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It's Time To Take Games Seriously

by TJ Keitt and Paul Jackson
for Vendor Strategy Professionals

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Video Games Provide An Effective Way To Reach Customers And Employees

by TJ Keitt and Paul Jackson
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EXECUTIVE SUMMARY

Serious gaming, or the use of games and gaming dynamics for non-entertainment purposes, is poised to take off thanks to the rise of Technology Populism, the greening of IT, and the emergence of the Millennials. Opportunity comes from many sectors, but competition comes from a hodgepodge of companies, including IBM and Microsoft. To achieve widespread adoption, the industry must deal with five issues: 1) what games should be called; 2) how slick the presentation should be; 3) how users should interface with the games; 4) how to determine ROI; and 5) determining if the technology has any limitations. Clearing these hurdles will open the door for revolutionary uses of games, but getting from here to there will require patience and guidance on the part of serious games vendors.

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NOTES & RESOURCES

Forrester interviewed 28 vendor and user companies, including Blitz Games Studios, BreakAway, Cisco Systems, Digitalmill, Duke University Medical Center, Forterra Systems, Hilton Garden Inn, HopeLab, IBM, ImpactGames, Johnson & Johnson, Philips, PIXELearning, Red Knight Learning Systems, Seriosity, Serious Games Interactive, Virtual Heroes, and Zombie.

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FORRESTER

TECH POPULISM, GREEN IT, AND THE MILENNIALS PROPEL SERIOUS GAMES FORWARD

Ever since 1972 when Atari unveiled Al Alcorn's *Pong,* a take on table tennis "so simple that any drunk in any bar could play," a love affair has existed between people and video games.[1] However, because video games have often been dismissed as trivial and pilloried as destructive to our youth, their more practical applications have generally been lost on the business and educational communities. Over the past eight years, though, the blinders have been slowly lifted as educators and progressive business leaders see the potential benefits of games as part of marketing, recruiting, and training programs. This gradual understanding will rapidly evolve into mainstream acquisition because:

- **Technology Populism has employees expecting to use their personal technology at work.** Increasingly, employees are insisting on using the technology that they use in their personal lives, such as software, gadgets, social networking sites, and video games, for work.[2] As a result, leading firms — with support from human resources, sales, and IT — are embracing video game technology to provide a familiar and engaging environment to help with a host of business activities, like role-playing experiences for sales training and games to identify which job might fit best for a candidate.

- **The green revolution and budget concerns are changing how work is done.** Companies around the world are looking to lower their energy and operating costs and see IT as a prime target.[3] To oblige, IT departments are turning to collaboration tools like virtualization and videoconferencing.[4] Virtual worlds have become popular with companies like IBM and SAP as a means to accomplish these goals.[5] This comfort with virtualized workspaces has opened the door for the use of video games to help reduce long-term expenses in other cost centers like training, learning, and team building.[6]

- **The Millennials are the most technologically savvy group ever.** This group, born between 1980 and 2000, is the largest generation since the baby boomers, and they came of age using PCs, the Internet, and video games. This has altered how they developed and, as a result, how they prefer to process information.[7] To attract talent and attention from this generation, recruiters, trainers, and marketers must appeal to them in the technology vernacular with which they are familiar. Games appeal to this cohort that grew up with Nintendo Entertainment Systems in their homes, *The Oregon Trail* in the classroom, and gaming tie-ins to summer blockbuster movies going back to *E.T.: The Extra-Terrestrial.*[8]

Serious Games Deeply Engage Players To Accomplish Organizational Goals

Serious games' definition and benefits are shrouded in confusion. Game vendors can cut through this by helping their customers understand the breadth of possibilities that games present. How can you do that? Forrester begins by defining serious gaming as:

The use of games or gaming dynamics not simply to entertain the player, but rather to inspire a particular action, effect some type of attitudinal/behavioral change, or instill a particular lesson in the service of an organizational goal.

Of course there will be skepticism. So explaining how this works in practice is essential.

- **Serious games are engaging for players, . . .** Many organizations dismiss games in general — and video games in particular — as simple diversions. This is a mistake. As explained by Director of the MIT Comparative Media Studies Program Henry Jenkins, games, at their root, are problem sets. How motivated the player is to solve the problem — i.e., play the game — is based on the clarity of the defined goals and the path to achieve them. These elements, when executed correctly, are what draw the player in and make the game "fun." Game Designer Raph Koster expands on this concept, stating that players seek to learn the pattern that underlies a game in order to play the game more efficiently and eventually beat it.[9] This makes users want to play and stay engaged, which provides the opening for the organization to introduce its messages.

- **. . . which opens the door for many uses.** Many flavors of serious games exist across a spectrum of uses (see Figure 1). The most common today are immersive learning simulations. These training games let players role-play tasks that they will be asked to carry out in real life. For example, Volvo Car UK's *Knowledge Drive* helps salespeople understand complex British laws regarding automobile sales. Advergames, which are essentially marketing content wrapped in a video game, include Chevron's environmental game *Energyville*, which links the company to ecoconscious energy policy.[10] Persuasive games can rally people to a particular point of view, such as *Darfur is Dying*.[11] A myriad of other serious gaming disciplines exist, including "games for health" like disease education — for example, HopeLab's cancer-zapping game, *Re-Mission*.[12]

This foundation will help vendors deconstruct another misconception: Second Life, which has become short hand for anything that contains 3D avatars, is not a game. Serious gaming is a specific activity — the presentation of a task that must be accomplished within a set of parameters — and has a defined time frame. It does not persistently exist for the sake of existing; the game boots, you solve the problem, and the game is over. There may be elements of collaboration and persistence, as seen in virtual worlds, and serious games may even reside inside large, virtual environments, but the task orientation of the activity is what sets it apart from its cousin technology.

Figure 1 Serious Games Span A Spectrum Of Uses
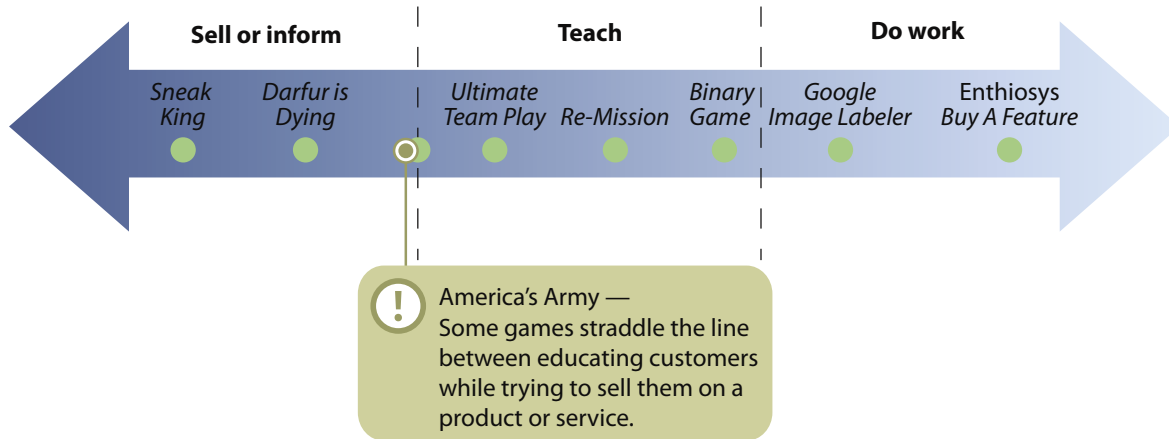
45021   Source: Forrester Research, Inc.

THE SERIOUS GAMES MARKET HEATS UP

The serious games market is embryonic. Buyers' demand is tepid as firms try to determine exactly what it is — and what the benefit for the business is. In response, a hodgepodge of vendors providing, with varying degrees of deft, differing solutions has emerged. Professional organizations like the Alliance for New Generation Interactive Leisure & Simulations (ANGILS), research institutions like the Serious Games Institute, and think tanks like the Serious Games Initiative have appeared to educate the market and provide guidance as to how serious gaming will grow.[13] In conjunction, universities are investigating the possibilities of serious games: For example, Michigan State University offers a master's in serious game design and Coventry University in the UK houses the Serious Games Institute.[14]

Serious Games Are Providing Business Value, But Recognition Is Taking Time

Interest in serious games is — and has been — uneven. Very early adopters were those organizations that needed simulations because what they wanted to teach was too complicated, dangerous, and/or expensive to practice in real life. Later adopters — and current ones — went beyond simulations (See Figure 2). In the current market, opportunities for game producers vary by segment:

- **The US military pioneers game-based training and recruiting.** To help prepare soldiers for battle, the US armed forces have relied on billion-dollar simulators from firms like Northrop Grumman. The pricey nature of these machines turned the military's eyes to commercial markets. In 1981, the US Army asked Atari to create a version of its hit game *Battlezone* to teach soldiers tank warfare. While the Army's initial effort was unsuccessful, this opened the door for later projects like the US Marine Corps' 1996 fire-team trainer, *Marine Doom,* a modification of the popular computer game *Doom II*.[15] The Army struck gold, though, when it turned its attention to

using games for recruiting, resulting in *America's Army.* While the Army has not been forthcoming with data on recruits coming from the game, with 7 million registered players in 2006 collectively logging in excess of 160 million hours, the game seems like an unmitigated success.[16]

· **Emergency response and the healthcare industry seek tools to help patients.** Games are being used for training in two situations that are expensive and difficult to replicate in real life: 1) mass casualty situations such as an earthquake; and 2) a trauma situation where the patient's life is in the balance. In response to the threats since 9/11, games are being developed under the umbrella of federal funding, such as the Department of Justice's *Incident Commander*, which trains multiple agencies in coordinating emergency response.[17] Duke University's Human Simulation and Patient Safety Center's *3DiTeams* trains medical personnel how to work together during the high-stress experience of trauma care. Going a step further, healthcare organizations are using games to improve patient well-being — for example, mental health professionals have modified *Full Spectrum Warrior* to allow Iraq War veterans suffering from posttraumatic stress disorder (PTSD) to confront their trauma.[18]

· **Universities use serious games to teach, . . .** Higher education, particularly business and engineering schools, has a history of using simulation to drive home classroom lessons. For example, 38 universities participated in IBM's pilot of its business process management (BPM) game, *INNOV8.*

· **. . . but grades K through 12 fail to embrace them.** As described by Impact Games co-founder Asi Burak, the K through 12 market is slow moving, hard to penetrate, and poorly funded, with all material needing to be tied to state curriculum. These factors can be hard to reconcile with expensive games that may be difficult to align to a particular lesson plan. This has led some educational game developers, such as VTech, to pitch directly to parents.

· **Enterprises focus on marketing and training.** It was the marketing departments that flirted with video games early on; for example, in the 1990s, General Mills included *Chex Quest* in boxes of Chex cereal to drive sales.[19] Today, firms use games for training. Companies as varied as Cisco Systems, Hilton Garden Inn, and Johnson & Johnson are using games to teach topics like binary math, customer service, and drug development. On the periphery, some companies are using games to accomplish real work. For example, Google uses *Google Image Labeler*, a game similar to Carnegie Mellon's *ESP Game*, to allow users to tag photos for Google Images.[20]

Figure 2 The Serious Game Buyer Landscape Is Diverse

Segment	How they use gaming	Example
Military	• Initial interest focused on providing tools to train soldiers on things that would be difficult and dangerous to simulate in real life (e.g., assaulting a building or dropping ordinance in the middle of a city) • Currently, interest in games is split between training soldiers and recruiting teenagers. These games provide prospective recruits a chance to simulate the tasks a soldier would be required to do in real life.	• *Marine Doom* • *Full Spectrum Warrior* • *America's Army*
Emergency services and healthcare	• Like the military, these games are designed to simulate costly and life-threatening situations, such as a disaster or a trauma. • Beyond training, games are used to aid rehabilitation, disease prevention and education, and exercise. While some of these uses, such as disease education, require the creation of specific games, things like exercise are being accomplished by repurposing commercially available entertainment games.	• *Incident Commander* • *3DiTeams* • *Re-Mission*
Education	This is the hardest of the markets to sell into because of budgetary and curriculum concerns; games are used here to reinforce particular lessons through simulation of topics covered in class or practice of skills recently learned. Universities, particularly business and engineering schools, have been more amenable to using games than their counterparts in grades K through 12.	• *INNOV8* • *Global Conflicts: Palestine* • *PeaceMaker*
Business	• Companies began using games as part of marketing efforts, but have branched out to use them as part of training initiatives. These games often drill employees on skills they will need to do their job, such as management abilities, cultural sensitivity, and work-specific skills. • At the edges, this technology is being used to accomplish real work. Work like picture tagging, concept testing, and email management is done using either games or parts of video games, such as MMORPG economic structures.	• *Ultimate Team Play* • *The Philips Simplicity Showdown* • *Attent*

45021   Source: Forrester Research, Inc.

Stalwarts And Upstarts Compete For Serious Game Dollars

So which companies will be jockeying for position in this market? Forrester categorizes these vendors into four types (see Figure 3):

1. **Traditional video game companies.** These companies have well-established skill sets in game design and user interfaces. Seeing a chance to capitalize on the market's desire for design expertise or a way to diversify their offerings, these companies are making forays into serious gaming. For example, Zombie, a company with a long history in simulation, contributed to *America's Army* and Blitz Games Studios created a serious games division called TruSim. While many, like the aforementioned companies, have built good reputations in this market, other entrants will have to demonstrate skills like project management and educational principles.

2. **Serious games vendors.** These firms, which produce both custom and off-the-shelf offerings, typically combine expertise in game design and the use of the games in education or product placement. Often times, because of the immaturity of the market and the need for education, these vendors also have become consultants, counseling clients on what serious games are and how they should be used in their organizations. While some of these developers have gained a good reputation thanks to an extensive portfolio — such as Virtual Heroes and PIXELearning — many other companies are still finding their sea legs.

3. **Stalwart software giants.** IBM and Microsoft lead the charge here. IBM has long been a proponent of virtual worlds. Recently it teamed with Forterra Systems to use virtual worlds to address communication and collaboration issues for the US government.[21] IBM has also partnered with Seriosity to conduct research on leadership in multiplayer games. Its most overt action in the serious games space was the creation of the previously mentioned *INNOV8*. Meanwhile, Microsoft — leveraging its timeless *Flight Simulator* — created a 3D simulation platform called ESP. This allows developers to create rich simulations and has already netted long-time simulator developers Northrop Grumman and Lockheed Martin as partners.

4. **Multimedia companies.** Operating under the radar, some media firms are creating serious games for their customers as part of a suite of offerings. Some, like C2 Creative, a New York marketing agency that created Philips' internal team-building game *The Philips Simplicity Showdown*, simply leverage existing capabilities, like Flash design, when asked. Others, like Texas-based learning software vendor Red Knight Learning Systems, advertise a serious games capability in addition to offerings like simulations. But, as Red Knight Learning Systems' President John Purdy notes, serious games are not the focal point of their business.

Figure 3 The Serious Games Vendor Landscape

Type of company	Who they are	Example
Traditional video game companies	These companies are entering the market to capitalize on emerging interest in simulation and game design skill sets or an urge to diversify their offerings. They bring competency with game design and integration with various types of hardware platforms. These firms are also familiar with various types of user interfaces. While many have developed good reputations, other entrants still need to prove their abilities in areas like custom project management and educational simulation design.	• Blitz Games Studios • Zombie Studios
Developers of serious games	These vendors sprang up in the early 2000s to meet the growing demand for serious games. They are often packed with designers from both the video game and eLearning industries, giving them technical skills on par with those of traditional video game companies. What these companies desire is to break with their current business model of creating custom games and move into the more profitable creation of development environments to allow their clients to build their own games.	• Virtual Heroes • PIXELearning
Stalwart software giants	Seeing their clients need for collaboration and training tools, these companies have begun to move into this space to offer solutions. These run the gamut from producing actual games to creating development suites in which clients can create their own games. In a sense, they are pointing the direction in which the serious games industry will go; but, because the hot young game designers will probably not want to work at these companies, it is not likely that they will spearhead the charge into the next phase of this industry's development. What they will do is lend credibility to the technology.	• IBM • Microsoft
Multimedia companies	Not necessarily seasoned game designers, these companies typically have a facility in animation or Flash and are able to create simple games for their clients to use for training, team building, or marketing. While some companies in this segment do have experience with the development of serious games, it is not the crux of their business. For these firms, serious games are one part of a suite of offerings to their clients.	• C2 Creative • Red Knight Learning Systems

45021   Source: Forrester Research, Inc.

Vendors Struggle To Create Useful And Profitable Offerings

The nascent nature of the market has vendors doing everything from education to off-the-shelf software. Vendors making a play in this space should be aware that:

- **Off-the-shelf offerings generate some business, . . .** While boxed games, such as Serious Game Interactive's *Global Conflict* series, are commonly found serving the education market, there is a limited market among business users. UK-based PIXELearning Managing Director Kevin Corti points out that canned offerings in communities outside of education have only niche appeal: small organizations that can't afford a custom project or the minority of organizations that have a topic generic enough that an out-of-the-box game suffices.

- **. . . but custom offerings drive the industry despite low margins.** Custom building games to meet client-specific objectives is where the vendors we spoke with — and where the industry generally — put most of their effort. The cost is high, often pricing them out of the reach of smaller organizations: BreakAway's Product Marketing Director Josh Johns notes that a typical project can run from $300,000 to more than $1 million. While the custom creation of these proprietary games is currently the industry's lifeblood, it needs a more steady — and profitable — software licensing model, producing development suites that will allow "game developers" within client organizations to pick up and customize a package that has 90% of the work done.

- **Consultancies operate on the periphery.** Some vendors we spoke with said that they were getting paid to help organizations understand serious games. They were being hired to answer two questions: What is this and what should I do with it? The emergence of interested but quizzical marketers and information and knowledge management professionals has opened the door for some serious games vendors to offer consulting services that inform and guide. Some of the companies currently providing services of this nature include Digitalmill, Seriosity, and The Electric Sheep Company.

VENDORS MUST ADDRESS FIVE QUESTIONS TO ENSURE INDUSTRY GROWTH

Forrester has identified five issues that it believes are impeding this industry from growing to its true potential. We see these as low hurdles that speak more to the comfort level of potential users than inherent flaws with the technology. We expect these concerns to be addressed in seven years — opening the door to widespread adoption (see Figure 4):

1. **What should they be called?** While organizations are comfortable with the use of the term "games" in external marketing and recruiting campaigns, bringing "games" and the association of "fun" internally gives pause. According to an eLearning Guild member survey on immersive learning, 74% stated that they agreed with the following statement: "Games are great; it's the word 'game' that's a problem."[22]

Forrester's take: The phrase the industry should rally around is "serious games" to bring together the numerous disciplines. However, Forrester recommends identifying individual games with the underlying goal of the game, for example, calling Volvo Car UK's game an immersive learning simulation. We don't see this being an issue in a few years, as the old guard in the workforce is replaced by younger colleagues. As this happens, doubts about calling a game a game will subside. Future business leaders are already thinking in terms of games as seen with IBM's BPM video game coming out of a competition between business students at Duke University and the University of North Carolina at Chapel Hill.

2. **Do serious games require a slick presentation?** Conventional wisdom holds that the fancier a game is, the more it will really engage players. This means mimicking what is available on systems like the Xbox 360. However, much of the hardware, whether it is slow, old computers or mobile devices with limited graphics capabilities, currently deployed throughout firms may not be able to support this technology.

Forrester's take: The point for vendors to hammer is achieving an effective engagement level doesn't necessarily require a serious game to mirror *Grand Theft Auto IV* (see Figure 5). A well-designed game, even without a 3D interface, can engage wholly. For example, Cisco's *Tetris*-like *Binary Game* and Philips' team-building *The Philips Simplicity Showdown* use relatively simple graphics.[23] With slow PC corporate refresh cycles, it will be awhile before firms have powerful hardware in place.[24] For games that require a rich interface, we recommend that vendors suggest buyers consider consumer options like the Playstation Portable (PSP). While seemingly a radical idea, the latest release of the PSP allows it to be connected to a television turning any room with a TV into a training room for less than $200.

3. **How should people interface with serious games?** Because the vision of what these games are centers on its big brother — the entertainment video game industry — there is the notion that controls for serious games will mirror those of games seen in the commercial world, such as joy sticks and keyboard navigation. For many of the PC-based serious games being produced, the user will have to master a form of keyboard navigation, which can be daunting for the non-gamer.

Forrester's take: Game developers must show their clients that controls need only be as complex as necessary to achieve the desired business result. If the game can successfully be operated, and its underlying purpose achieved, using simplistic interfaces like hotspot navigation — i.e., the ability to click on a spot and the character moves there — should be pursued. However, if a game requires complex interactions with more robust controls, tutorials before game play begins, rollover boxes with instructions, and prompts within the game in addition to cue cards that players can keep handy all help make the controls of the game less tricky. Over the next five years, intuitive, natural interface controllers will be the answer — as presaged by the development of the Nintendo Wii and camera-based controls.

4. **How do you prove their business worth and ROI?** This is the hardest of the five questions facing serious games. For some games, such as advergames, it's easy to see the link to ROI: For example, Burger King's three Xbox 360 titles developed by Blitz Games Studios ranked among the top-selling Xbox games over the winter holidays in 2006 and were credited with the company's 41% profit increase in its second quarter.[25] However, such a 1 to 1 relationship between a game and a desired outcome is often hard to tease out in something as nebulous as diversity training. And for those deploying games, divining whether their target audience internalized the lesson instead of just becoming good at playing the game is paramount.

   Forrester's take: There is a growing body of evidence that serious games are effective at behavioral and attitudinal change.[26] Still, International Game Developer Association (IGDA) Board Member Bob Bates notes that these studies are spread over disparate areas, having different goals and motivations.[27] Proving the efficacy of a game for a particular business depends on the goal of the game. For something as straightforward as training, it is important to tie the goals of the game to a particular outcome. For example, Hilton Garden Inn's customer service trainer *Ultimate Team Play* is tied to the loyalty and satisfaction survey that guests complete at the end of their stay. However, it isn't as easy to tie games to measurable goals if organizations use them for developing softer skills — like problem solving or analytical thinking. This does not mean that the game is worthless, but it does require the game developer to gain a deeper understanding of what the buyer is trying to do in order to manage expectations.

5. **Are there limitations on what serious games can do?** A lot of this discussion is tied to very narrow definitions of this technology. As many organizations focus on the use of games to train their employees, they become fixated on the idea of serious games being a synonym for training game. Thus, a lack of imagination as to what games can do outside of drilling employees exists. Even within what is widely believed to be the prescribed use, doubts linger as to what serious games can actually accomplish: Examples include the perception that they can only be used to reinforce lessons, not teach them or that they are ineffective in teaching soft skills.

   Forrester's take: It is our belief that games themselves are not limited, but they suffer from the limited vision of those developing plans to use the games. Overcoming this requires providing examples of success. Where can you find these? Effective uses are found in marketing and recruiting, healthcare, and persuasion. And there are burgeoning disciplines like the use of games in product development.[28] The flexibility of games inherently means that they cannot be pigeonholed. For example, games can make effective teaching tools depending on the subject as demonstrated by Johnson & Johnson's replacing its introductory in-person training module on drug development with the game *Mission Possible*. The game's commissioner must understand what the end goal is and produce the game in a manner that is complementary to the process that achieves that goal.

Figure 4 The Serious Game Adoption Hurdles

| Question	Forrester's take
Should they be called games?	They should be called "serious games." However, when referring to a particular type of serious game, like an immersive learning simulation, you should refer to it as such. The reason for this is threefold: 1) to ease any handwringing over the word "game," 2) to dampen the urge to interpret the umbrella term "serious game" as meaning one type of game, and 3) to drive home what the game is intended to do.
Do they require a slick presentation?	Not necessarily. For some things, such as medical training, the games should look as realistic as possible to grab the player's attention. However, for mundane tasks, such as learning a technical skill or team building, you do not need games that look like what's being developed for next-generation game consoles. Cisco and Philips have shown this with their wildly successful games that use Flash technology.
How should people interface with games?	This depends on the purpose of the game. If this is a game that requires extensive interaction with the virtual surroundings, then the controls must be complex. However, if this is not required, a developer can get by with simpler controls like hotspot navigation.
How do you prove their business worth?	Once again, this depends on the game. Advergames, for example, can easily be tied into profits (e.g., how many people visited the shop because of the game). For training simulations, tying the games to outcomes is helpful (e.g., look at the customer satisfaction scores of locations where the employees have been trained using a game). More nebulous goals, such as soft skills training (e.g., diversity training) will require the company to move away from thinking about the game in terms of return on investment. Figuring this out will require discussions between the person commissioning the game and the game's developer.
Are there limitations on what these games can do?	It is too early to judge this. There is a body of evidence suggesting that serious games can be effective in a range of disciplines. At the moment, the limitations lie more with a lack of imagination in the plans to use serious games and to measure their effectiveness.

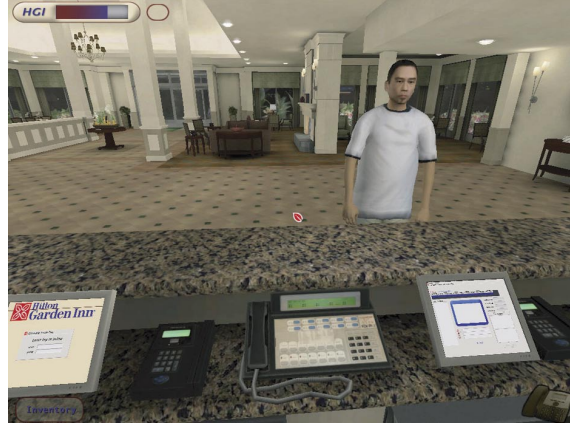45021   Source: Forrester Research, Inc.

Figure 5 The Graphics Question

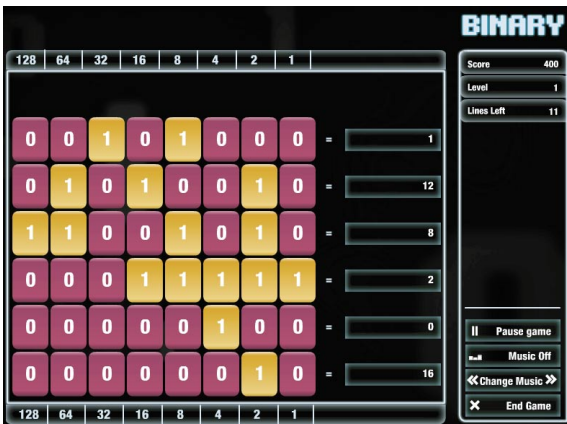**5-1**   **Ultra-realistic graphics have their place**
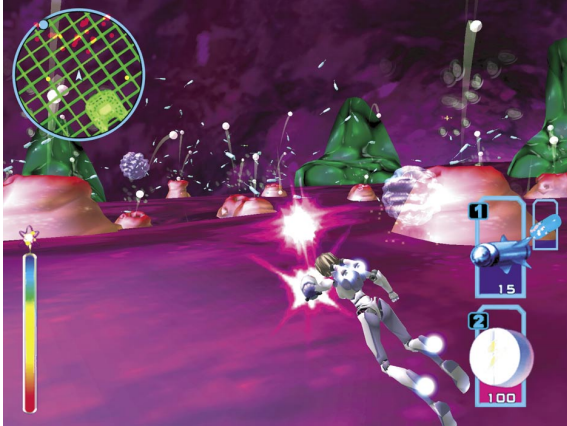
HopeLab *Re-Mission*   **Hilton Garden Inn** *Ultimate Team Play*

> (!) HopeLab and Hilton Garden Inn felt these graphics were necessary to reach their constituencies.

5-2   **2D and Flash-based graphics can be effective**

Cisco *Binary Game*   ***The Philips Simplicity Showdown***

> (!) Cisco and Philips have been wildly successful in using relatively simplistic graphics.

45021   Source: Forrester Research, Inc.

SERIOUS GAMES POTENTIAL WILL BE UNLOCKED IN THE NEXT SEVEN YEARS

The serious games industry will blossom after hurdling its issues. This means countless opportunities for organizations to improve a host of internal and market activity — but it also unlocks a new vendor market. It will ultimately take its place alongside Web3D and virtual worlds, all of which will bloom as important business tools in the next seven years.[29]

The Future Serious Games Marketplace Will Hinge On Technology Advances

Out of its proof-of-concept phase, serious games vendors should find a market welcoming of their next-generation ideas — thanks both to Gen Xers and Millennials having more seats at the table in businesses and academia and to a technological landscape that is more robust. Technology improvements such as those found in the Apple iPhone and computers powered by Windows Vista and Windows 7 provide game designer platforms with robust interfaces and graphics capabilities. These circumstances will allow each segment of the market to whittle games into tools that more efficiently address their core missions. In our view:

- **Military and defense will provide developers with a place to innovate.** In the course of its mission to more efficiently recruit and train troops, the US military will continue to push the envelope on serious games technology and adoption. For example, the US Air Force unveiled the next generation of recruiting and training in January 2008 — a virtual environment called MyBase. It allows troops — through avatars issued when they enlist — to train and collaborate in a virtual environment that they interact with through haptic controls. It will also have a public face that will allow potential recruits to explore Air Force opportunities through games and other resources.[30]

- **Healthcare and emergency response will embrace large-scale games.** On the training front, healthcare and emergency response organizations will move away from games that focus on various pieces of their jobs — e.g., one game for triage, one for incident management — and toward comprehensive environments that place all elements of a disaster situation or trauma into one scenario in which multiple players can interact, providing more holistic training. A well-designed training game would allow officials to quickly set up and run through scenarios covered in the real-world exercise on demand at a fraction of the cost. For patients, the use of technology like the Nintendo Wii for exercise and rehabilitation will continue as platforms that start out as toys become available for uses beyond entertainment.

- **Universities will become competition to game developers.** The dynamics of primary and secondary schools will not change insofar as materials will still have to fit into state-certified curriculum and budgets will be tight. However, as more research on video game education emerges and younger and engaged teachers come onboard, an increased openness to serious games in the classroom will occur. Colleges and universities will answer the call first, offering cost-effective games as a result of their early research on serious games use. We are already

seeing this happen with North Carolina State University's Highly Interactive, Fun Internet Virtual Environments in Science (HI FIVES).[31] Of course, this partnership between universities and grades K through 12 to develop and deploy games will only be sustainable if there is funding, which is currently flowing from both nonprofit organizations and the US government.

- **Enterprises will seek to make games a part of work.** Like their counterparts in medicine and emergency response, enterprises will deploy holistic games that cover the many aspects of a particular job — management, problem-solving, particular job functions, etc. — while still using standalone games for things like diversity training. However, the strongest ROI and ultimate adoption will be in serious games that help workers do real work. We are already seeing this with the use of games in product development and collective intelligence, but the real dynamic idea is to pull out the incentive structures and tools of games to boost productivity and employee morale. Indiana University Associate Professor Edward Castranova notes that elements similar to those found in Xbox Live — scoring, ranking, and awards — could be applied to jobs with high turnover, such as call centers, to lower attrition with the introduction of fun competition and encourage high performance.

Vendors Will Offer Shrink-Wrapped Products But Will Still Deliver Significant Customization

In seven years, the vendor landscape will have developed — but in aggregate will not be that different than where we are today — albeit with much more advanced technology.

- **All types of gaming companies will develop business tools . . .** Seeing something that can be productized, vendors will jump at the opportunity to extract elements of games to insert into the business process. Companies like Seriosity, which got an early start, will be at the fore, but expect these types of offerings to also come from traditional video game companies that have developed games that interface with player ranking systems over large networks.[32] The difference will be that these types of systems will need to plug into multiple established business tools like employee management software, customer relationship management (CRM) systems, and email clients. This will require all of the vendors interested in making a play for this part of the serious games business to acquire an understanding of business processes and systems integration.

- **. . . while continuing to provide made-to-order games.** Even as enterprises pivot to do more with game technology than just build games, there will still be a need to produce games in the service of marketing, training, teaching, recruiting, and other such efforts. Additionally, as organizations attempt to build massive games that allow them to teach and drill on multiple topics at once, they will need the expertise of game vendors, particularly those versed in massively multiplayer online role-playing games (MMORPGs), to express what is feasible and build the applications. However, most serious games vendors will seek to lessen the percentage of their business in this arena to focus on more profitable mass products such as business tools and development suites.

- **Vendors will move toward facilitating clients building their own games.** As the use of serious games grows, organizations with some level of technical savvy will seek to create their own games, much as they do with Web tools and other business applications. Today, companies like BreakAway already provide development suites for customer development teams to design games germane to their organization.[33] However, these tools still require a level of technical sophistication on the part of the internal game developer. Going forward, suites will become accessible for non-programmers and fragmented as they become more specific to a type of activity (e.g., a development suite for an office game). This specialization will fragment the suite developers into companies that specialize in creating a specific type of game.

- **Consulting will shift from "what" to "how."** The need for consultancies to explain the basics of serious games will wane as companies become more comfortable with the technology. It is here that systems integrators (SIs) like IBM will do well as they team with serious games developers to explain what an organization's options are and which solution will best meet its need. Partnering with SIs will provide serious games vendors a way to introduce their technology for managing and facilitating the intersection of virtual worlds, serious gaming, and work processes to a wider market.

RECOMMENDATIONS

GENTLE GUIDANCE AND PATIENCE ARE THE ORDER OF THE DAY

It goes without saying that the serious games industry is nascent and will require time to be fully appreciated by organizations that can benefit from it. This is a process that cannot be rushed by eager vendors and advocates within organizations — especially in the face of an economic slowdown — but it can be nursed along through understanding of the challenges associated with this technology and reasoned responses to those concerns. To this end, vendor strategists at serious games producers should:

- **Focus on the efficacy of games and not the word "game."** Concerns over whether or not these tools are called games are moot if there is evidence that they are successful in achieving an organization's objectives. Any pitching of a serious game should center on case studies, both longitudinal studies and anecdotal evidence, regarding games that effectively addressed a particular problem. Because companies are tight-lipped on their internal testing of the effectiveness of their games, vendors should focus on building readily available examples of game value. For example, Blitz Games' TruSim developed *Triage Trainer* with an eye toward having evidence that the games it creates do what the company claims the games can do.

- **Take the emphasis off the slickness of the graphics.** The urge to create games that compete with the next generation in game consoles in terms of high-fidelity graphics is a mistake. The casual games that make up popular gaming sites like MSN Games draw in users

of all ages and both genders without running on the Unreal Engine. What will ultimately make the game successful is how well the gameplay allows the player to slip into the experience and take away the information the game is providing. It is incumbent upon the game developer to get to the underlying goals that the game commissioner has at the outset to determine if high-fidelity graphics are needed for the project and, if not, explain what can be accomplished with lesser quality, usually cheaper, tools, such as Flash-based and 2D games.

• **Reassure potential buyers that the controls will not be an issue.** From the outset, get an understanding of what level of interactivity is required to achieve the goals of the game. If rudimentary controls like hotspot navigation are warranted, go with it! If something more robust is necessary, explain what will need to be done and set out a concrete plan on how you will train novices to use the game. Building this plan will take some understanding of the culture of the organization — namely its ability to absorb change and the familiarity the potential players have with technology. In some scenarios, the effectiveness of the game will hinge on its ability to win converts — and hard-to-master controls could be the deal-breaker. Therefore, the instruction plan should be set up to ensure that even mastery of the skills needed to play the game is efficient and fun.

• **Remind potential buyers that a game is not a standalone item.** Basically, the game cannot exist in a vacuum — it must have a clear role as part of a larger strategy. Understanding this strategy will help the game developer tell the game commissioner what is feasible and what tools will be necessary to place around the game to ensure that it meets the goal.

• **Encourage experimentation with video games.** There is nothing like first-hand experience, and allowing organizations to pilot games would go a long way toward leaders within those entities developing comfort with the technology. These tentative steps toward using games is tailor-made for off-the-shelf offerings, which would allow an organization to use a game to train its employee or clients on a generic topic without going through the drawn-out process of commissioning a custom game. Game developers should be amenable to these types of experiments going forward.

W H A T   I T   M E A N S

INTERACTIVE EXPERIENCES WILL FOREVER CHANGE HOW BUSINESS IS DONE

We are entering an era of organization/employee/client relations where what the latter two groups expect from the former is not just a static delivery of information, but dynamic presentations that allow them to interact and immerse themselves in an experience. Serious games, along with virtual worlds and Web3D, provide a means to this end through a competitive, problem-solving-oriented task that requires players to burrow into an activity in order to achieve their goal. Through this type of activity, we will see a revolution in marketing, research, recruiting, teaching, training, and work as the way in which individuals interact with organizations drastically changes to reflect this new emphasis on immersion.

> Organizations will allow prospective applicants to simulate jobs to which they are contemplating applying; consumers will be able to test out using a product before they lay out their cash; students will be able to see what they are studying in practice; and organizations will manage and motivate employees using systems that leverage competition and scorekeeping.

SUPPLEMENTAL MATERIAL

Companies Interviewed For This Document

Ambient Performance

Blitz Games Studios (TruSim)

Brandeis University (Brandeis International Business School)

BreakAway

Carnegie Mellon University

Cisco Systems

Digitalmill

Duke Corporate Education

Duke University Medical Center

Forterra Systems

Hilton Garden Inn

Homeland Security Policy Institute at George Washington University

HopeLab

IBM

ImpactGames

Indiana University

Johnson & Johnson

Massachusetts Institute of Technology

Philips

PIXELearning

Red Knight Learning Systems

Seriosity

Serious Games Interactive

University of Georgia

University of Manchester

University of Southern California

Virtual Heroes

Zombie

ENDNOTES

[1] "After the commercial failure of [Atari co-founder Nolan] Bushnell's first game, Computer Space, he decided his next needed to be so simple that 'any drunk in any bar could play' and commissioned a simple tennis game." Source: Jason Hill, "How I created Pong" *Sydney Morning Herald,* March 13, 2008 (http://www.smh.com.au/news/articles/how-i-created-pong/2008/03/11/1205125913707.html). For more information on the entertainment video game industry, see the June 20, 2008, "Capturing The Hearts And Wallets Of European Online Video Gamers"; see the May 25, 2007, "Sony PSP: A Consumer Communication Hub?"; see the November 14, 2006, "The Dawn Of The Next Video Game Console War"; and see the May 22, 2006, "E3 2006: Microsoft's Live Anywhere Underlies Gaming's Multiplatform Shift" reports.

2   Traditionally, implementation of new technology followed a standard pattern of experimentation and rationalization. This has changed with the arrival of the Web-based tools of Web 2.0 and Internet-enabled devices like the iPhone, which have allowed employees to bring into the workplace their own tools to help them succeed in their jobs. This, of course, leads to a natural sense of trepidation on the part of companies weary of how these technologies will affect their infrastructure's performance and security. See the February 22, 2008, "Embrace The Risks And Rewards Of Technology Populism" report.

3   Fifty-five percent of IT procurement and operations professionals cite the need to "reduce energy-related operating expenses" as one of their top three reasons for pursuing green IT operations, while 31% place "reducing other operating expenses (e.g., IT maintenance or labor spending)" in their top three. See the December 17, 2007, "Green Progress In Enterprise IT" report.

4   For more on what technologies are being adopted as a result of the greening of IT, see the March 10, 2008, "Green IT Nudges Tech Adoption" report.

5   Companies are seeing that their travel costs are rising and are looking to reduce them in conjunction with being greener. Virtual worlds provides one means of addressing these concerns as it allows groups in disparate locations to meet "face-to-face" over distance in a cost-effective manner. See the January 7, 2008, "Getting Real Work Done In Virtual Worlds" report.

6   In the short run, it may be the case that creating a custom game can cost an organization as much as putting together a traditional training program. However, by building the game once and using it over and over, there will be a long-term cost savings as organizations eliminate costly travel, space reservations, and lost productivity associated with in-person exercises.

7   Growing up as "technology natives," Millennials' brains were shaped to respond to technological stimuli. As a result, this group is wired to respond to speed, interactivity, and multiple stimuli — causing them to be ardent multitaskers. These changes in neurological makeup in turn affect how these individuals expect to interact with the world. See the September 30, 2005, "Get Ready: The Millennials Are Coming" report.

8   The Millennials (also referred to as Gen Y) and their older siblings in Gen X have an affinity for gaming stemming from their roles in initially making games popular (Gen X) and embracing them as a part of their lives (Gen Y). Data pulled from Forrester's North American Technographics® Benchmark Survey, 2008, seems to confirm this as 71% of Gen Y and 59% of Gen X are video game players. See the July 21, 2008, "Benchmark 2008: Gen Y Defines The Traditional Video Gaming Market" report.

9   Raph Koster lays out his theory of what makes games compelling in his book *A Theory of Fun for Game Design*, based on a presentation he delivered at the Austin Game Conference 2003. The presentation and information on the book are available at http://www.theoryoffun.com/. While expanding on the idea of fun equating to an understanding of the pattern of a game, Koster points out that once players understand and master this pattern, the game loses the quality that makes it "fun." But it is in this period when the player is trying to understand the pattern of a game in order to defeat it that he or she is open to the messages that the game producer is trying to introduce, such as how to assess a trauma patient.

[10] *Energyville* demonstrates to players the complex choices that must be made when providing power to a major city. You can view the game at http://www.willyoujoinus.com/. Advergaming as a segment of serious gaming is interesting because, in promoting a product or service, it can take several routes. Some games allow players to sample a company's product or service in order to build interest. Other games present players with games that may be tangentially related to the company's product or service, seeking to create a relationship between the game's topic and the brand in the player's mind. Others still have nothing to do with the company's product or service, but instead are simply vehicles in which a company can place advertisements for their products before a player. Arthur W. Hermansen provides a more complete discussion of advergames at Gamedev.net. Source: Arthur W. Hermansen, "Case Study: Advergaming For Private And Public Interests," Gamedev.net, March 25, 2005 (http://www.gamedev.net/columns/events/coverage/feature.asp?feature_id=92).

[11] *Darfur is Dying* comes from the joint effort of the Reebok Human Rights Foundation, the International Crisis Group, and mtvU. The game is the product of three University of Southern California students and allows players to experience the crisis in Darfur firsthand as a Darfurian. Source: *Darfur is Dying* (www.darfurisdying.com). Other examples include the *McDonald's Video Game,* which is an anti-McDonald's game produced by subversive game developer Molleindustria. The game is designed to show the negative effects of McDonald's operations on the environment, workers, and consumers, Source: Molleindustria (www.mcvideogame.com). Breakthrough.tv created the video game *ICED* (which stands for "I Can End Deportation") to try to build the popular opinion that deportation of illegal immigrants is unfair. Source: Breakthrough.tv (see www.icedgame.com).

[12] The Serious Games Initiative, a thought leadership group in this space, has put together an extensive taxonomy of serious games. Details can be found on the Digitalmill Web site (http://www.dmill.com/presentations/serious-games-taxonomy-2008.pdf).

[13] More information on the organizations mentioned can be found at the following Web sites: ANGILS (www.angils.org); Serious Games Institute (www.seriousgamesinstitute.co.uk); and Serious Games Initiative (www.seriousgames.org).

[14] Other examples of collegiate interest in serious gaming include Carnegie Mellon University's Entertainment Technology Center (http://www.etc.cmu.edu/), which produced the first-responder game *HazMat Hotzone* (http://www.etc.cmu.edu/projects/hazmat_2005/), and the Massachusetts Institute of Technology's Comparative Media Studies Program, which has produced a wide range of games, including a colonial-era simulation called *Revolution*. Comparative Media Studies Program Director Henry Jenkins outlined the key projects to come out of MIT on his blog, *Confessions of an Aca-Fan*, in a five-part series. The first entry of this series can be found at Jenkins' blog (http://henryjenkins.org/2007/11/from_serious_games_to_serious_1.html).

[15] The US Army continued its pursuit of a battlefield training game, as the US Army Program Executive Office for Simulation, Training, & Instrumentation (US Army PEO STRI), a group tasked with spearheading the training game effort, commissioned the controversial *Full Spectrum Warrior*. The controversy surrounding *Full Spectrum Warrior* lies in the accusation that the game was not realistic enough for the Army and that this was a result of the developers keeping an eye toward making the game consumer-friendly. The fact that

the game was expensive to produce but did not provide the Army with a useable game led to the belief that the Army, and by extension the taxpayers, were fleeced. Source: Britt Conroy, "Full Spectrum Welfare: How Taxpayers Paid for One of the Nation's Most Profitable Video Games," Taxpayers For Common Sense. More information on the US Army PEO STRI can be found at its Web site (http://www.peostri.army.mil/).

[16] The other services, not to be outdone by the Army's success, set out to create their own games, which included the US Marine Corps' *Close Combat: First to Fight*, the US Navy's *Navy Training Exercise Strike and Retrieve*, the National Guard's *Guard Force* and *PRISM: Guard Shield*, and the US Air Force's *USAF: Air Dominance*. Source: C. Mark Brinkley, "Patriot games; Success of 'America's Army' leaves other services looking for their own hit," *Air Force Times*, May 29, 2006.

[17] Another example of this type of training is The Homeland Security Policy Institute at George Washington University's *Zero Hour*, a game that allows EMS crews to practice triage, medical command, and patient treatment in scenarios ranging from the mundane (a routine ambulance run) to the harrowing (a train carrying cyanide derailing).

[18] This work follows in the footsteps of a mid-1990s effort to treat Vietnam veterans with a virtual reality simulation called *Virtual Vietnam*. *Virtual Iraq* was developed by clinical psychologist Albert Rizzo. Source: Sue Halpern, "Virtual Iraq," *The New Yorker*, May 19, 2008 (http://www.newyorker.com/reporting/2008/05/19/080519fa_fact_halpern).

[19] Other examples of corporate mascots to have games based on them include the Pepsi mascot's 1990s Playstation game, *Pepsiman*, and 7Up's *Cool Spot* multiplatform game. For more information on the use of advergames, see the July 6, 2006, "Why Game Marketing Matters" report.

[20] The *ESP Game* works by providing two players with an image and asking them to identify it. If the two come up with the same word to describe the picture, they are awarded points and move on. By doing this exercise, Google is able to label its images in ways that people commonly think about them. Sources: Carnegie Mellon (http://gwap.com/gwap/) and Google (http://images.google.com/imagelabeler/).

[21] Called Babel Bridge, the effort combines Forterra's OLIVE 3D platform with its own Sametime software and Unified Communications and Collaboration platform to help address intra-agency communication, collaboration, and training issues for the US government's security agencies. Source: "IBM, Forterra Using Unified Communications in Virtual Worlds to Solve 'Tower of Babel' for Intelligence Agencies," Forterra press release, March 20, 2008 (http://www.forterrainc.com/index.php?option=com_content&task=view&id=5&Itemid=1)

[22] For respondents who answered that they agree with the statement "Games are great; it's the word 'game' that's the problem," 22% said that they "strongly agree," and 52% said that they "somewhat agree." The base of the question referenced was 1,134 respondents. Source: Steve Wexler, Kevin Corti, Anne Derryberry, Clark Quinn, and Angela van Barneveld, "Immersive Learning Solutions 2008," The eLearning Guild, March 2008. Information on the report is available online (http://www.elearningguild.com/research/archives/index.cfm?action=viewonly2&id=128&referer=http%3A%2F%2Fwww%2Eelearningguild%2Ecom%2Fresearch%2Farchives%2Findex%2Ecfm%3Faction%3Dview%26frompage%3D1%26StartRow%3D1%26MaxRows%3D40).

[23] According to data collected in May 2007, Cisco's *Binary Game* was averaging 3,400 visitors a month. As of May 15, 2007, the game's site had 168,067 visitors. More interesting was the fact that the game was found to be posted on 41 external sites (20 non-English sites in Asia, 7 non-English sites in Europe, and 14 English language sites in North America and Europe). *The Philips Simplicity Showdown* was a team-building game exclusively deployed in North America and played by close to 7,000 employees. It was a competition not between individual players, but between business groups. Prizes for the winning team included a trip to the Bahamas and second prize won a Philips Home Theater System. Participation was encouraged through supervisor coaching as well as points awarded to supervisors who logged in consistently to monitor their team's work.

[24] Forrester projects that Windows Vista deployment will begin in earnest in 2008, but it will only account for one-fourth of the machines in North American and European enterprises. The majority will still be run on Windows XP, with pockets of Windows 2000 machines still hanging around. For more information, see the November 12, 2007, "<u>How Windows Vista Will Shake Up The State Of The Enterprise Operating System</u>" report. In regards to the iPhone, Forrester does not believe that it, as currently constituted, is completely read for enterprise use. While we do see potential of its unique user interface providing employees with a proxy for tablet PCs and a great tool to run line-of-business applications, there are issues with its design, price point, carrier, and security that give us pause. For more information, see the December 12, 2007, "<u>The iPhone Is Not Meant For Enterprises</u>" report.

[25] Burger King's three titles, *Pocketbike Racer*, *Big Bumpin'*, and *Sneak King*, retailed for $3.99. How they were sold depended on the location, as some locations chose to sell them individually and others as a set. The fact that the games were cheap led many video game industry watchers to attribute the games' success to this instead of their quality. Source: Jaclyn Giovis, "BK thinks inside the Xbox," *South Florida Sun-Sentinel*, January 31, 2007.

[26] HopeLab conducted a study of 375 cancer patients between the ages of 13 and 29. They were given a baseline assessment at one month and an assessment at three months, which found that the patients playing *Re-Mission* were improving in all of the areas that the game was focusing on. HopeLab found that cancer patients who played its game showed improvement in their medication compliance, knowledge of cancer information, and even quality of life and self-efficacy. Source: "Re-Mission Outcomes Study," HopeLab (http://www.hopelab.org/wp-content/uploads/2007/11/hl_re-mission_outcomes_study_20070905.pdf)

[27] The dearth of research that is applicable to all serious games is something that may be holding the industry back. As Alicia Sanchez, who studies synthetic learning, notes, "Without understanding what makes serious games a viable and effective learning tool as a whole, we can't begin to understand what characteristics of games enhance learning." Source: Jill Duffy, "The Road to Purpose," *Game Developer*, December 1, 2006.

[28] Enthiosys is piloting an online version of its game, *Buy a Feature*. The game assigns each player a certain amount of money and presents them with a series of features for a product. No one player has enough money to purchase all of the features, so the group must work together to buy the features that are most important to them. Through collecting the conversations that occur during this process in addition to the features purchased, developers can understand how clients think about their product and what features are important. This game is a part of a suite of games, called Innovation Games, and was detailed in a book by the same name. Source: Enthiosys (http://www.enthiosys.com/).

[29] Web3D, which will provide the framework combining the walled-gardens of virtual worlds with the openness of the Internet, is over the horizon. This avatar-based, interactive environment will also provide a catalyst for revolutions in user interfaces that will not only be beneficial to virtual worlds but also to serious games. The technology will also open up a means to bring serious games to the Internet to allow for distance training. See the April 18, 2008, "Web3D: The Next Major Internet Wave" report.

[30] This is a project that the Air Force envisions taking place between 2008 and 2030. The Air Force envisions an organization called Air Force 2.0, which will consist of three areas: "knowledge management that discusses how the Air Force operates; continuous learning that covers how the Air Force develops people; and precision learning that explains how the Air Force delivers learning." Source: "AETC White Paper," Air Force Education and Training Command (http://www.aetc.af.mil/library/whitepaper.asp).

[31] The technology allows teachers to build their own games. It is "[f]unded by a $1.2 million National Science Foundation grant, the program uses Source Engine, the programming code responsible for the wildly popular 'Half Life 2' game." Source: Sam LaGrone, "Companies put games to work," *The News & Observer*, May 17, 2007.

[32] Seriosity's first foray into creating business tools out of gaming dynamics is its email management system program, Attent. This program provides users with a finite currency that they use to assign an importance to their email. The more value they place upon an email, the more important the recipient knows it is and can prioritize reading it accordingly. Source: Seriosity (http://www.seriosity.com/).

[33] BreakAway's platform is called mosbe, which stands for Modeling and Simulation Builder for Everyone. More information about the mosbe can be found at the company's mosbe Web site. Source: BreakAway (http://www.mosbe.com/).

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