



Games-based business & management skills development

## **Games-based Learning; a serious business application**

**By Kevin Corti, founder, PIXELearning Limited, Feb 2006**

### Abstract

Games-based Learning (a.k.a. 'Serious Games') is all about leveraging the power of computer games to captivate and engage end-users for a specific purpose, such as to develop new knowledge and skills. Games-based Learning enables learners to undertake tasks and experience situations which would otherwise be impossible and/or undesirable for cost, time, logistical and safety reasons. This paper serves to introduce games-based learning, to show the potential benefits of using it and to discuss some of the implementation issues.

### **1. Introduction**

This white paper has been written to serve as an introduction to what is rapidly becoming a very hot topic in training and education: games-based learning (GBL), also known as 'Serious Games'.

GBL has the potential to significantly improve training activities and initiatives. You only have to look at an 'average gamer' who, by the way, is in his/her late 20s, to see that the computer & videogame industry has more or less mastered the art of using computer technology to, not only captivate its audience, but to also persuade it to spend approximately £10bn a year to use it.

If we compare a typical entertainment games technology-based experience with a typical learning technology-based experience the contrast is glaringly obvious. When was the last time you had to drag a learner from their PC at 11 o'clock at night whilst they pleaded; "Please...just another hour...I really want to finish this level"?

Entertainment games are demonstrably 'engaging'. In comparison, when the training industry uses the word 'engaging', there is an all too obvious incongruity.

The motivational virtues of videogames are what initially entice training and development professionals to look to games-based approaches, but there is a lot more to GBL than simply using fun as a means to engage learners.

Simulations and role playing are two key genres of entertainment-orientated games that many people deem to be particularly appropriate for adoption as training tools.

A simulated environment (e.g. the user support desk), a simulated system (e.g. a production line) or a realistically recreated role play scenario (e.g. a sales meeting) can allow learners to experience something that is too costly, too risky or even physically impossible to achieve in the real world. You would not let your new management trainees run your business but you would like them to fully understand every facet of your business as early as possible. GBL can help you achieve this.

Repeatability is also a key strength of GBL. Learners can play out a particular strategy or adopt a certain approach. If he/she fails or does not quite deliver the desired outcome, then they can try again with a modified approach. '*Learning by doing*' and '*experiential learning*' are possibly overused terms, but in this case, it is very pertinent to building a deep understanding of scenarios, concepts, processes, environments and systems.

'*Experience*' is a key word when people discuss using games-based learning. Games engage people psychologically - they can be very emotional experiences - and they also engage people physiologically. What is going on beyond the peripheries of the TV screen or computer monitor ceases to register to the user. His/her heart rate increases, the hair on the back of the neck stands up and s/he may well end up laughing out loud at (or furiously cursing at) a virtual character who is actually nothing more than a collection of pixels and programming code.

Games are very good at using drama, storyline, humour and characters to create a compelling experience which, from a training point of view, develops memory hooks and means that learners not only remember what happened but also why it happened. If undertaken appropriately, GBL is the vehicle for embedding new knowledge and/or skills that can then be immediately applied in the workplace.

If you strip away all the techno-wizardry games are essentially highly experiential software applications which foster deep levels of cognitive activity e.g. higher-level thinking skills such as conflict resolution or negotiation.

Games are nothing more than a vividly recreated environment and/or system in which the user has to solve a problem or series of problems. Solving that problem, be it 'how to kill 100 aliens as fast as possible without dying yourself' or 'how to settle a contractual dispute with a fictional client', is what derives satisfaction on the learner's

part. If a GBL application enables the learner to solve that same problem for real (e.g. make a client and their own employer happy) then doubtless the learner's employer will also derive satisfaction!

The ability to assess, for example, what strategies a learner adopted, how well he/she analysed and made sense of information, how well he/she explained and justified his/her decisions, and how well s/he understood how the decision affected a specific outcome, are what inform the trainer about that person's knowledge, competency, problem-solving skills and even their personality. GBL applications track all of this data in often staggering levels of detail and, if they are designed properly, provide this data to those that need to see it in an appropriate manner.

Games-based learning isn't about using simplistic '*Pong*' or '*Who wants to be a millionaire?*' as a means to teach people raw facts. That was the approach that edutainment took and which by and large failed for all except, perhaps, primary school children. GBL can be made to realistically represent a complex environment, system or process that is intrinsically relevant to the learner because it is what they recognise as being relevant to their vocation or career aspirations. That might be achieved by allowing them to explore a virtual oil rig for health & safety training (modelling a physical environment) or allowing them to run a virtual business (modelling a set of interrelated business activities, objectives and processes).

The author's contention is that GBL should not be dismissed as being a gimmick but rather it is a serious business application for solving problems and unlocking opportunities for organisations of all shapes and sizes.

This paper will illustrate where GBL is being used right now, by what organisational types and why they adopted it. In addition it will examine some of the issues involved in the implementation of GBL.

Before that, we need to get to know our audience.

## **2. Gamer demographics**

There exists a powerful 'gamer stereotype' that paints a typical gamer as being a spotty, white, teenage male who is lacking in basic social skills.

If you subscribe to the same aforementioned stereotype then consider the following:

- Microsoft's XBOX and Sony's PlayStation 2 games consoles, whilst aimed at a 'hard core' gamer audience were nonetheless marketed to people in the 18 to 35 age range i.e. adults.
- According to Nielsen NetRatings, 41 percent of people who frequent online game sites such as GameSpot, Candystand and Pogo are women, and 43 percent are aged between 25 to 49.

- ScoreNetworks, an American firm which measures online game use, confirms players are beginning to resemble the general (American) population. On average, 8.9 percent of players at the Top 10 gaming sites are African American, 4.2 percent are Asian and 79.3 percent are white. More significantly, about 35 percent of players on those sites earn US\$50,000 to US\$100,000 annually, while 16.2 percent take home more than US\$100,000.

There have been many studies into the gamer demographic. The entertainment games industry has funded much of this because they want to know their customers better. It is a basic market research activity. Lately, however, the rise in interest in GBL has also led to studies for the purposes of understanding what sections of the population it can be applied to.

A pertinent quote, from USA Today in 2004 is:

*"...[I]f you're over 35, chances are you view video games as, at best, an occasional distraction....If you're under 35, games are a major entertainment and a part of life. In that sense, they are similar to what rock 'n' roll meant to [baby] boomers."*

To conclude, gamers span both sexes, all ages and all income brackets. If senior training decision-makers believe the 'gamer stereotype' and dismiss GBL on this basis, then they are failing to fully understand that their audience are rapidly becoming what Marc Prensky<sup>1</sup> called 'Digital Natives' and that their appetite for a diet of traditional eLearning approaches is rapidly diminishing.

If you want to learn more about the 'average gamer', two excellent online reports can be found at the following web sites:

BBC, 'Gamers in the UK; Digital play, digital lifestyles' (2005)

[http://open.bbc.co.uk/newmediaresearch/2006/01/bbc\\_uk\\_games\\_research.html](http://open.bbc.co.uk/newmediaresearch/2006/01/bbc_uk_games_research.html)

Entertainment Software Association, 'Essential Facts about the Computer and Video Game Industry' (2005)

<http://www.theesa.com/files/2005EssentialFacts.pdf>

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<sup>1</sup> Prensky, M (2000), Digital Games-based Learning, McGraw-Hill

### **3. GBL is a hot topic!**

In Section 1 of this paper I described GBL as being a 'hot topic' in training and education. The proof of this is in the myriad of publications, academic research, white papers, books, conferences, exhibitions, TV & radio coverage and governmental/public sector support. My own company, PIXELearning has a rapidly expanding scrap book of press coverage, has been featured in the book *Serious Games; games that educate, train and inform* (Michael and Chen, 2005) and was the subject of a recent BBC radio interview.

This interest is also demonstrated by the demonstrable uptake of GBL and 'Serious Games' which I will illustrate in Section 6.

Some of the examples of coverage, interest and activity are described below:

#### General media publications

GBL has been a topic covered in many training and education articles in recent times including THES, The Guardian, eLearning Age, The FT and The NY Times.

#### Academic research

GBL is the subject of a huge amount of academic research. In the US, the Massachusetts Institute of Technology, Pennsylvania State University, Carnegie Mellon, the University of Southern California, Stanford University, The IT University of Copenhagen and the Naval MOVES Institute have undertaken significant research programmes. EA Games have funded NESTA in the UK to research the educational benefits of commercial off-the-shelf games. BECTa carried out a similar research project in 2001 entitled "Computer Games in Education Project". The University of Birmingham are also involved in a DTI-funded 'serious games' research project.

Some of the key names in the research space around games-based learning are Henry Jenkins (MIT), Kurt Squire, John Kirriemuir, Robert Stone, Angela McFarlane and Simon Egenfeldt-Nielsen.

## White papers

The Internet is teeming with white papers a sample of which are listed below:

- Ahdell, Rolf and Andresen, Guttorm [Games and Simulations in Workplace eLearning](#) Masters Thesis, 2002
- Amory, Alan, Kevin Naicker, Jackie Vincent and Claudia Adams. [Computer Games as a Learning Resource](#) (South Africa)
- BBC. [Learning Games Do Not Boost Results](#) – BBC News 11-26-01
- BECTA. [Computer Games to Support Learning](#) – Information Sheet, BECTA (UK) Jan 2002
- Chao, Dennis. [Doom as an Interface for Process Management](#) , U of New Mexico 2001
- Deutsch, David. [Taking Children Seriously: Video Games: Harmfully Addictive or a Unique Educational Environment?](#). 1992
- Gardner, Patrick. [Games With A Day Job: Putting the Power of Games to Work](#) (Sweden)
- Grenade, Stephen. [Teaching With Interactive Fiction: ESL](#)
- Grenade, Stephen. [Teaching With Interactive Fiction: Critical Thinking Skills](#)
- Jenkins, Henry. [A Game Theory On How To Teach Kids](#) , MIT Technology Review April 1, 2002
- Kawashima, Ryuta. [Computer Games Stunt Student Brains](#) – Description of Ryuta Kawashima's Research, The Observer, 8-8-01
- Kafai, Yasmin. [The Educational Potential of Electronic Games: From Games-To-Teach to Games-To-Learn](#) UCLA K•D•S
- Keighly, Geoff. [Millenium Gaming](#) GameSpot, December 2000
- Kirriemuir, John. [Video gaming, education and digital learning technologies: relevance and opportunities](#) , lib magazine, February 2002.
- Kirriemuir, John. [The relevance of gaming and gaming consoles to the Higher and Further Education learning experience](#), –JISC Techwatch commissioned report, April 2002
- Koster, Ralph, [Game Design papers](#)
- Lewis, David. [Video Games 'Valid learning Tools'](#) – BBC report of Sony Research by David Lewis
- Maloof, Christine and Gabriel, Deborah. [Bridging Schools and Homes: the Lightspan Project](#), 9-1-98
- MacFarlane, Angela [Video Games 'Stimulate Learning'](#) – TEEM. BBC News 3-18-02
- MacFarlane, Angela. [Games in Education](#) (TEEM Report)
- Prensky, Marc. [Digital Natives, Digital Immigrants](#) , On the Horizon, 9:5, Sept-Oct 2001
- Prensky, Marc. [Do They REALLY Think Differently?](#) On the Horizon, 9:6, Nov-Dec 2001
- Prensky, Marc. [The Motivation of Gameplay](#) On the Horizon, Vol 10, No 1
- Prensky, Marc. [Not Only The Lonely: implications of "social" online activities for higher education](#) On the Horizon, Vol 10, No 4
- Prensky, Marc. [Open Collaboration](#) On the Horizon, Vol 10, No 3
- Prensky, Marc. [Simulations : Are They Games?](#) From *Digital Game-Based Learning*
- Prensky, Marc. [Types of Learning and Possible Game Styles](#), *Digital Game-Based Learning*
- Prensky, Marc. [Why Games Engage Us](#) from *Digital Game-Based Learning*
- Prensky, Marc. [Why NOT Simulation](#)
- Robson, Robby. ['No Significant Difference' Phenomenon](#) – Online and offline learning have same results
- Sawyer, Ben. [Serious Games: Improving Public Policy through Game-Based Learning and Simulation](#), Woodrow Wilson International Center for Scholars.
- Smith, Richard, Curtin, Pamela and Newman, Linda. [The educational implications of computer and computer games use by young children](#) (Australia)
- Squire, Kurt. [Games in Instructional Technology](#)
- Travis, Alan. [Zap! Go to the Top of the Class](#) – Alan Travis, The Guardian 3-24-2001

## Books

- "*Learning by Doing*" by Clark Aldrich, (John Wiley & Sons, 2005)
- "*Simulations and the Future of Learning : An Innovative (and Perhaps Revolutionary) Approach to e-Learning*" by Clark Aldrich (2003)
- "*What Video Games Have to Teach Us About Learning and Literacy*", by James Paul Gee (Palgrave Macmillan, 2003)
- "*Serious Games: Games That Educate, Train, and Inform*" by David Michael, Sande Chen (Thompson Course Technology, 2005)
- "*Theory of Fun for Game Design*", by Raph Koster (Paraglyph Press, 2005)
- "*Developing Serious Games*", by Bryan Bergeron (Charles River Media, 2006)
- "*Engaging Learning: Designing e-Learning Simulation Games*" by Clark N. Quinn (John Wiley & Sons, 2005)
- "*Digital Game-Based Learning*", by Marc Prensky (McGraw-Hill, 2000)
- "*Changing Minds: Computers, Learning, and Literacy*", by Andrea A. diSessa (MIT Press, 2000)
- "*Joystick Nation: How Videogames Ate Our Quarters, Won Our Hearts, and Rewired Our Minds*", by J.C. Herz (Little, Brown, 1997)
- "*The Nature of Computer Games: Play as Semiosis*", by David Myers (Peter Lang, 2003)

## Conferences & Exhibitions

- Serious About Games 2006, Birmingham, UK  
- [www.seriousgames.org.uk](http://www.seriousgames.org.uk)
- Serious Games Summit, March, San Jose, California  
- [www.seriousgamessummit.com](http://www.seriousgamessummit.com)
- Serious Games Summit D.C., November, Washington D.C., Virginia  
- [www.seriousgamessummit.com](http://www.seriousgamessummit.com)
- Serious Games Summit Europe, October, Lyon, France.  
- [www.sgseurope.com](http://www.sgseurope.com)
- Education Arcade Games in Education Arcade Conference, May, Los Angeles  
- [www.educationarcade.org](http://www.educationarcade.org)

## Industry Associations

Serious Games Initiative – ( [www.seriousgames.org](http://www.seriousgames.org) ) The Woodrow Wilson International Centre for Scholars in Washington D.C. launched the Serious Games Initiative to encourage the development of games that address policy and management issues.

ANGILS – ( [www.angils.org](http://www.angils.org) ) - a new UK networking organisation tasked with bringing innovative organisations and groups together with industry from across the interactive entertainment, CGI, online games, learning, scenario-planning and simulation industries.

NASAGA – ( [www.nasaga.org](http://www.nasaga.org) ) – The North American Simulation and Gaming Association is a growing network of professionals working on the design, implementation, and evaluation of games and simulations to improve learning results in all types of organizations. Started in North America, NASAGA has members from more than 50 countries from around the globe. Membership is open to all.  
Govt support/backing

Governmental support for games-based learning is becoming increasingly prevalent at local, regional and national levels across the USA and Europe. In the West Midlands, companies such as ours are obtaining increasing levels of interest and support from the regional development agencies, Learning Skills Councils, UKT&I, universities and colleges which is manifesting itself as fully-funded projects. These include Coventry University's "Diversification of Game Industry" project and the soon to opened Serious Games Institute in Coventry (incubation, development funding and research projects).

Sources of GBL-related information can be found at the following web sites:

PIXELearning's GBL resource mini-site

[www.pixelearning.com/serious\\_games-resources.htm](http://www.pixelearning.com/serious_games-resources.htm)

The Serious Games Initiative

[www.seriousgames.org](http://www.seriousgames.org)

Social Impact Games (entertain games with non-entertainment goals)

[www.socialimpactgames.com](http://www.socialimpactgames.com)

Watercooler Games (videogames with an agenda)

[www.watercoolergames.org](http://www.watercoolergames.org)



#### 4. Why should you be interested?

Some of the key potential benefits of GBL are outlined below.

**Performance improvement:** If GBL is used appropriately it can directly act to improve employee skills and knowledge and thus lead to a more productive workforce

**Increase awareness of the importance of employee roles:** Because games vividly bring to life the interrelated and interdependence of different company roles (e.g. sales and engineering) it helps employees to understand the effect of their decisions and behaviour on other important business areas that otherwise seem unconnected.

**Competency testing:** GBL can be a very powerful tool for competency testing. Realistic scenarios can be played out in a risk-free environment to see how learners perform.

**Assessment/ROI:** Games capture a staggering degree of information – both quantitative and qualitative - whilst being used by a learner. This can be used to create detailed reports for assessment.

**Recruitment processes:** GBL can be used to test potential new hires by evaluating how well they perform in roles/situations that the job role will demand.

**Customer & partner education:** GBL can be used to help your customers and channel partners gain a comprehensive understanding, for example, of your product and service portfolio.

**Promotional tool:** Serious Games can be used as the basis for pushing out informational messages e.g. to highlight the importance of good customer service, promote corporate & social responsibility policies or for PR.

**Induction:** GBL can be used to introduce new hires to your company and, for example, your products and services and the market characteristics that you operate within.

**Motivational tools:** Using the compelling power of games to engage people, serves as a powerful tool to overcome any initial reluctance to engage in training, and keeps users actively engaged for longer.

**Aspirational tools:** GBL can be used to allow employees to try something new, to see whether they like it and to open new avenues for both employee and employer.

**Best practice:** Virtual experts or mentors can be embedded within scenario-driven GBL to guide learners through a situation and to serve as a trusted source of advice.

And finally;

It is important to remember that games need not be a solitary, i.e. 'single-player', experience! Some of the world's most popular entertainment games are multiplayer games where players team up to work together. This brings about interesting opportunities for providing social learning environments such as, for example, around team dynamics.

Multiplayer GBL can also draw upon the competitive nature of games with users being 'dropped' into virtual situations with other real people with whom they need to perfect their negotiation, communication and conflict resolution skills.

## **5. The difference between computer games and traditional eLearning & multimedia learning experiences**

Typical eLearning content involves heaping reams of mainly text-based information upon learners, dropping in some small multimedia elements and/or simplistic Flash movies and then bolting on a simplistic drag 'n' drop quiz or MCQ assessment whereupon the user receives some notional feedback along the lines of:

"Congratulations user, you scored 64.7%...we suggest that you revisit chapters 3,5,6,9 & 11 (which you have just read) and then retake the (same) test."

Like most people, my inclination would be to answer that with a resounding; "No thanks!" The content is not going to react differently to my using it for a second time. The 'experience' will be exactly the same each and every time I replay it. This is not an engaging experience, it is not interactive and I feel no compulsion to commit my time and effort to it. This is a classic (automated) "Tell, Test" approach to instruction. The gamer generation – and remember the demographics – are increasingly frustrated by this.

HTML files (web pages) use hyperlinks to allow the user to jump from one page to another. Hyperlinks are frequently referred to as being 'interactive' when in essence clicking on a hyperlink is nothing other than an electronic version of turning a page in a book. Modern PCs, even bog-standard £299 bargain examples, possess the processing power and multimedia capabilities to deliver so much more than this. If we don't utilise this existing resource to its potential then I, and many people, would argue that you would be better off simply giving learners a good book!

Whilst this is a somewhat grubby caricature of eLearning it is not inaccurate. E-Learning, as it frequently gets implemented, does not provide a truly interactive, experiential level of learning. It is characterised as offering rapidly developed, low budget content (as opposed to powerful software applications) which delivers fundamentally shallow learning experiences



Now compare this with a game (which is a powerful software application).

Games:

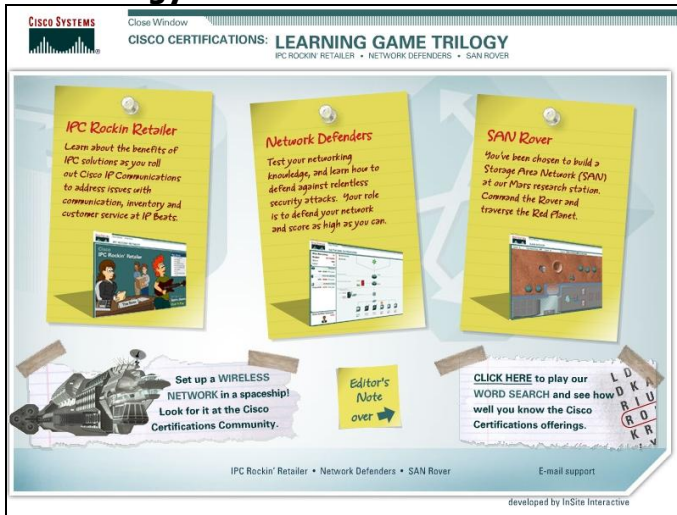
- have realistic and relevant environments and systems which allows users to 'explore' the boundaries, options and the problem space.
- have clearly defined (overt) rules: "If your wings break you will crash", "If you step on a landmine it will blow up", or "if you run out of cash you will go bust".
- have clear objectives – "save the princess from the big scary monkey", "double turnover in 3 years".
- are truly interactive; every thing that the learner does, or does not do, has an effect and are thus highly experiential.
- have clear outcomes; "You were shot...you are dead", "You have run out of cash and have been closed down". They provide meaningful and relevant feedback (e.g. because of your actions or lack of actions, the plane crashed, the cash ran out, the employees quit) to show the learner the consequences of their decisions and actions. This is important because the user knows explicitly why a particular outcome happened and allows them to assess different approaches to the problem in an informed manner.
- are adaptive; they automatically track the user's progress and performance to maintain a careful balance between boredom (because it is too easy) and frustration (because it is too hard). Static content (eLearning) cannot be easily designed to achieve this and is, therefore, customised to a very specific audience and of very limited use elsewhere.
- require (and foster) a level of cognitive application from the user that far exceeds reading text and then regurgitating facts. Gamers analyse huge quantities of information from a variety of sources. Games encourage, for example, problem solving, creative thinking, lateral thinking, investigation and trial and error, all of which are valuable in the workplace.
- are genuinely enjoyable. This leads to longer attention spans, improved attentiveness and positive feelings.

If you want to explore these themes further (or if you remain sceptical) I strongly suggest that you beg, borrow or steal "A Theory of Fun" (Koster) and/or "Digital Games-based Learning" (Prensky).

## 6. The cross-sector adoption of GBL

<p><b>Manufacturing</b></p>  <p>The screenshot shows a 3D-rendered factory floor with two robotic arms. Overlaid on this is a management interface. At the top left, it says 'R &amp; D'. The main interface is divided into several sections:</p> <ul style="list-style-type: none"> <li><b>Products in Development:</b> A table with columns for Product, Qty, and Launch Date. <table border="1"> <thead> <tr> <th>Product</th> <th>Qty</th> <th>Launch Date</th> </tr> </thead> <tbody> <tr> <td>Large estate</td> <td>200</td> <td>5 Jan 2007</td> </tr> <tr> <td>Compact MPV</td> <td>300</td> <td>5 Jan 2007</td> </tr> <tr> <td>MPV</td> <td>200</td> <td>5 Jan 2007</td> </tr> <tr> <td>MPV</td> <td>300</td> <td>5 Jan 2007</td> </tr> <tr> <td>MPV</td> <td>100</td> <td>5 Jan 2007</td> </tr> <tr> <td>MPV S</td> <td>100</td> <td>5 Jan 2007</td> </tr> </tbody> </table> </li> <li><b>Components in Development:</b> An empty table.</li> <li><b>Team Skill Rating:</b> A percentage value.</li> <li><b>Monthly Team Spend:</b> A percentage value.</li> <li><b>Actual Team Size:</b> A percentage value.</li> <li><b>Monthly Budget:</b> A percentage value.</li> <li><b>Required Team:</b> A percentage value.</li> <li><b>Variance:</b> A percentage value.</li> </ul> <p>Buttons for 'New Product', 'Redesign Product', and 'New Component' are visible. At the bottom, there is a 'MAIL' icon, a 'Product Line 1' status box (Staff Morale LOW, Efficiency LOW, Unit Cost HIGH, Inventory HIGH), and a date '18 December 2019'.</p>	Product	Qty	Launch Date	Large estate	200	5 Jan 2007	Compact MPV	300	5 Jan 2007	MPV	200	5 Jan 2007	MPV	300	5 Jan 2007	MPV	100	5 Jan 2007	MPV S	100	5 Jan 2007	<p>LearningBeans<sup>®</sup>, as developed by PIXELearning, allows the learner to play through an extremely detailed scenario, based upon high volume manufacturing and includes sales, marketing, HR, finance, production, distribution and export planning.</p> <p>Learners implicitly understand the interdependencies between all aspects of the business.</p>
Product	Qty	Launch Date																				
Large estate	200	5 Jan 2007																				
Compact MPV	300	5 Jan 2007																				
MPV	200	5 Jan 2007																				
MPV	300	5 Jan 2007																				
MPV	100	5 Jan 2007																				
MPV S	100	5 Jan 2007																				
<p><b>Energy/utilities</b></p>  <p>The top image shows a real-world electrical meter cabinet with its door open, revealing internal components. The bottom image shows a 3D virtual character, a woman in a blue top and jeans, standing in a virtual hallway with a red carpet and a staircase. The text 'British Gas Servi' is visible at the bottom right of the 3D image.</p>	<p><b>British Gas</b> created a game based upon an entertainment game engine to illustrate the importance to field engineers of customer communication and diagnostic problem solving.</p> <p>The solution made use of a commercially-available 1<sup>st</sup> person shooter game engine which was modified to create a 3D role-playing training tool.</p>																					

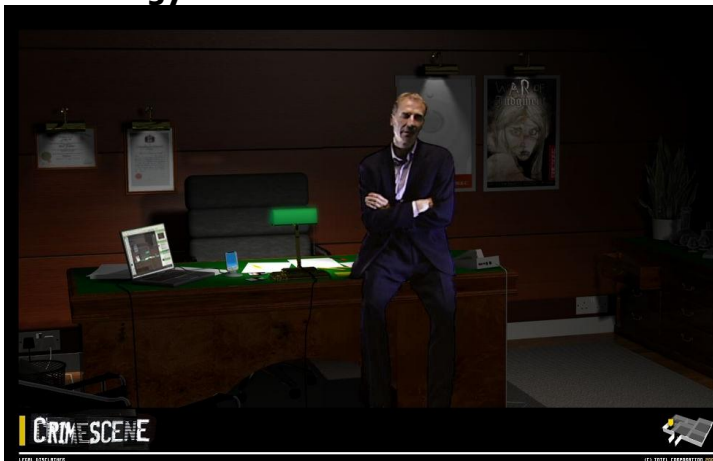
## Technology



**CISCO** have developed their Learning Game Trilogy, a combination of three online technology games: Rockin' Retailer, Network Defenders and SAN Rover.

As part of the Cisco Career Certifications Program, these free games are offered as a challenge to individuals who are interested in learning while engaging in competitive game play.

## Technology #2



**INTEL** commissioned a game to illustrate the importance of IT security and used a 'whodunit' role playing game style.

The Flash application makes heavy use of professionally created video footage and a series of mini games within an overall umbrella scenario.

## FE/HE





## Virtual-U

Designed to foster better understanding of management practices in American colleges and universities.

Originally designed for 1,000 users, it has had well over 100,000 downloads.



<p><b>Retail</b></p>  <p>The screenshot shows a virtual retail store environment. At the top, the title 'The Retail Game' is displayed along with the student name 'Charles McGee'. Below the title are buttons for 'Instructions', 'Credits', and 'QUIT'. The main view is a 3D-rendered store interior with shelves, a counter, and a computer monitor showing a data dashboard. A notification box at the bottom right indicates a 'NEW MESSAGE RECEIVED' from the 'Store Manager' regarding 'NEW SALES TARGETS'. System icons for 'SPEED', 'SOUND ON', and 'HIGH QUALITY' are visible at the bottom left.</p>	<p><b>'The Retail Game'</b></p> <p>PIXELearning are currently working with a midlands-based college of further education to create two games: one to promote careers in retail; and, another to foster the development of skills for retail staff.</p>
<p><b>Financial services: PWC's 'In\$ider' game</b></p> <p>In\$ider is a four part learning solution comprising four self-paced multimedia CD-ROMs on financial products and how they are used by corporate bodies to hedge interest rate and currency risk. In\$ider was commissioned by PWC to allow them to train a large number of derivatives traders quickly in order to meet compliance requirements.</p>	
<p><b>Telecommunications</b></p>  <p>The screenshot displays a business simulation interface. It features a central window with a grid and various data points, likely representing a business performance dashboard. To the right, there are several document icons, one of which is titled 'DAILY PLANET SOUTH AMERICA HUMAN RIGHTS CONCERNS'. The interface is part of the 'BT - Better Business Game'.</p>	<p><b>BT – 'Better Business Game'</b></p> <p>A simulation game from British Telecom about managing social and environmental issues in a business. The player takes on the role of corporate CEO.</p> <p>The game's contents is drawn from general business dilemmas across all industries.</p>
<p><b>Pharmaceutical</b></p>  <p>The screenshot shows the title 'Packy &amp; Marlon' in a colorful, stylized font. Below the title is a cartoon illustration of two elephants, Packy and Marlon, wearing colorful clothing and hats. They appear to be in a playful or friendly interaction.</p>	<p><b>Diabetes Management – "Packy &amp; Marlon"</b></p> <p>The game is used at home in hospitals, in clinic waiting rooms, and in diabetes summer camps. Studies have found that children and teens with diabetes who have the Packy &amp; Marlon video game available to play at home reduce their diabetes-related emergency and urgent-care visits by 77 percent.</p>

### Hospitality & catering



### Hospitality & Catering NVQ/Henley College

PIXELearning are creating a games-based application that helps students to progress through their NVQ in Hospitality & Catering.

We are also doing some pilot work with a large beverages producer to help them educate their retailers in order to increase product sales.

### Construction



### The Site Safety Game

PIXELearning developed this proof-of-concept mini-game to demonstrate how 3D games technology can be used for construction industry training.

The game places the learner on a building site as a safety inspector. They have to identify and quantify potential hazards.



### Computer Software



### "The Monkey Wrench Conspiracy"

A first-person shooter game designed to teach mechanical design engineers to use 3-D CAD software.

A player must complete 30 CAD tasks, including cutting through solids and constructing new parts for their weapon, on their way to save a valuable space station from the evil Dr. Monkey Wrench.

<p><b>NGO/public departments</b></p> 	<p><b>UN/WFP – foodforce</b></p> <p>This game was commissioned by the U.N. World Food Programme to raise awareness of the issues around world hunger.</p> <p>It is available as a free internet download and has been used by 3 million people world wide since it was released in 2004.</p>
<p><b>Healthcare/well-being</b></p> 	<p><b>Zipland Interactive – Divorce Recovery for Kids</b></p> <p>"A 'psychological edutainment product,' in the guise of a full, fun adventure game."</p> <p>Designed to help kids with divorced or separated parents deal with the emotional issues which arise as a result of the separation.</p>

The examples that have been shown on the previous pages are but a handful of the many hundreds of examples of GBL across the world. The Social Impact Games web site ([www.socialimpactgames.com](http://www.socialimpactgames.com)) is an excellent repository of other examples spanning many different industries/needs.



My own company, PIXELearning, is currently developing projects and proposals for a diverse range of clients and markets that include a wide variety of applications such as:

**Financial:** Finance for non-financial managers / money management skills for teenagers.

**Project management:** PM basics / PRINCE2 methodologies

**Implementing technologies:** Showing business benefits to SMEs

**Sales training:** Sales methodologies / sales meeting preparation / international trade

**Marketing:** raising awareness of the importance of marketing to SMEs

**Enterprise training:** educating school students / helping budding entrepreneurs

**Commercialisation:** Showing academics how to go about exploiting IP and/or R&D

## 7. Implementation Issues

A word (or 7) of caution!

The potential benefits may make a very compelling business case. However the design, development and implementation of GBL requires very thorough planning, piloting, testing and ongoing evaluation. Adopters need to be aware of several issues which are discussed briefly below.

**Technology:** The creation of complex software applications is significantly more demanding than traditional eLearning or multimedia content.

*Tip! Don't do it in-house unless you have a dedicated resource and all the necessary skill sets in place. If you decide to outsource a solution look for a specialist GBL provider that can demonstrate a proven track record (with available client testimonials) and place a high degree of emphasis upon those that have pre-existing GBL platforms. You do not want to pay to reinvent the wheel.*

**Time:** A typical entertainment-orientated game can take up to three years to bring to market. If you have a problem that needs solving now you need a solution now.

*Tip! Bespoke development = long project. Ask yourself how quickly you need to solve the problem at hand and, if possible, seek a GBL specialist that has prior technology it can bring to bear quickly.*

**Assessment:** The whole point of even considering GBL is to improve the effectiveness of a training and development programme. If you cannot evaluate, for example, skills development and knowledge acquisition, then you cannot build a business case for, calculate ROI of or rationalise, in any way, the outcomes from a GBL (or any other) training solution. Games can generate a huge amount of metrics but an entertainment-orientated games technology platform is unlikely to be adequate for the task.

*Tip! Know what performance indicators (metrics) you need to evaluate learner progress and performance and ensure that the GBL specialist can capture, track and report these to you in a format that is appropriate.*

**Cost:** Entertainment games cost between £500k and £5m to develop. GBL need not be as 'hi fidelity' as the latest XBOX game but, nonetheless, development can be expensive, especially if it is a 100% bespoke development.

*Tip! Work with a GBL specialist to fully define the business case (for both parties) before committing to a full-blown project, if you have never undertaken GBL previously. If you have several potential solutions, then choose the easiest one first and then break the project down into an initial proof-of-concept (mock up), small scale pilot and then, subject to satisfactory evaluation, a full-blown application.*

**Delivery:** Your choices for deployment are to run it from a CD/DVD, to install a PC '.exe' file or to opt for a browser-based solution. Optical media (CDs and DVDs) incur duplication costs, can get lost and, if the application is updated frequently, need to be tracked carefully to ensure that all learners have the up-to-date version. An '.exe' file requires for a higher level of IT literacy, can have security issues and, for a large implementation, can result in significant IT administration costs. Browser-based solutions can tend to be less 'high fidelity' but the quid pro quo is instantaneous version control and maintenance/installation costs are minimised.

*Tip! Always go for the most simple technology approach that you can; minimise the IT burden.*

**Skill sets:** GBL projects can require a bewildering range of people and skills including: concept artists; voice actors; 3D modellers; simulation logic designers; subject matter experts; texture artists; audio engineers; GUI designers; physics programmers; game programmers; database designers; game designers; level designers; script writers; testers.....and more!

*Tip! Just because your in-house eLearning or web designer thinks it would be 'cool' and is convinced he/she can 'give it a go', consider carefully whether your organisation really does have the skills and experience required and even if you do, is that resource going to be readily available?*

**SCORM/LMS interoperability:** It is fair to say that the GBL vendor space lacks experience in, and awareness of, the issues around interoperability. This is especially true if the GBL specialist has come from an entertainment games background as it is simply something that they will never have encountered before. To be even-handed, it is somewhat more challenging to make a highly interactive game application SCORM-compliant than it is to give simplistic web content the same treatment. There are two main factors involved in interoperability: 'content' identification (so that any LMS can recognise the GBL application); and, question and test data exchange (so that the learner's assessment data can be accessed via any LMS).

*Tip! Check whether the GBL vendor can implement eLearning standards themselves and, if they cannot, then seek to bring in an inter-operability expert into the project to work with them.*

**Accessibility/usability issues:** These are some of the most challenging issues that GBL specialists will encounter. Static eLearning content is easily modified 'on the fly' to make it suitable for the hearing, physically or visually impaired and, when it is not, organisations tend to offer specially designed alternative content. The very nature of a game makes it very difficult for vendors to achieve true accessibility/usability compliance.

*Tip! Know your legal compliance requirements (e.g. Bobby, W3C Accessibility, Section 508). Work with the GBL specialist to ensure that the GBL solution is as compliant as can be (such as making sure it can be fully operated without a mouse) but be prepared to offer alternative approaches where full compliance is too expensive or time-consuming or where (as is likely) full compliance would water down the GBL solution to such an extent that it no longer offers the benefits you required in the first place.*

## 8. GBL is part of the blend

If a GBL specialist claims that games are the panacea for all your training needs and that you can convert all aspects of your training to games....thank them for their time and walk away!

Games can be excellent means for letting learners put the theory into practice. They can be a powerful means of testing competencies. **They are bad at delivering content.** Information can be delivered 'in game' but only in small doses. If there is a lot of theory to absorb (e.g. case studies, introductions to complex concepts, legal transcripts) then deliver that to the learners by the most appropriate alternative means.

*Last tip! Use GBL to allow learners to be able to put the theory that they have learned elsewhere into practise in a safe, simulated and realistic environment.*

PIXELearning seeks to work with established training and education service providers who have the experience and capability to undertake thorough organisation and learner needs analysis and who can apply an objective, holistic, systems-level approach to assessing client's needs and designing appropriate blended solutions.

We are proud of our relationship with the Matchett Group; a relationship that empowers PIXELearning to do what we do best, safe in the knowledge that the project aspects such as training needs analysis and traditional face to face instruction, which we are not our speciality, are in the hands of a respected and reliable partner.

For more information about The Matchett Group visit: [www.thematchettgroup.com](http://www.thematchettgroup.com)

## 9. The 'sales pitch': PIXELearning – what we do and what we can do for our clients

PIXELearning specialise in web-based approaches to business education and business and management skills development. Our founders' background and most of our staff are from the eLearning and traditional training sector.

We have invested over a dozen man years into developing custom-built games-based learning technology platforms to ensure that we can create compelling, engaging and effective learning experiences rapidly and cost-effectively.

We **do** believe that it is 'cool' to create powerful learning solutions.

We **do not** think that it is 'cool' to use technology for technology's sake.

Corporate site: [www.pixelearning.com](http://www.pixelearning.com)  
LearningBeans® site: [www.learningbeans.com](http://www.learningbeans.com)  
Business Game site: [www.thebusiness-game.com](http://www.thebusiness-game.com)  
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"You can learn more about a man in an hour of **play** than in a year of conversation."

- Plato, from *The Republic*