

Serious Games: An Innovative Way to Accelerate Deep Skills

Highlights

- Games are not merely for entertainment
- Serious Games increase learning retention by immersing learners in realistic scenarios and challenges
- New methods of learning enable formal and informal learning that overcome the historical boundaries of time and place
- New technologies empower learning in nonconventional methods
- Proper integration of new methods and technologies is the foundation of our *Smart Play Framework*

“The best games build an intuitive level of education into the play itself. Players can’t help but learn the skills necessary to master a game while they play, and they usually improve quite rapidly. Similar approaches – building learning intuitively into work process and procedures – might allow companies to shift from costly and infrastructure-heavy training and development programs to more flexible contextual learning models that allow people to develop emerging new skills as needed.”

This also raises an intriguing possibility for a better approach to increased productivity: fun. Imagine if employees were as addicted to their work as they are to these games. There may be a vast well of energy, effort and creativity that remains largely untapped if employers continue to make strict divisions between work and play.”

Learning through ‘Smart Play’

Gaming is not merely a global phenomenon for entertainment, but also a strategic direction to more effectively engage and prepare the emerging workforce through rich, realistic, immersive learning environments where developing the knowledge, skill and competencies to master the game is directly aligned with the performance needed to excel on-the-job.

A recent 2010 meta-analysis study conducted by researchers from the University of Colorado Denver Business School reported that workers trained on simulation games versus formal classroom or web-based tutorials, do their jobs better with greater skill and higher retention of relevant information. “Simulation games” are defined as “instruction delivered via personal computer that immerses trainees in a decision-making exercise in an artificial environment in order to learn the consequences of their decisions.” As a result, workers trained on simulation games not only had *higher attainment of declarative and procedural knowledge at 11% and 14%*, but more importantly, they *developed self-efficacy at a significantly higher rate – 20%*. This is one’s belief in their own ability and competence to perform effectively in challenging situations with the intrinsic motivation to attain the desired goal or outcome.

Most people intuitively understand that when we play, we learn. Learning within serious games occurs through smart play. In this context, we see ‘play’, as a construct of innovation – connecting, reorganizing and redeploying from small groups and organizations to hundreds of thousands of players around specific endeavors and enabling them to self-organize based on their capabilities, interests and reputation capital.



Within a well-crafted and designed immersive simulation game learners are placed in a graphically-rich simulated world of virtual characters engaged in a compelling storyline through which they:

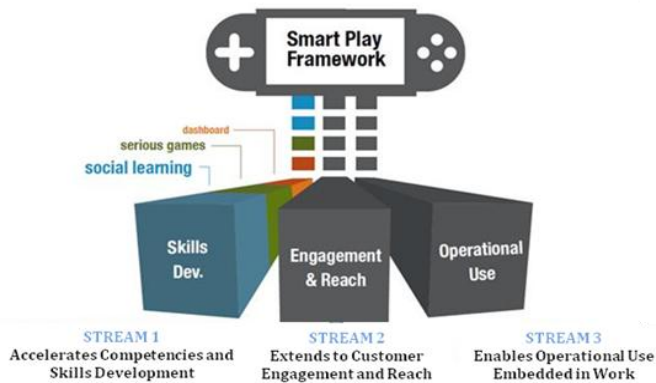
- Achieve desirable goals and recognition of achievement, or levels of mastery, for targeted, role-based competencies and capabilities (e.g., effective partnering, team building, informed risk-taking, etc.)
- Exhibit the relevant behaviors and traits/attitudes needed to address challenges and solve problems
- Practice and build targeted knowledge and skills through the various levels of challenge (including ‘fail forward’ learning through errors)



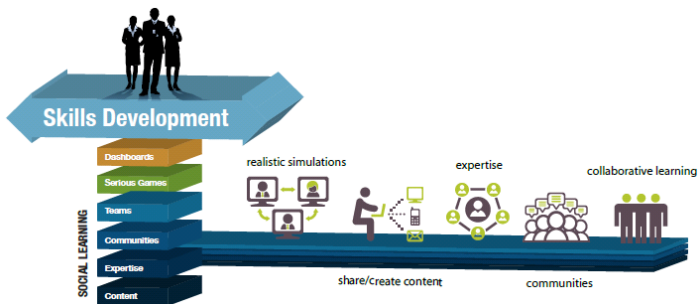


IBM's Smart Play Framework

Thinking seriously about play, we see that our ability to play is a core competency which can be used to navigate an immersive simulation game to effectively master real world challenges. Since early 2000, IBM has made significant investments in research and development in the efficacy and benefit of Serious Games, Collaboration, Social Media, and advanced Analytics strategies and tools to address 21st century global challenges.



IBM's Smart Play Framework is based on parallel strategic work streams to evolve advanced capabilities from accelerating deep competencies and skills development to enabling immersion in game-based scenarios with real data and analytics.



To accelerate the development of needed competencies and skills, the Smart Play Framework integrates three main components for effective, high impact learning, including:

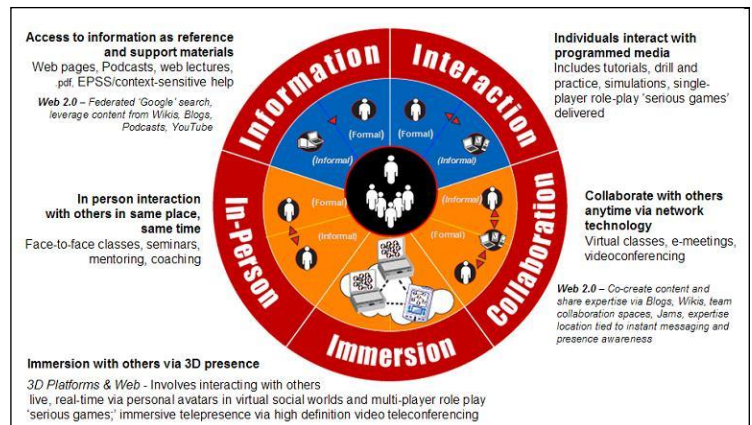
- **Social Learning** designed to enable individuals, experts, teams, and communities to compete and collaborate on realistic challenges and solutions.
- **Serious Games or Immersive Simulations** designed to engage players in creatively addressing challenges that build targeted competencies and skills, like strategic thinking and problem-solving.
- **Performance Dashboards** that provide ongoing assessment and insight into individual skills gap closure, team performance, and ultimately, business impact through advanced learning analytics.

See [IBM Smart Play Framework video on YouTube](#)

How to Engage in the Discovering the Art of the Possible

For challenges requiring innovative solutions with a strong learning and collaboration focus on the *art of the possible*, we have developed a learning strategy and design approach with methods and tools to streamline the process. For example, the Optimized Blended Learning Model and Method (U.S. Patent 7,281,219) shown below was developed by IBM to advance learning by:

- Providing a schematic for a blend of both formal training and work-based learning delivered through the optimal modes to shorten the time to achieve critical job competencies, increase the transfer of learning for productivity and quality, and to enhance the relevance of their learning experience.
- Positioning learners at the center of their optimal learning context with role-based scenarios to effectively define and communicate the future learning solution's value to the people and the organization.



Optimized Blended Learning Model and Method (U.S. Patent 7,281,219)

We recommend jump-starting game design with a 4 to 6 week Discovery Engagement with our Creative Team through a collaborative Learning Innovation Strategy and Visioning Workshop. Engagement outputs include:

- High level requirements, conceptual framework, technical parameters, and 'day-in-the-life' scenario of the optimized blended learning solution for the targeted content area and learner population(s).
- Game play framework and components, including: mission, goals and objectives; quest-based storyline with compelling scenarios; playing and non-playing characters; interactions, levels and flow; and key performance indicators for scoring, tracking, evaluation and recommended follow up activities.
- Development and implementation roadmap, including: timeline, resources, scoping and deliverables (typical learning innovation transformation starts with development and testing of a hosted prototype with pilot test population (20 to 50 typical learners) to full implementation scoped.



Can Engaging Serious Games Be Cost-Effective?

Absolutely! IBM creative teams leverage Serious Game authoring platforms and tools for single player and multi-player games with methods, templates and partnerships to reduce the time and cost of developing instructionally-sound and highly interactive, engaging Serious Games with low to moderate levels of programming and custom graphics.

The major factors contributing to determining the cost of end-to-end single player and multi-player serious game development can be broken down along the following three dimensions:

1. **Fidelity of the graphics and animation (low to high)**

- 2D - Static graphics with no animation of characters or scenes
- 2.5D - Moderate animation of characters and/or scenes integrated with 2D style graphics
- 3D - Full animation of characters and scenes rendered using 3D modeling tools

2. **Complexity of design and interactions**

- Level of simulated environment 'physics engine' needed to simulate real-world scenarios and consequences
- Capabilities to support levels of difficulty, including the ability to increase in levels of difficulty with replay-ability of the game
- Capabilities to adjust the play time - indication of the scope and depth of the game (a few minutes vs. days/weeks) including:
 - Time of average play session
 - Time to complete individual challenges and game overall (1 session; multiple sessions over days or weeks)
- Leader board – ability to show player status to all to foster competitive spirit; Individuals versus global (all player) scores
- Achieving levels of recognition and rewards
- SCORM-based modular design, results are tracked and reported via an LMS

3. **Extent of customization versus standard platform, tools, templates and graphics libraries**

- Custom build using proprietary or off-the-shelf gaming engine designed for entertainment-style video game developers
- Reusable templates with scenarios and game play interactions for instructionally-sound game design
- Extensive library of graphics objects, characters and scenes based on industry standards for reuse

Get into the Game Today!

Experience for yourself the power of immersive simulation games through two highly engaging games developed by IBM creative teams for gaining insight into complex challenges and ways to solve them — **CityOne** and **PowerUp**.



Innov8: CityOne is a custom-designed online single player marketing game through which players experience what it's like to run a city and make it smarter. They learn how to apply advances in technology to solve real problems. Players discover how their choices within the game impact the economy, environment, and urban population and how decisions in one area can impact what happens in others.

Learn more at <http://www.ibm.com/cityone>



PowerUp is a custom-designed multiplayer online game developed through a partnership between IBM Corporation and the New York Hall of Science (NYHOS) as part of the TryScience initiative that leverages kids' interest in fantasy virtual worlds and gaming to encourage them to learn about and apply engineering principles by riding over rugged mountains in buggies to build solar towers or searching through grim junk yards to repair wind turbines. This academic game challenges teenagers to help save the planet "Helios" from ecological disaster. The game also features non-player characters that represent a diverse cross section of the population, to be role models to encourage every young person to consider a career in engineering as they act as guides for the game.

Learn more at <http://www.powerupthegame.org>

Partner with IBM on the *Art of the Possible*

Our aim is to team with business leaders in a creative, collaborative approach to push the boundaries of the *art of the possible* to accelerate effective learning and performance.

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