficits may emerge as auditory deficits, but they are cognitive rather than physical in nature.
- Walter Reed issued a solicitation to develop a rehabilitation program for the cognitive deficits.

Living with TBI



Current Approaches

- Rehabilitation success depends greatly on adherence to the regimen.
- But current techniques are lengthy, repetitious, and tedious.
 - Memory: Digit span tasks
 - Attention: Seashore rhythm task
 - Speed of Processing: Mental rotation
- As a result, patients do not continue their exercises at home.

Design Considerations

- How can we increase adherence to the regimen at home?
- There were many possible alternative delivery methods, including face-to-face and computer-based training.
- Games inherently address many of the shortcomings of current techniques
 - Engaging, fun, and promote repetition
- This generation of Soldiers grew up playing videogames
 - And have expectations of what makes a game fun, and what does not.

Assembling a Multi-Disciplinary Team

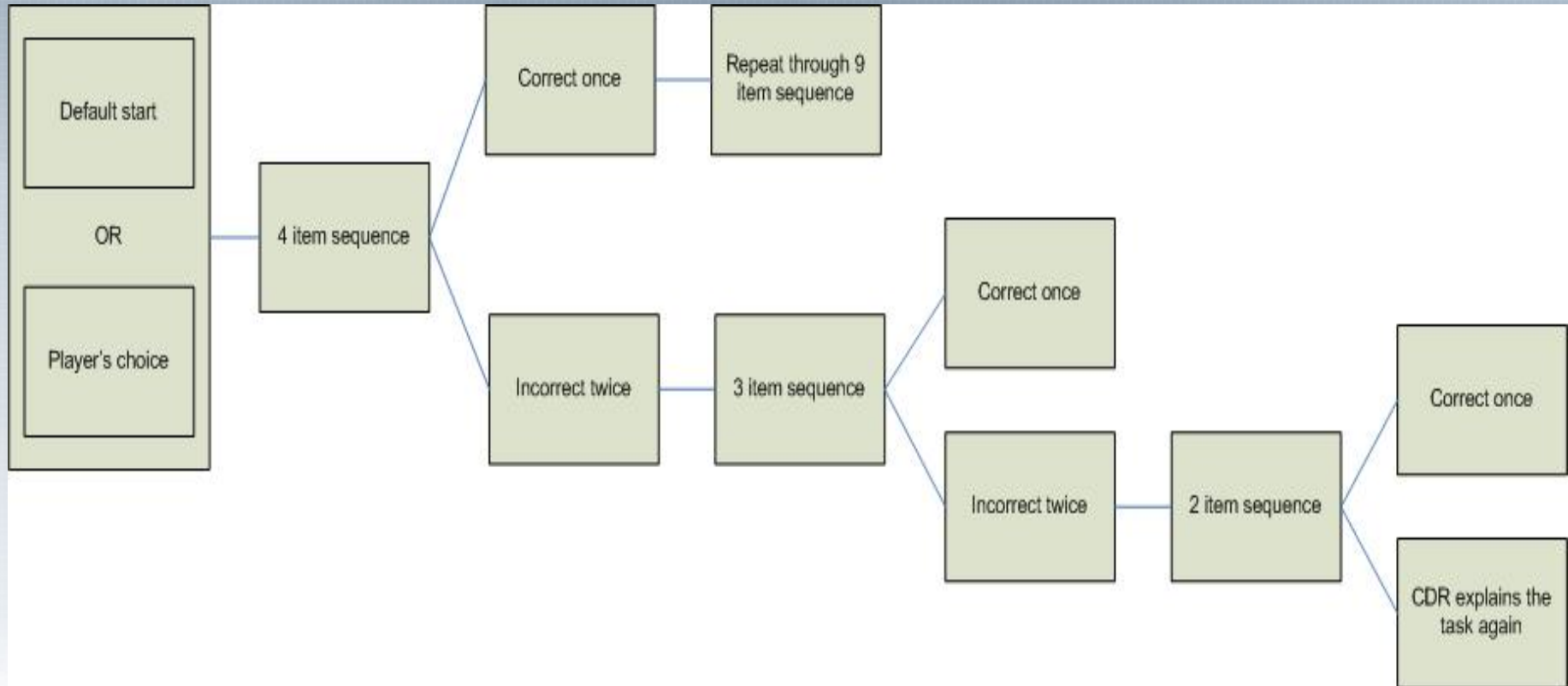
- Aptima
 - Expertise in cognition and neuroscience
 - Experienced game designers
- Clinicians
 - Experience with shortcoming of current techniques
 - Both military and non-military (e.g., National Football League) experience
- Game developers
 - For top-tier experience
 - It's easy to create a bad game!
 - We even added music students from the New England Conservatory to increase the quality of our sound experience.

How to Collaborate with Game Developers



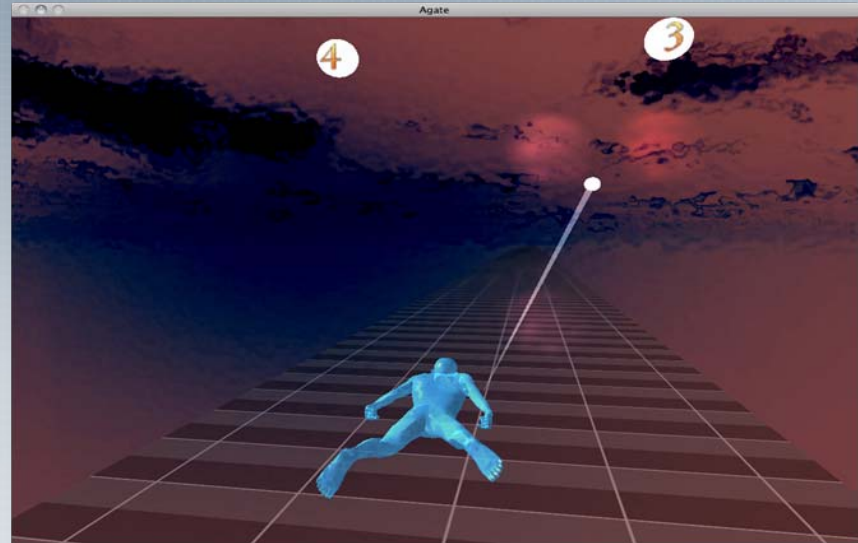
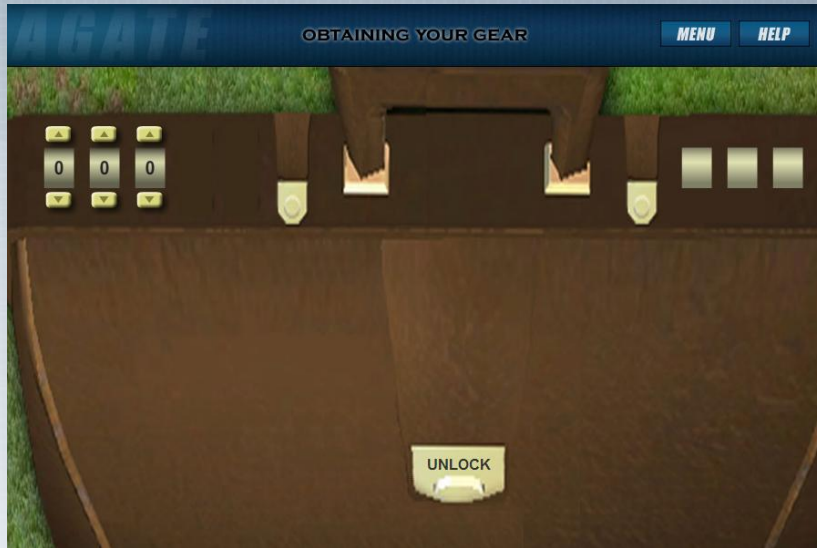
- You need to ensure that your goals are achieved through the game.
 - Otherwise the game will be fun, but will not be used for its intended purpose
- You need to give developers the creative freedom to achieve your goals.
 - Otherwise the game might be designed for its intended purpose, but won't be fun.
- You need to find a common “handshake” point.

Preserving the Science, Finding the Fun (1)



This chart outlines the flow and parameters of the digit span task, in which the player must recall increasing sequences of numbers.

Preserving the Science, Finding the Fun (2)



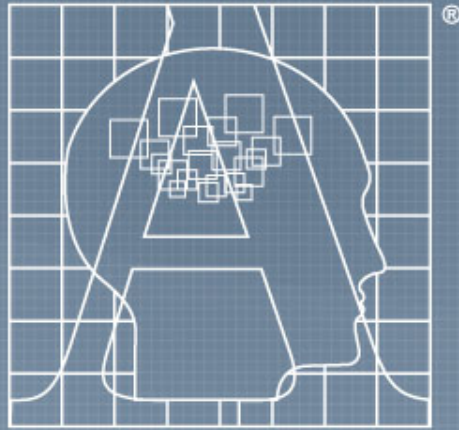
- These are two different versions of the digit span task.
- On the left, the player enters numbers into a keypad on a briefcase to unlock it.
- On the right, a player shoots objects in the sequence in which they were presented on the screen.

Which game is better?

- **Achieving rehabilitation goals**
 - The 3D virtual world promoted too much time away from tasks
 - The key to rehabilitation is the repetition
- **Costs**
 - You can create fun games regardless of budget.
- **User expectations**
 - If you're committing to the 3D blockbuster game, it needs to be good!
 - But don't equate 3D game with good.
 - Even simpler, lower budget games are wildly popular.

Summary

- We used gaming technologies to promote adherence to a rehabilitation program at home.
- We assembled a multidisciplinary team with varied expertise
- We were game designers with the task of ensuring that the game preserved the science while finding the fun
- We designed a game that met our rehabilitation goals within our budget that met the expectations of our users.



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