Serious Games, Virtual Worlds and MMOGs – Building the Puzzle Without the Picture

Paul Roman
Royal Military College/ Directorate of Land Synthetic Environments
Roman.pa@forces.gc.ca
Agenda

• Simulation Renaissance – Emerging from the decade of darkness.
• Games – Just How Serious Are They?
• Virtual Worlds – finding their place
• MMOGs – Your guess is as good as mine.
The Five Forces Effecting the Adoption of Game Technology (Smith 2007)

Hardware Costs
- Significant reduction in computer hardware costs required to support game-based applications
- e.g. 10X Reduction for PCs
- 100X for Consoles

Software Power
- Significant power of game-based software applications and tools
- e.g. Intelligent Agents, 3D Worlds, Accessible GUI, Physics Models, Global Network, Persistent Worlds

Industry Success
- Success of the technology in other industries
  - e.g. Military Training, Chemistry Experiments, Corporate Training, Architecture Design

Adoption Pattern
- Niche Area
- Unregulated Spaces
- Certified Applications
- Recommended Practice
- Mandatory Standard

Social Acceptance
- Growing social acceptance of game-rooted solutions to serious applications and industries
- Driven by Maturing Gamers, Social Prevalence, Media Image

Experimentation
- In-industry experimentation with the technology identifies areas for useful application
Experiential Learning
Renaissance

From This

To This
Experiential Learning Guidelines*

- Balance cognitive load and the complexity of the environment
- Sequence experiential events to promote understanding
- Deliberately increase tempo, cognitive load and complexity of the environment
- Have a purposeful feedback strategy including AARs
- Provide deliberate opportunities to promote reflection

Tactical Training Requirements Met with Serious Games

• Introducing, teaching and rehearsing new drills and TTPs.
• Showing the viewpoint of all sides, enemy and own forces.
• Representing the use and effects of current and future systems that either cannot be or are poorly represented in conventional training.
• Reviewing actions and events from all perspectives both during the event and in post game analysis.
• After Action Review (AAR). This was reported as a ‘big win’ and develops a feeling of inclusion in the training process for all participants.
• Developing new teams and fostering teamwork.

• EMPHASIS IS ON COGNITIVE AND TEAM BASED SKILLS
## Training Needs Framework

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>Skills</th>
<th>Discrete Vignettes</th>
<th>Continuous Scenarios</th>
<th>OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collective (TMST)</td>
<td></td>
<td></td>
<td></td>
<td>Operationally Ready/Certified</td>
</tr>
<tr>
<td>Collective (5-7)</td>
<td></td>
<td></td>
<td></td>
<td>Operationally Trained</td>
</tr>
<tr>
<td>Collective (3-5)</td>
<td></td>
<td></td>
<td></td>
<td>Operationally Capable</td>
</tr>
<tr>
<td>Individual (1-3)</td>
<td></td>
<td></td>
<td></td>
<td>Operationally Competent</td>
</tr>
<tr>
<td>Leadership</td>
<td></td>
<td></td>
<td></td>
<td>Capable, Adaptive Leaders</td>
</tr>
</tbody>
</table>

**Canadian Army Application Domain for Serious Games**

Adapted from: Roman and Bassarab, IITSEC, 2007
Ex: Armour Troop WO Course

Driver

Gunner

DS/Observer

Driver

Surv Op

Commander

Leader

Commander

Gunner

Leopard

Coyote
Evidence of Efficiency

DP3 Tp WO 0701 (1 day VBS, 5.5 weeks in field)
- Fuel: $53,130.22
- Misc food: $29,094.28
- FOA (approx): $ 31,012.80
- Total cost: $145,668.50

DP3 Tp WO 0702 (2.5 wks VBS/3 wks fd)
- Fuel: $29,756.35
- Misc food: $19,830.24
- FOA (approx): $ 14,398.80
- Total cost: $96,031.46

Total Savings: $49,637.04
## Evidence of Effectiveness

<table>
<thead>
<tr>
<th></th>
<th>Serial 0602 (No VBS®)</th>
<th>Serial 0701 (1 day VBS®)</th>
<th>Serial 0702 (2.5 weeks VBS®)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% pass on 1st trace</td>
<td>0</td>
<td>30%</td>
<td>67%</td>
</tr>
<tr>
<td>% pass by ½ of traces</td>
<td>61%</td>
<td>72%</td>
<td>100%</td>
</tr>
<tr>
<td>% pass by end of course</td>
<td>72%</td>
<td>83%</td>
<td>100%</td>
</tr>
</tbody>
</table>
We will never be able to simulate this (nor would we want to, because it never gets old)...

WO Lanny Hill (MMS 2008)
Additional Evidence of Effectiveness

• Australian Army VR Tail Gunner Training (Carpenter 2008), unacceptable pass rates.
  – Integrated VBS2 with VR headgear
  – Increased pass rate, increased standards and reached acceptable level of throughput

• USMC Urban Shoot House (Wiederhold, 2006)
  – 90 of 210 subjects rehearse in game prior to live training
  – Assessed as 100% effective on all runs compared to 80% effective on 80% of the runs for the control group

• UK sponsored series of SG experiments (QinetiQ)
  – Urban, dismounted infantry, convoy operations
  – Qualitative descriptions of effectiveness very similar to those above.
Roman’s Rule

• Given a robust set of SG rehearsals that:

1. Create an Adequate degree of immersion or presence (Pringle, 2007), in a meaningful context
2. Employ good experiential learning guidelines (Menaker et.al., 2006)

• Trainers can expect:

To go from 75% to 95% effective in about half of the time that would have been required with live training on its own.
What is a Virtual World?*

• Include:
  – Graphical Landscape
  – Avatars
  – Persistent
  – Shared
  – Massive
  – Goals

• Examples
  – Second Life
  – Olive
  – QWAQ

* Mike Macedonia 2009
Shared*

- Changes made to the environment are theoretically viewable by any other user.

* Mike Macedonia 2009
Massive*

A VW must have enough inhabitants for realistic patterns of human behavior and interaction to appear.

* Mike Macedonia 2009
**Graphical landscape**

The primary means of interacting with the VW is generally through a rich graphical landscape using both verbal and non-verbal communication.

* Mike Macedonia 2009
Activity-based taxonomy

• Level 1 - Passive (student acts solely as a receiver of information).
• Level 2 - Limited participation (student makes simple responses to instructional cues).
• Level 3 - Complex participation (student makes a variety of responses using varied techniques in response to instructional cues).
• Level 4 - Real-time participation (student is directly involved in a life-like set of complex cues and responses).

(Department of Defense, 2001) Development of Interactive Multimedia (Part 3 or 5 Parts) MIL-HDBK-29612-3
Level I*

Passive (student acts solely as a receiver of information)

* Mike Macedonia 2009
Level II*

Limited participation (student makes simple responses to instructional cues).

* Mike Macedonia 2009
Level III*

Level 3 - Complex participation (student makes a variety of responses using varied techniques in response to instructional cues).

* Mike Macedonia 2009
Level IV*

Real-time participation (student is directly involved in a life-like set of complex cues and responses).

* Mike Macedonia 2009
Other Applications of Virtual Worlds*

- Media Sharing
- Group Meetings & Collaboration
- Events
- Team Project Management

* Mike Macedonia 2009
MMOGs

• Leadership training at least.
Summary

- **Serious Games:**
  - Proven effective

- **Virtual Worlds**
  - Impressive potential

- **MMOGs**
  - You be the judge…

- **Attend Military Modeling and Simulation 2010 to learn more**
  - Part of SpringSim 2010 – Orlando, 12-15 April.
  - [www.scs.org](http://www.scs.org)