Game-based Learning Development

It's not a game!

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Dolly Oberoi, CEO, C² Technologies, Inc.
Gary C. Powell, Ed.D., Sr. Instructional Technologist, C² Technologies, Inc.

Topics

- About C^2
- Lingo of the instructional game space
- Benefits of Game-based Learning (GBL)
- Important considerations to make as you jump off into GBL
  - Instructional Systems Design (ISD)
  - Technical
  - Client
  - Cost
- Lessons learned
- Migrating to GBL
- Standards-based output
- Cost considerations
- Evaluation
- Debunking GBL myths
- Final thoughts

About C^2

Our mission is to be the best performance improvement company in the marketplace.

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C² Technologies, Inc.

C² Core Business Areas

- Training & Development
- Strategic Human Capital Management
- Information Technology
- Training Support Services
- Established in 1989
- Woman-owned Business
- 3 Development Sites
- 400 Employees

Game-based Learning

- Discovery
- Multi-sensory stimulation
- Situated learning
- Learner control
- Challenge
- Excitement
- Immersion
- Fun

Lingo

- Game
  - Inherently nonlinear
  - Involves one or more players
  - Has rules, goals, constraints, payoffs, and consequences
  - Game state changes with the players' actions. A puzzle is static. A game is interactive
  - Variable and quantifiable potential outcomes are assigned different values, some being positive, others negative
  - Players are attached to the outcomes: "happy" with positive outcomes; "unhappy" with negative ones
  - Players must invest effort in order to influence the outcome—a struggle

Lingo (cont'd.)

- Game
  - Involves some aspect of competition, even if that competition is with oneself
  - What makes a game a game (unlike a puzzle) is the need to make decisions
- "Serious Game" or GBL
  - The use of computer game and simulation approaches and/or technologies for primarily non-entertainment purposes
  - Serious games are designed to promote higher-level intellectual skills and attitude learning, as opposed to verbal knowledge outcomes. This is particularly true for games and simulations created for adults

Lingo (cont'd.)

- "Serious Play"
  - Is purposeful, or goal-oriented. Most important, the individual views the experience of serious play as satisfying and rewarding in and of itself, and considers the play experience to be as important as any outcomes produced as a result of it
  - A process of immersion whereby a person's attention is fully engaged in the activity (even losing track of time), and which results in learning of some kind
- Game Design
  - The process of taking an idea and creating a system of systems to deliver that idea to a player in a manner that is engaging and fun

Benefits of GBL

- Enables engagement in learning activities otherwise too costly, dangerous, difficult, or impractical to implement in the classroom
- Prepares the learner for the emotional states and sensory inputs that could impact “real-world” performance
- Puts the learner in the role of decision-maker
- Offers a “cost-effective” tool for training
- Addresses the “Digital Culture” learning style

Benefits of GBL (cont'd.)

- Provides "Experiential Fidelity"—"the whole experience"
- Low-risk experimentation in a safe environment (viewable consequences)
- Provides an environment to simulate complex human interactions
- Average game player will spend 150 hours to master a game. Imagine a training tool that learners would not only use at home, but would play that long!

Are Games for Learning Catching On?

- U.S. Sales: $3.2 billion in 1995
  $10.4 billion in 2003
  $9.9 billion in 2004 (a decline of less than 1%)
- 50% of all Americans ages 6 and older play video games!
- 239 million video and computer games sold last year in the United States

So, How Have Games Changed the Learner?

- Increased situational awareness (University of Rochester study)
- Improved pattern recognition and spatial processing abilities (UCLA Prof. Patricia Marks Greenfield)
- Improved inductive reasoning, users “learn by doing” (Prof. Sherry Turkle, MIT)
- Videogame players are comfortable with processing large amounts of data
- Game players have an insatiable desire to “win”!

Considerations

- Instructional Design (ISD)
- Technical
- Client
- Cost

ISD Considerations

Traditional (WBT)

- Often linear and didactic
- Core ISD skill set is adequate
- Often clear-cut goals and objectives
- Extrinsic motivation is more common
- Level 2 interactivity is often assumed

GBL

- Open-ended and largely nonlinear
- Not a standard ISD project
- Need a skilled team of ISDs and Game Developers
- Need to develop meaningful play
- Emphasis on intrinsic motivation is critical

ISD Considerations (cont'd.)

Traditional (WBT)

- Primarily mouse-driven
- Easy to create, standards-based

GBL

- High fidelity and interactive
- Various interface devices (mouse, keyboard, joystick)
- No clear line between play and learning
- Tricky to create
  - the dynamics of learning are fully integrated with the dynamics of game play
  - Keeping the player in a flow state by increasing the skill level of the game while the player's skill level increases

Development Process

Technical Considerations

Traditional (WBT)

- Smaller file sizes
- Deployed online
- Easy LMS integration
- Easy SCORM and Section 508 compliance implementation
- Little if any access to learner's hard drive

GBL

- Large file sizes
- Mainly CD-ROM delivery, or download from LMS
- Challenge to make Section 508-compliant
- Can be linked to SCORM-conformant LMS as an SCO or an RLO
- Complexities in learner tracking

Technical Considerations (cont'd.)

Traditional (WBT)

- Easy learner tracking
- Easy to update
- Tradeoffs can be an issue

GBL

- Careful selection of a gaming engine
- Access to learner's hard drive
- Issue of feature tradeoff due to expense
- Updates/changes not always simple

Client Considerations

Traditional (WBT)

- Similar expectations across the board
- Agree on requirements and capabilities at project onset
- Realistic assumptions
- Must agree on design approach
- Paper-based storyboards are okay

GBL

- Shared responsibility
- Set realistic expectations
- Assessment of when GBL is an appropriate learning solution
- Agree on requirements and capabilities at project onset
- Assumptions and desires tainted by XBOX-type games
- Agree on design approach

Client Considerations (cont'd.)

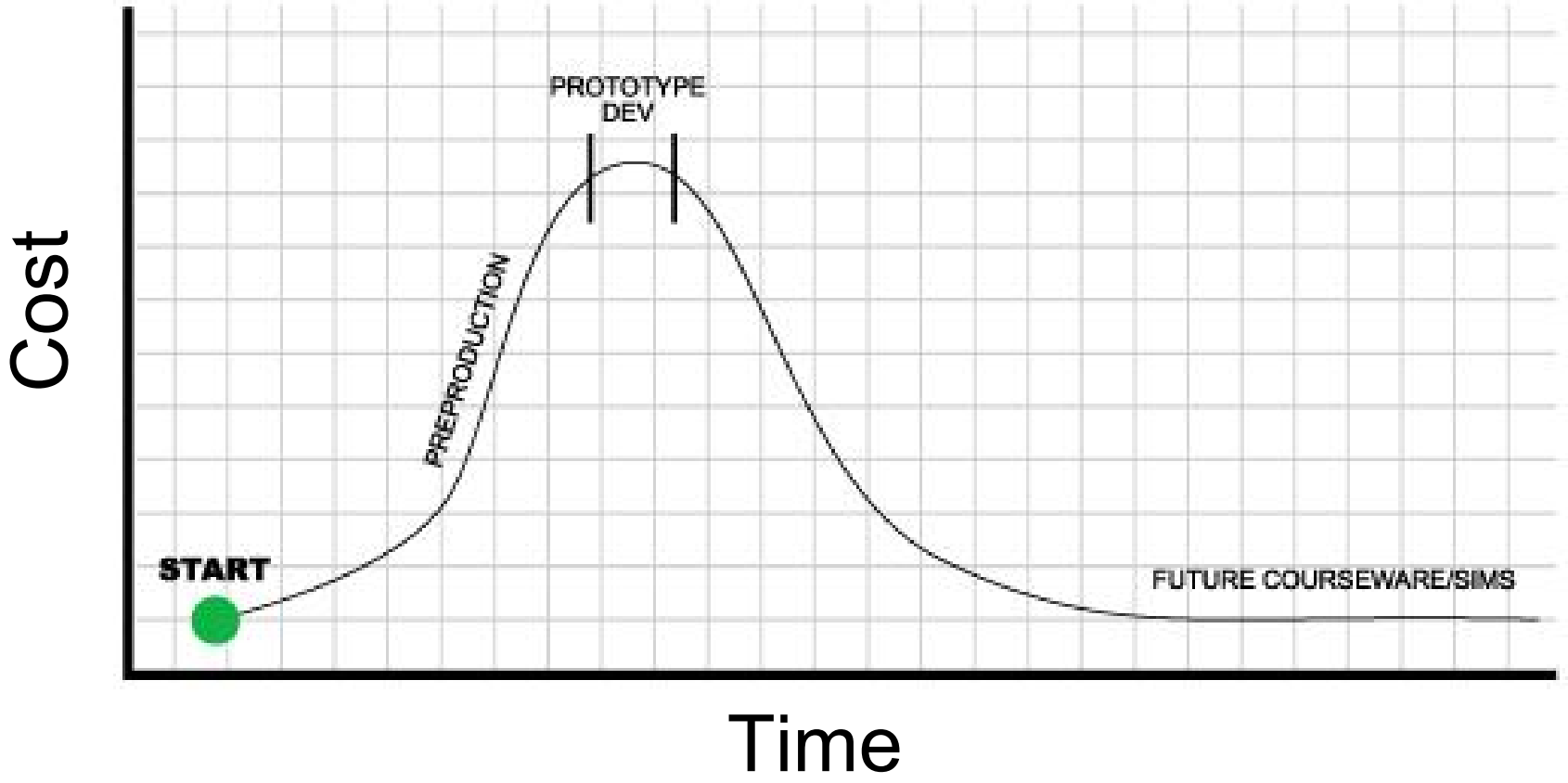
Traditional (WBT)

- As the "ooh-ah" factor of WBT is small these days, even Flash animations aren't enough to distract attention away from instructional integrity
- Expectations tend to remain level
- Shared responsibility
- eLearning is understood
- Able to self-assess readiness

GBL

- Present a functional prototype, not just sample screens
- Focus on non-instructional elements, e.g., fidelity of avatars
- Recalibrate expectations at several spots during design/development phase
- Assess organizational readiness
  - Organization, Learners (age, etc.), Technical analysis, Infrastructure, Cost-benefit analysis, Learning outcomes

Cost Considerations



Lessons Learned

- Understand stakeholder needs and expectations
- Define the technical environment—document from technical design to flow charts
- Select the right development team—need right mix of roles/skills
- Partner with a gaming company that understands instructional design, budget, and timeline constraints … a *"build it and they will come"* attitude does not work!
- Gaming partner must have a reliable gaming engine which can withstand rigorous testing and QA … trial-and-error does not work!

Lessons Learned (cont'd.)

- It's not just another ISD project; it's games!
- Balance instructional value of games with the tools and technologies
- Stay focused on the "L" in GBL
- Define the learning objectives for the game
- Create an exciting storyline to support these objectives—one which provides intrinsic motivation to play the game
- Complete learner control
- Intuitive interface
- Aesthetic appeal (*users judge a game by its cover!)*

Lessons Learned (cont'd.)

- Prototypes are critical
- Establish the fidelity upfront
- Set clear expectations for the learners
- Random generation of scenarios—no two experiences are the same
- Reusability of code due to high development costs
- Incorporate clear and concise instructions for players to access if needed
- Play as many entertainment games as possible to get a handle on what the games industry does well

Migrating to GBL

- 100% eLearning approaches don't afford learners the opportunity to put theory into practice
- Blended approaches—games embedded within a WBT experience are a safe first step

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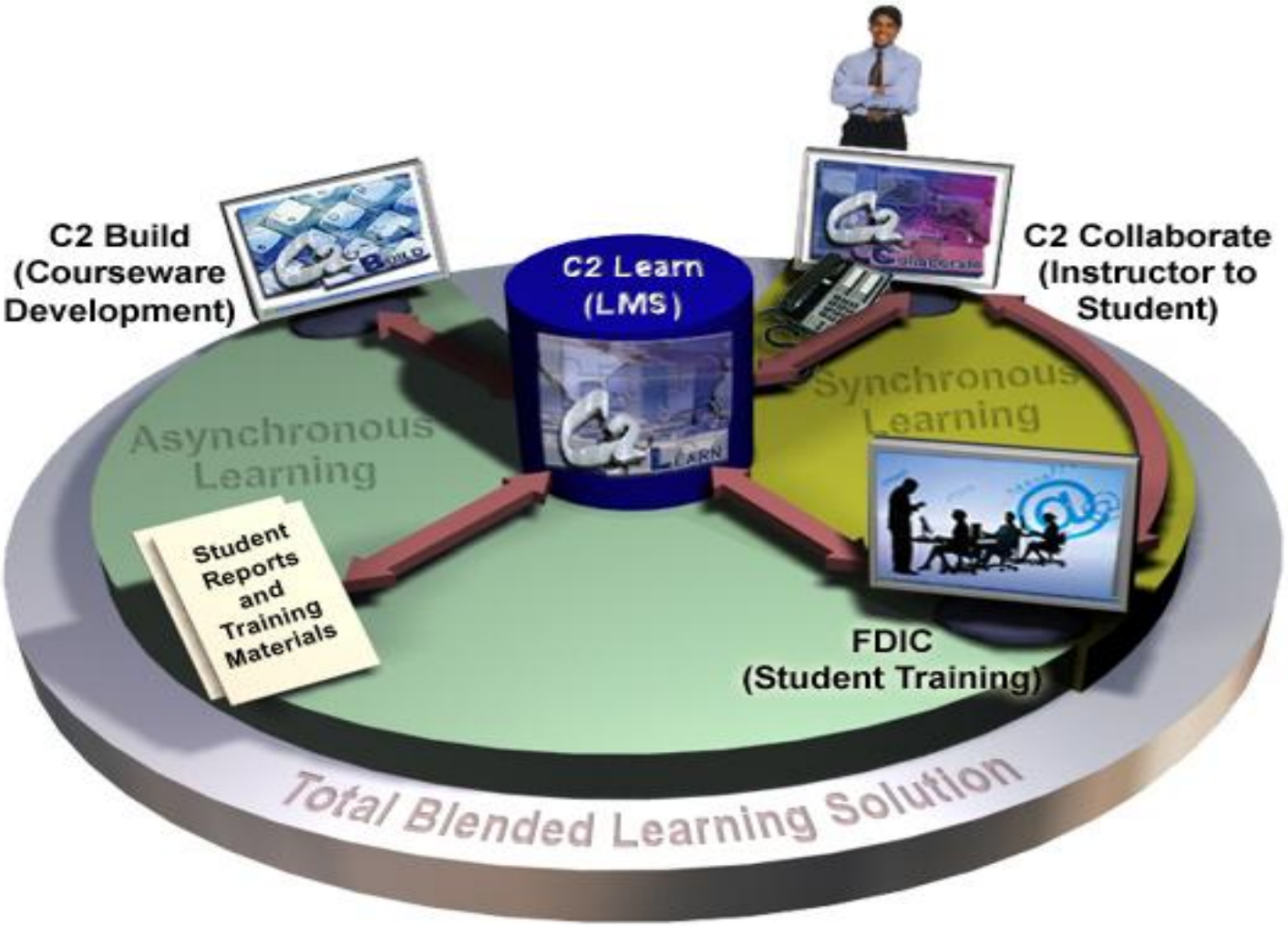
Standards-based Output
For Synchronous and Asynchronous Learning



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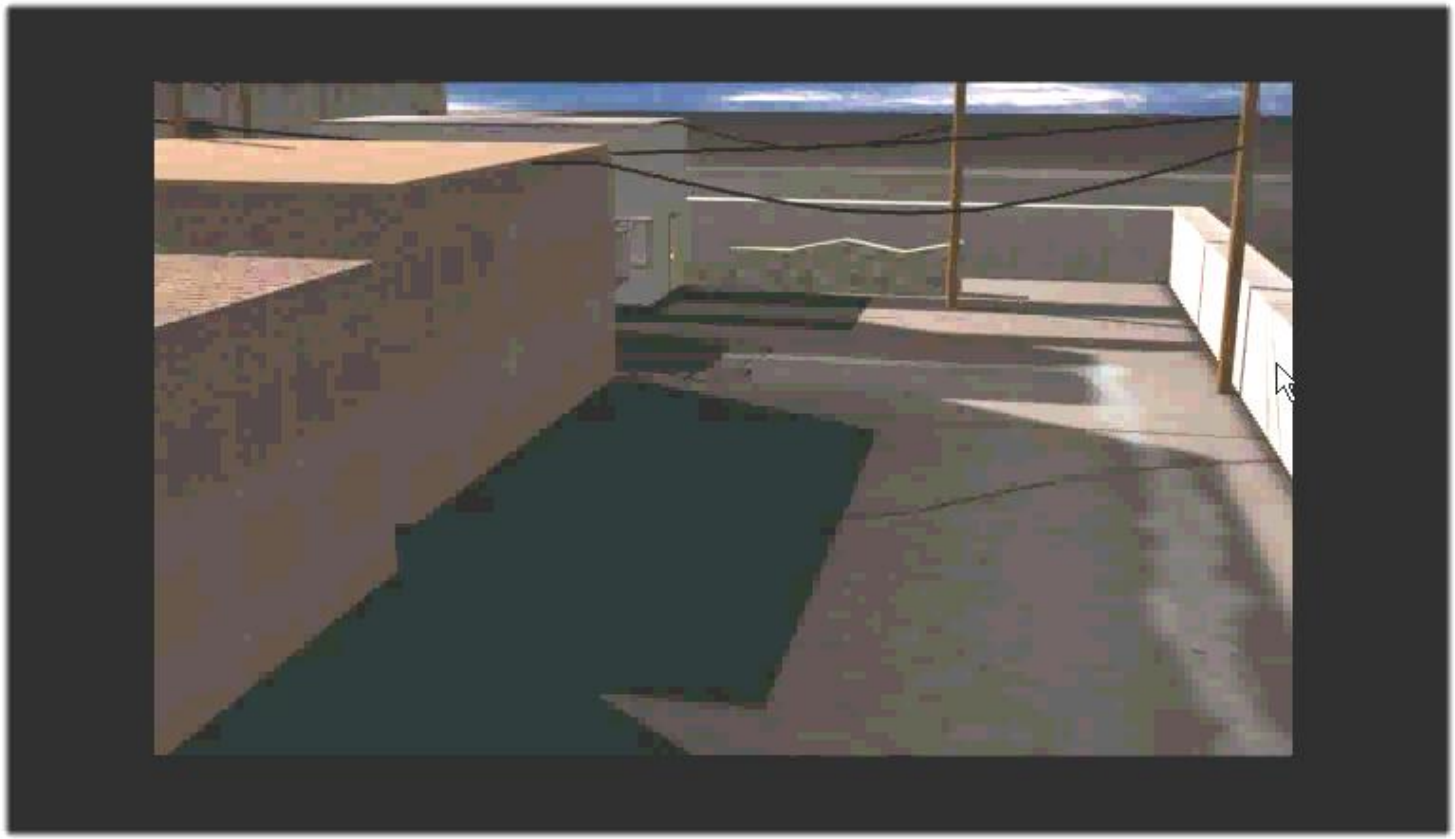
Virtual Mobile Training Team

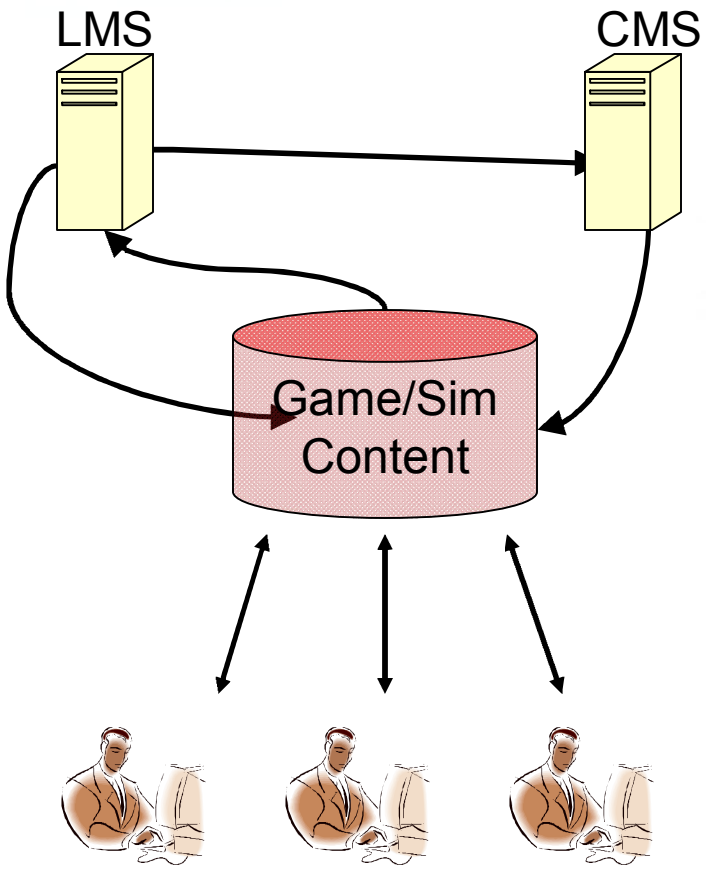
Stryker Vehicle - Battle Damage Assessment and Repair (BDAR)

Introduction - Initial Situation



Menu References Glossary Help Exit 1 of 3

Measuring Success



- Tracking of learner performance
- Capture all decision points for instructor review and assessment
- Playable replay of simulation
- Capture learner behaviors for “Lessons Learned”
- Fully integrate with SCORM-conformant LMS & CMS systems

Debunking GBL Myths

- Reformatting traditional WBT assessment items into a *Jeopardy* or *Millionaire* format is not GBL
- Tension has value; it makes for fun games
- Failure may be the most critical aspect of play
- *SimCity* is a toy, not a game; it has no goals, no victory conditions
- GBL is not the only way learning can be fun; learning is enjoyed when learners have a sense of their own progression and see it as relevant

Final Thoughts

- GBL can be a cost-effective method for training/learning
- GBL offers a way to address the learning style of today's digital culture
- GBL provides experiential fidelity
- GBL is not just about "games," but about delivering effective training

There is a lot more to GBL than simply trying to make learning fun ~ Powell & Oberoi, 2006

Technologies, Inc.

Contact Info

- Dolly Oberoi
  - doberoi@c2ti.com
- Gary C. Powell, Ed.D.
  - gpowell@c2ti.com
- www.c2ti.com
- 1-800-316-6221
- 1921 Gallows Road
  Suite 840
  Vienna, Virginia, 22180