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Digital World

# Serious games

Advergaming, edugaming, training and more

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# Serious Games

## Advergaming, edugaming, training and more

**This study outlines the characteristics, uses and different genres of serious game. It examines the challenges involved in the design, development and distribution of various types of titles, while analysing the outlook for the industry and its growth drivers.**

600 million to one billion potential users worldwide.

At the end of 2007, the global video game industry was worth 30 billion USD. At the same time, the serious gaming market was estimated to be worth between 1.5 and 10+ billion USD.

According to IDC, 40% of the USA e-learning market will employ serious gaming in 2008.

In the USA alone, the advergaming industry is expected to be worth 262 million USD in 2008.

According to a SharpBrains study, the Brain Fitness software market grew from 100 million USD in 2005 to 225 million USD in 2007 in the United States.

Serious games can be classified in three main categories:

- Message-based serious games,
- Training serious games,
- Simulation or serious play serious games.

## Defining serious gaming

There is a huge variety of ways to classify serious gaming. However, accepting the ambiguities and possible challenges inherent in this, this study defines serious gaming as follows:

■ The purpose of a serious game is to get users to interact with an IT application that combines aspects of tutoring, teaching, training, communications and information, with a recreational element and/or technology derived from video games.

■ This combination aims to make practical, useful content (serious) enjoyable (game). It is achieved by developing scenarios that are at once practical and enjoyable.

## The origins of serious gaming

*America's Army*, developed for the U.S. army and distributed free-of-charge over the internet as of 2002, is considered the first ever significant serious game, with over 17 million downloads recorded in 2004 alone. The first-person shooter simulates military training exercises and combat missions, though the main aim of the game is to promote the American army and to serve as a recruitment tool for young people between 16 and 24.

■ Links between gaming and the army are far from new: during World War II, the army's general staff were the first to use "wargames", and employed them to improve their image with the population.

■ In the United States, many people associate the term "serious games" with "military games".

■ North American approaches are usually employed to promote the serious game industry.

## Areas addressed

Today, serious games are employed in a wide variety of sectors.

■ *Defence*: one of the most important areas in terms of client investment and orders. Serious games are also used by armies in Europe, though less widely than in the USA.

■ *Teaching and training*: serious gaming has a key role to play in this market, and IDC predicts that by the end of 2008, 40% of e-learning applications in the USA will employ the technology.

■ *Advertising*: serious games designed for advertising (advergames) allow clients to promote a particular brand or product to users throughout a game. In the United States alone, the advergaming industry is expected to be worth 262 million USD in 2008.

■ *Information and communications*: though details on the information market are still anecdotal, advertising-related communications (edumarket games) are playing an increasingly significant role in in-game advertising, an industry currently worth 205 million USD (USA, 2008).

■ *Health*: Nintendo has enjoyed considerable success with applications dedicated to brain training and fitness. According to a SharpBrains study, this market rose from 100 million USD to 225 million USD between 2005 and 2007, in the USA alone.

■ *Culture*: though this sector only accounts for a minor part of the serious gaming industry at present, strong growth is possible, particularly in the areas of cultural and industrial tourism.

■ *Activism*: this sector is unique in that it does not follow traditional economic models: titles are produced with little or no financial backing and have the sole objective of putting across a particular message, such as that of *September the 12th*, based on the 9/11 attacks.

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## Different type of serious game

Bearing in mind their principal objectives, serious games can widely be divided into three categories:

■ Message-based serious games: aim to deliver a specific message in an educational, informative or persuasive fashion

■ Training serious games: aim to improve users' cognitive/motor skills.

■ Simulation or serious play serious games: do not aim to evaluate users. As such, they offer a wide variety of potential uses.

## Serious gaming's target market

IDATE estimates that there are between 600 million and one billion potential users worldwide in 2008. This number includes both purchasers and non-purchasers of entertainment titles. Though those under 25 represent the most important target market, serious games are aimed at all generations:

■ Under 15: the presence of an adult or suitable framework is often required if serious games are to be used effectively by this group.

■ Between 15 and 24: this group expects the highest quality in terms of video games, and uses big budget titles (AAA) as a benchmark. Casual games should be employed to encourage this group to use serious games.

■ Over 24: within the 25-55 age group, the amount of time spent playing video games gradually reduces with age. Above 55 however, the gaming audience starts to grow again, for two key reasons: people in this group have more free time available, and they wish to form a bond with their grandchildren. It should also be noted that serious games are used to stimulate residents of some retirement homes.

## Serious game backers

The biggest serious game clients at present are the American army and government, which have financed the most significant productions and are developing the industry as a whole. Other backers include political parties, businesses, public and private institutions and publishing houses.

## The serious game value chain

The serious game industry is polymorphous as it groups together all the niche areas and markets that employ video games for objectives other than pure entertainment.

The value chain is made up of the following three major groups:

■ developers: produce the content of serious games, or tailor them according to the B2B, B2C or B2B2C segments. Cur-

rently, in the United States and Europe,, these tend to be SMEs or VSEs/freelancers and are generally serious game "pure players". They do not usually have a video game background, but have worked in the promotion, development or publishing of professional software.

■ Publishers: these cover the costs involved in publishing, marketing and packaging serious games, both for physical and electronic sales. This group also includes developers/publishers that produce their own titles internally. There are currently no serious game "pure player" publishers due to the diversity of applications.

■ Distributers: serious games often do not follow traditional retailer-based distribution models – the American army and NSA for example distribute their product directly to the public. Most titles are distributed via the internet, with electronic sales of serious games far more common than in other video game sectors.

## Serious gaming business models

Three segments have been identified within the serious gaming market.

■ B2B:

**The order-based model** is where a client contracts a business of some kind (though not a private individual) to design and develop a serious game. This is then used exclusively by the client.

**The licence-based model** is where titles produced by any kind of publisher, company, independent, association or public or private institution (though not a private individual) are made available for a fee. The application is either a ready-to-use serious game (customized or non-customized), a piece of development software to produce a serious game, or a serious game integrated within another application or product.

**The consulting/training model** is where a public or private institution's designers/developers are trained in all the different stages of serious game development on-site.

■ B2C: the publisher/developer model is where a publisher, company, independent, association or public or private institution designs and develops a title, then offers it for sale directly, without any prior demand or order. The serious games here are ready-to-use, may or may not be customized, and are available to all types of consumer.

■ B2B2C: this segment is made up of the three B2B business models, with the difference that the backer acts as an intermediary between the developer and the user.

## Serious gaming distribution models

There are three different ways to distribute serious games:

■ **Free-of-charge distribution**: essentially based on web marketing, this approach employs all the various marketing strategies used online;

■ **Semi-free-of-charge distribution**: characterized by bonus products, demoware, shareware and trialware, and virtual communities.

■ **Commercial distribution**: made up of electronic and physical sales, as well as use in restricted areas.

## The serious game market in the USA

The army and government are the two main serious game backers in the USA, largely as a result of the Small Business Act, which offers SMEs access to contracts worth between 2,500 and 100,000 USD – a large number of orders of this size are for serious games. This market should not obscure  that of industry and private institutions however, as these also commission serious games. The major video game companies have not positioned themselves on the serious American market as yet.

## The serious game market in Europe

Younger than that of the United States, the European market is principally driven by the UK, Scandinavia, Germany and France. There is no real political support in Europe to help develop the market, though there are a number of local initiatives aimed at accelerating progress. However, it is important to note the Pacte PME, the French "equivalent" of the Small Business Act, which came into force on 1 August 2006 and is likely to have a similar effect. Though the publisher/developer business model may not be widely supported in Europe, the order-based model seems to show increasing development in the spheres of e-learning, industrial training, and advergaming.

## Outlook and challenges

The serious gaming approach is as old as the video game industry, and the term refers to a marketing technique above all else. However, the "serious games" name can help video games to evolve, and to reach new areas where they can be of great benefit.
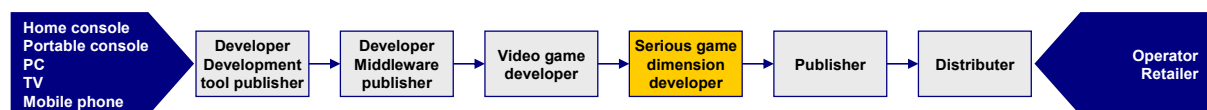
In terms of outlook, there are three key aspects for the future:

■ **Distribution**: mobile telephony, game consoles and PCs are each indispensable for the distribution of serious games. As these devices develop, so will serious games, both in their use and as an industry.

■ **Technology**: a number of new devices are set for development, such as the interactive white board and ubiquitous technology.
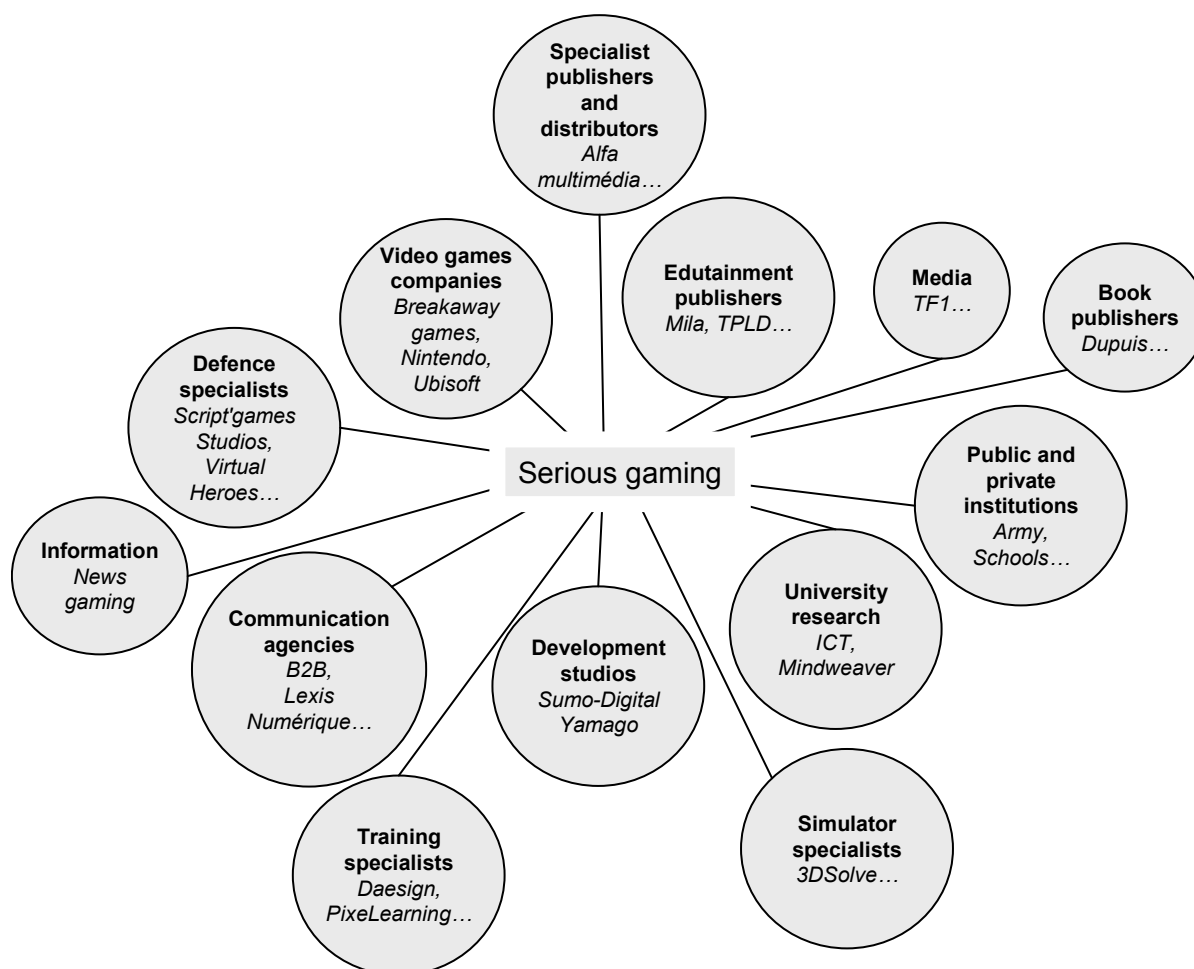
■ **Interfaces and employment**: the serious game market should lead to changes in the horizontal value chain. In the B2B and B2C sectors, major video game companies should focus increasingly on serious games. To do this, they will have to create new positions within their businesses and reorganise promotional activities and sales support – creating a separate body appears to be worth pursuing. Smaller companies should also be able to succeed, with a level of professional expertise that allows them to continue offering sophisticated practical scenarios.

**Figure 1: the serious game value chain**

| Home console<br>Portable console<br>PC<br>TV<br>Mobile phone | Developer<br>Development<br>tool publisher | Developer<br>Middleware<br>publisher | Video game<br>developer | Serious game<br>dimension<br>developer | Publisher | Distributer | Operator<br>Retailer |
|---|---|---|---|---|---|---|---|

Source : IDATE

**Figure 2: the various backgrounds of companies involved in the serious gaming market**

Specialist publishers and distributors *Alfa multimédia…*

Video games companies *Breakaway games, Nintendo, Ubisoft*

Edutainment publishers *Mila, TPLD…*

Media *TF1…*

Book publishers *Dupuis…*

Defence specialists *Script'games Studios, Virtual Heroes…*

Information *News gaming*

Serious gaming

Public and private institutions *Army, Schools…*

Communication agencies *B2B, Lexis Numérique…*

Development studios *Sumo-Digital Yamago*

University research *ICT, Mindweaver*

Training specialists *Daesign, PixeLearning…*

Simulator specialists *3DSolve…*

Source: IDATE

# Table of Contents

# 1.    Introduction

At the start of the 1980s, the videogame market experienced its first growth phase and generated almost double the profits of the American film industry. Despite cyclical downturns for around six years, the videogame market continued to grow, and from 2003 to 2007, worldwide gaming industry sales rose from 18[1] to 30 billion USD[2]. In May 2008, there were 281 million game consoles around the world, with IDATE estimating the number of potential players to be between 600 million and one billion.

At the start of the 21st century, the videogame can thus no longer be considered some sort of passing trend, and it now appears to form a significant part of our culture. This is the context that serious games have developed within, with the genre's first significant title being *America's Army*, released in 2002[3]. This type of IT application is based around videogames, both technically and culturally, but aims to *"offer more than pure entertainment"*. Serious games, or rather games with a practical benefit, usually aim to teach, inform, train or test users while they play. Current areas of application include the health, defence, education, political, industrial, research, training and communication sectors, and the technology is continuing to move into new fields. In 2008, the markets that make up serious gaming are expected to generate sales between 1.5 and 10 billion USD[4]. The imprecision of this figure is due to the different definitions currently employed by the main players in this new market, as well as the fact that serious gaming marks a major transitional phase for the videogame industry. The industry is now targeting a wider age range, and is developing and maturing, resulting in new development opportunities in the B2B (Business to Business) and B2C (Business to Consumer) sectors for all companies involved.

This study initially sets out to identify the characteristics, uses and different genres of serious games. After outlining the target audiences and areas of application, it moves on to discuss the challenges involved in the design, development and distribution of various types of title. The market is then presented, along with the way in which the industry is organised, both domestically and internationally, before the study discusses the outlook for serious gaming and its growth drivers in terms of distribution, technology and employment.

Semi-structured interviews were carried out with representatives from across the serious game industry, including a consultant in the field and nine companies. The companies can be divided as follows:

- 3 edugame publishers,
- 1 health application publisher,
- 3 communication agencies,
- 1 company that specializes in developing serious games for corporate training,
- 1 company that specializes in developing serious games for military training.

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[1] Sauvé L., *Les eJeux: Un moyen pour s'engager activement dans son apprentissage*. (eGames: a means for active involvement in teaching) Notes from the 4th conference on educational questions in higher education, Louvain-La-Neuve, Belgium, 24-26 January 2007

[2] Source: *NPD* (http://www.commentcamarche.net/actualites/2007-l-annee-de-tous-les-records-en-jeux-video-4754737-actualite.php3)

[3] "(*America's army) was the first successful and well-executed serious game that gained total public awareness*" (http://www.usatoday.com/tech/gaming/2006-05-19-serious-games_x.htm)

[4] Source: *IDC*

# 2.    Introduction to serious games

## 2.1.  The definition of a serious game

There are several different ways of defining serious gaming. Some industry figures believe a serious game must include a genuine element of gameplay twinned with a practical dimension. Others employ the term for any application produced using development software from the videogame industry, which means a majority of simulators would be considered serious games. Further groups think that serious games are simply videogames, and that the classification is nothing more than a marketing technique.

For the purposes of this study, the following definition has been employed: serious games are IT applications that combine aspects of tutoring, teaching, training, communications and information, with an entertainment element derived from videogames. By offering this combination, the programs aim to make practical, utilitarian content (serious) enjoyable (game).

Serious game designers thus use people's interest in videogames to capture their attention for purposes that go beyond pure entertainment.

To achieve this, designers must combine two types of scenario:

- the first one being utilitarian,
- and the second purely recreational.

**Utilitarian scenario + videogame scenario = serious game**

These scenarios must be combined coherently, as will be discussed further on in this study, so that the user enjoys the videogame element and practical dimension simultaneously. When this is not achieved, and the two scenarios exist in parallel without any real link, the application loses its balance and one of the aspects gains precedence over the other. In this situation, the serious game offers little practical benefit.

## 2.2. The history of serious games

### 2.2.1. The official origins

*America's Army*[5] was launched on 4 July 2002, Independence Day in the USA. Developed for the American army and distributed free-of-charge over the internet, the application is based on the *Unreal Tournament*[6] (*UT*) videogame engine and offers simulations of military training exercises and combat missions. However, *America's Army* differs from other military games in that the best players are sent an official letter inviting them to apply for the American army.

Designed to promote the American army's image and to serve as a recruitment tool, the first person shooter (FPS), which can be played over a network, was downloaded over 17 million times worldwide in 2004. The army confirmed that, among a sample group, the game was their most successful recruitment device for young people aged 16 to 24.

*America's Army* continues to be regularly updated, with new versions of the *UT* engine integrated, extra missions added, and an editing tool made available that allows users to design their own levels and distribute them. At the same time, *America's Army* is no longer limited to the PC, with *Xbox, Playstation*, arcade and mobile phone versions all now available.

Noting the title's popularity, Ben Sawyer, CEO of American development company *Digitalmill* and co-director of the *Serious Games Initiative*, states that *America's Army,* "*was the first well-produced serious game that found real success among the general public*"[3.] As a result, it did a great deal to increase awareness of the emergence of serious games. In 2003, Sawyer contributed to one of the first conferences dedicated to serious games: *Serious Game Day*[7], where *America's Army* was represented. Since then, the event has established itself in the industry's calendar, and is now known as the *Serious Game Summit GDC*[8], and is one of the genre's leading annual exhibitions.



*America's Army*, U.S. Army, 2002          *Doom*, *id Software*, 1993          *Battlezone*, *Atari*, 1980
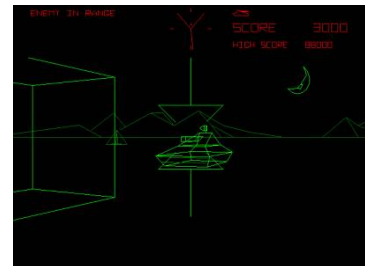
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[5] www.americasarmy.com

[6] Epic, 1999

[7] www.epa.gov/osp/futures/news.htm

[8] http://www.gdconf.com/conference/seriousgamessummit.htm

## 2.2.2.    A prehistory of serious games

Though serious games are said to have arrived in 2002, a number of titles released before this date combine a videogame base with utilitarian elements.

*Marine Doom,* for example, was released long before *America's Army*. Dating from 1996, this modified version of the game *Doom*[9] was used to train members of the US Marine Corps. 15 years earlier, in 1981, a simulation known as T*he Bradley Trainer* was developed for the American army to train new recruits in how to operate a *Bradley* tank.
This application was developed by a team from *Atari,* and was based on the *Battlezone* arcade game.

1982 and 1983 saw the release of several arcade games such as *Pole Position*, as well as games for the *Atari VCS 2600* console, such as *Pepsi Invaders*, which included elements of advertising (a type of application that today is known as an "advergame"). There was considerable interest among advertisers at this time, as the videogame industry was experiencing its first real boom, with the American public in 1982 spending nearly 5 billion USD in arcade halls and 3 billion USD on videogame products.
As a comparison, the film industry generated 2.8 billion USD in the same year.



*Pole Position*, *Namco*, 1982



*Pepsi invaders*, *Atari*, 1983

Even further back, in 1973, titles such as *The Oregon Trail* and *Lemonade Stand*, designed by the *Minnesota Educational Computing Consortium* (*MECC*), were developed for educational purposes (applications known today as "edugames"). The first of these games intended to teach users about American colonists, while the second focused on business management.



*Oregon Trail*, *MECC*, *Apple II* version, 1985



*Lemonade Stand*, *MECC*, *Apple Computer I* version, 1979

This brief history thus shows that the idea of adding a utilitarian dimension to a videogame base emerged long before 2002, and has been around since the arrival of the videogame industry, 30 years earlier. It is worth noting that advertising for the first ever game console, the *Odyssey* by *Magnavox* (launched in the USA in 1972), emphasizes the device's potential as an educational tool, further confirming this idea.

But if utilitarian videogames have as long a history as standard videogames, why is serious gaming currently such a hot topic?

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[9] id Software, 1993

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### 2.2.3.     The role of American marketing in serious games

The link between gaming and the army is nothing new: following the end of World War II, the general staff of the American army employed wargames to a wide extent, and used the technology to improve their image among the population. Nowadays, *America's Army* can be said to be part of this same strategy. However, the US army does more than produce this one military game: it is also playing a key role in the emergence of the serious game industry, as can be seen by the *Serious Games Showcase and Challenge* (*SGSC*), which it has organised and financed since 2006. This competition aim to, "*identify innovative game-based technologies and solutions that improve training across all segments for individuals, groups and systems*". The first year of the event was focused uniquely on the military, though since then, the competition has been open to other areas, particularly education and industry. But why did it open up in this manner?

In the USA, most people associate the term "serious game" with that of "military game". However, other areas of application, such as teaching, health and communications, are less well known. Opening up *SGSC* is clear evidence of a specific policy in the USA to promote all areas of the industry.

Japan and the USA are currently home to the two largest videogame industries in the world. Japan has also seen the release of videogames with serious purposes, such as *Dr. Kawashima's Brain Training: How Old is Your Brain?*, which had sold over 17 million copies worldwide by the end of 2007. Until very recently, Japanese developers did not seem to make any distinction between videogames and serious games. The term appears to have been imported from the USA, as can be seen on the American *Serious Game Initiative* website, which has a section entitled *Serious Game Japan*[10]. This move is undoubtedly an attempt to add credibility to the serious game industry by securing Japanese approval. The serious game industry is thus clearly marketed in an American way.

## 2.3.  Characteristics of a serious game

### 2.3.1.     What differentiates a serious game from a videogame?

Any videogame can be employed for practical benefits. *Warcraft III*[11] for example, could be said to be a reading aid, as players must be able to read and understand the different quests before completing them. *Pacman*[12] meanwhile, could be used to improve psychomotor response, as users must employ their dexterity by making a quick series of movements. With this approach, any number of videogames could be employed in such a way that adds a practical benefit to their purely recreational purpose. This raises a key question: if a serious game is based around a videogame and offers more than just entertainment, what real differences are there between serious games and videogames employed to achieve additional benefits?

The answer lies in their purpose. For the examples given above of *Warcraft* III and *Pacman*, the user sets a personal target mentally (or another person does) and intentionally employs them for cognitive benefits. With serious games however, the utilitarian aspect is incorporated right from the first design stages. This approach means the entire application is based around a utilitarian or educational scenario, twinned with a videogame base.

As such, serious games are characterised by the presence of this utilitarian/educational scenario, which distinguishes them from videogames where the practical benefit is added by the user after development.

It is also important to note that the utilitarian scenario must not exist simply in parallel with that of the game. The two scenarios must be combined coherently so that their respective objectives converge. The best way of achieving this is by having the videogame designers collaborate with people who work or have worked in whichever field the practical aspect relates to. This topic will be discussed in section 4.

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[10] http://www.anotherway.jp/seriousgamesjapan/
[11] Blizzard, 2002
[12] Namco, 1980

### 2.3.2.    What differentiates a serious game from an edugame?

Educational software programs can take on an entertainment aspect, as seen in the edugame genre, and serious games are designed around a videogame structure. As such, there appears to be a clear link between the two types of program.

The two are indeed very similar. However, as serious games are employed in a far wider range of areas (communications, health, museography, etc), edugames can be said to be a sub category of serious game.

### 2.3.3.    What differentiates a serious game from a simulation?

Simulations are defined as "software games", and offer a "world" where detail is extremely important. In the same way as serious games, they often present a message, with *The Sims*[13] embodying North American consumerist values: the wealthier a player, the more friends he makes.



Left: The Sims 2, EA/Maxis, 2004, right: *Flight Simulator*, *Microsoft*, 2004

Simulation games do not have clear objectives that allow the user to "win". For example, there are no precise goals in the first version of *Flight Simulator*[14]r. Users can simply fly around freely or set themselves an objective, such as flying underneath a certain bridge without crashing. As this objective is *set mentally*, it returns to the idea of adding an extra dimension to videogames that was discussed previously (cf. 2.3.1.). This approach can thus be differentiated from that of the serious game in the same way, as a utilitarian scenario is not actually integrated into the application.

However, simulation games can, like serious games, present certain messages. When a "serious" element is added to a gaming application, the program falls into one of two distinct genres:

1) Serious games based on videogames that present a *virtual world* with rules, and have a series of objectives integrated within the program. The latter defines these applications, and allow users to win,

2) Serious play based on simulation games that also present a *virtual world* with rules, but have no final objectives that allow the user to win.

The common bond between serious games and serious play is their *virtual world* and the way in which they can be used to transmit certain values. However, serious games involve an element of assessment and a closed frame of reference as a result of this, whereas serious play offers an open approach.

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[13] EA/Maxis, 2004
[14] Microsoft, 2004

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# 2.4. Serious gaming areas of application

Today, serious games are employed in a wide variety of sectors, including education, training, defence, health, simulation, communications, marketing, ergonomics, civil security, politics, religion, art, industry, museography, finance, sales, telemarketing, workplace safety, and career management.

Drawn up by research laboratories, institutions and businesses, this list is also far from exhaustive. As serious games are designed to offer more than pure entertainment, they can be employed in a vast number of areas. Below is a selection of sectors that employ serious games to a significant degree.

## 2.4.1. Defence

This is one of the biggest sectors for serious gaming. The American army actively supports the industry by commissioning "military games" such as *America's Army*, and in the USA, serious games are commonly associated with the army. Military applications have also been developed in Europe, though their use is not as widespread: one example is IPCA[15] by *Script'Games studio*.

## 2.4.2. Teaching and training

Edugames, when genuinely incorporating a videogame base, represent a sub-category of serious games. The industry is investing considerably in the education, training and e-learning markets, as can be seen by programmes such as the Education Arcade at *MIT* (Massachusetts Institute of Technology), which specializes in serious game projects[16] and has seen the development of *Labyrinth*, *Revolution*, *Supercharged* and more. According to *IDC*, 40% of the American e-learning market will employ serious gaming in 2008. As such, the teaching and training sector is particularly important for the serious game market.

## 2.4.3. Advertising

Serious games designed for advertising purposes allow advertisers to continually promote a particular brand or product to users while they play the game. The approach is usually used to complement other e-commerce tools, in the same way as the *Playmobil*[17] website. In the USA alone, advergaming is said to be worth 262 million USD in 2008. The market thus represents up to a fifth of the global serious gaming industry.

## 2.4.4. Information and communications

Serious games can be used to transmit messages and information in a wide variety of areas, such as to promote industrial careers in *Technocity*[18], publicise sexually transmitted diseases (STDs) in *Interactive Nights Out*[19], highlight humanitarian problems in *Food Force*[20], and criticise geopolitical conflicts in *Darfur is Dying*[21]. This sector is often combined with that of advertising in the form of viral marketing or edumarket games. Though details on the information sector market are anecdotal for the time being, advertising-linked communication titles are playing an increasingly significant role in the in-game advertising market, an industry estimated to be worth 205 million USD in the USA (2008). *Marketer.com* expects this figure to have risen to 650 million USD by 2012. This subject will be discussed further in sections 3 and 4.

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[15] http://www.scriptgames.net/sgs/ipca.php
[16] http://www.educationarcade.org/projects
[17] www.playmobil.de
[18] http://pedagogie.ac-toulouse.fr/technocity/Technocity.swf
[19] http://www.willinteractive.com/interactive-nights-out-1
[20] http://www.food-force.com
[21] http://www.darfurisdying.com
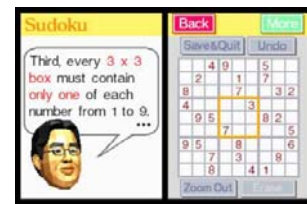
## 2.4.5.    Health

Serious games dedicated to the health sector aim to improve users' mental and physical abilities.



*Escape from DIAB*, Archimage, 2006



*Re-Mission*, *HopeLab*, 2006,



*Dr Kawashima's Brain Training: How Old Is Your Brain?* (*Nintendo DS* version), *Nintendo*, 2005

One of the leading titles in the field is *Dr Kawashima's Brain Training: How Old Is Your Brain,* which evaluates the age of users' brains by having them carry out a range of exercises (including multiple choice questionnaires, sudoku, and observation games), and allows them to maintain or improve their cognitive performance.

According to *Nintendo*, the application's publisher, *Wii Fitness* helps users stimulate their heart rate, improve balance, strengthen muscles and more. The brain fitness market is currently thriving; in 2007, it generated 227 million USD in the USA alone – a similar figure to that of in-game advertising.

There are also a number of less well-known applications developed in research projects with hospitals. One example of this is *Projet Autisme* (*Autism Project*) targeted at autistic children. Many experts in serious games, including Ben Sawyer, expect significant growth in the health sector over the next few years.

## 2.4.6.    Culture

Many museums are looking for fun ways to engage visitors and attract a wider audience, as can be seen with the edumarket game *Launchball*[22]. The applications found in these institutions are usually run on dedicated or ubiquitous systems, in the manner of *Wallstone* (section 5.1.4), which will be discussed later.

Industrial and cultural tourism in hostile (nuclear, toxic, etc.) or fragile (ecosystems, old monuments) environments is another area where serious games are employed. The virtual environment lets users discover sites without any negative consequences, with one example being the system developed by the Institut de Recherche Informatique de Toulouse (IRIT, Toulouse Information Technology Research Institute) for the Gargas Caves[23].

Economically, this sector currently only accounts for a minor portion of the serious game industry, though it is very likely that it will develop over the years to come.

## 2.4.7.    Activism

This sector includes all serious games that express a political, religious or environmental message. To maximize effectiveness, these titles often reverse traditional videogame structures, with players having to lose in order to win, or protect the enemy, as in *Antiwar Game*[24]. With the exception of a handful of productions such as the *Howard Dean for Iowa Game*[25], the activism sector is unique in that it does not follow traditional economic models: the games are almost always made without any financial backing and have the sole objective of putting across a particular message. Examples include *NewYork Defender*[26], dedicated to the 9/11 attacks, and *Madrid*[27], which focuses on those of 11 March 2004.

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[22] http://www.sciencemuseum.org.uk/launchpad/launchball
[23] http://dehais.perso.enseeiht.fr/docs/dehais_euromedia07.pdf
[24] http://www.antiwargame.org
[25] http://www.deanforamericagame.com
[26] http://www.ebaumsworld.com/games/play/784
[27] http://www.newsgaming.com/games/madrid/

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# 3.    Content and target audiences

## 3.1.  The contents of a serious game

### 3.1.1.    The market

The serious game market is currently experiencing huge growth, and it is highly like that this will continue, with the industry establishing itself over the long-term. This forecast is underlined by the following three indicators:

- The number of sectors where serious games are employed is growing.
- The serious game industry is closely linked to that of videogames, which regularly grows despite cyclical downturns before new technology emerges.
- Videogames are now a significant part of our culture. As the first generations to play them get older, videogames will increasingly be employed in adult training.

For the time being, the serious game market can be divided into three major segments:

- B2B: this segment is made up of serious games developed by public or private bodies on behalf of other companies. *Pulse!* Is an example here, which was developed by a business for use in training.
- B2C: this segment features serious games developed by public or private bodies that are marketed to the general public, such as *Versailles Mysteries, Oscar and the Athanor* or *Global Conflict Palestine.*
- B2B2C: this segment takes in serious games developed by private or public bodies on behalf of other organisations, who then distribute them to the general public. Examples include *Food Force,* developed by *UbiSoft* for the United Nations, which distributed the application to the public.

### 3.1.2.    Products

By analysing their principal purposes, serious games can be classed into one of three wide-ranging categories:

- **Message-based serious games**: aim to deliver a specific message in an educational (edugame), informative (informative videogame), or persuasive (advergame and activist videogames) fashion.
- **Training serious games**: aim to improve users' cognitive/motor skills.
- **Simulation or serious play serious games**: do not aim to test or evaluate users, and offer a wide variety of potential uses.

#### Message-based serious games

A number of sub-categories exist in this genre, depending on the nature of the message:

##### *Educational videogames or edugames*

Edugames aim to teach users information in an enjoyable way. An example here is *Revolution,* developed by *MIT* as part of their *The Education Arcade* programme, which helps teenagers learn about the American War of Independence. The game offers a variety of storylines, with political, social and economic aspects, and is based on the *Neverwinter Night*[28] (a role-playing game) engine.

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[28] Bioware, 2002: http://nwn.bioware.com/about/description.html?chl=fr&

*Revolution*, *MIT*, *The Education Arcade*, 2004

### *Advertising videogames or advergames*

Advergames often employ gameplay elements of established videogames to produce an advertising tool. The idea is that users do not have to worry about learning to play the game, and can concentrate on the application's graphics and sounds, which feature various products and/or brands. This is the case in *Ponkey Bong*[29]*,* a game that promotes the *Parker & Badger* comic strip characters (produced by *Dupuis* publishers) and is openly based around *Donkey Kong*[30].




*Ponkey Bong*, *Editions Dupuis*/Ja.games, 2003            *Donkey Kong*, *Nintendo*, 1981

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[29] Dupuis/Ja.Games, 2003: http://www.spirou.com/jeux/j_p&b_ponkey.html
[30] *Nintendo*, 1981

### *Informative videogames*

This subcategory features games that set out to inform users of a message, or to increase awareness of an issue, often social in nature. *Earthquake in Zipland*[31] for example, is structured like an adventure game and teaches children about divorce, while getting them to express their feelings on the subject. *Ditto's keep safe adventure!*[32] is another adventure game for children, and aims to increase their awareness of the dangers of paedophiles. Informative games tackle environmental issues too, with *Water Busters!*[33] focusing on the importance of saving water, by having users track down all the sources of water in a house within a specific timeframe.



*Earthquake in Zipland, Zipland Interactive*, 2006,



*Ditto's keep safe adventure!, Bravehearts Inc*, 2007,



*Water Busters!, Home Water Conservation*, 2006

Major companies are also concentrating on environmental issues, as can be seen by supermarket chain *E. Leclerc's* serious game: *Joue avec les p'tits repères* (*Play with little markers*).

*Edumarket games* mix marketing elements with an informative or educational approach. They combine a variety of types of message, e.g. advertising and educational, political and informative, activism and educational.



*Joue avec les p'tits repères*, E.Leclerc, 2005 – 2008

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[31] http://www.ziplandinteractive.com/
[32] http://www.ditto.com.au
[33] http://www2.seattle.gov/util/waterbusters

### *Activist videogames*

These serious games express political, religious or military-related messages. *Darfur is dying*[34] focuses on the geopolitical problems of Darfur, while *McDonald's Videogame*[35] attacks the way in which the American fast-food company exploits staff and damages farming practices by employing genetically-modified foods.



*Darfur is dying*, *MTV Networks On Campus Inc*, 2005



*McDonald's Videogame*, *Molleindustria*, 2006

## Training serious games

Titles in this category offer a simulated system where users are asked to meet specific objects to be evaluated. The idea is that this helps users improve their psychomotor or cognitive skills.

In *Pulse!* users must diagnose patients and give them appropriate care. The simulated environment in this case is that of a hospital operating room.

In other sectors, *Rail Simulator* is made up of a series of missions where users drive and manage trains. *Seer BAT game,* meanwhile, was developed by *PixeLearning* as a professional training title for English firm *Seer Limited,* which specializes in international commercial transactions. The application helps users develop their skills in managing international sales.



*Pulse!*, *Break Away*/Texas A&M University-Corpus Christi, 2007



*Rail Simulator*, Electronic Arts, 2007



*Seer BAT game*, *PixeLearning*, 2005

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[34] http://www.darfurisdying.com
[35] http://www.mcvideogame.com

## Simulation or serious play serious games

This last category is made up of serious games that do not attempt to evaluate users. The only framework to these titles is the world they are set in or the system that is simulated, and the way in which players can interact with this. Users or tutors are thus free to develop their own scenarios and personal objectives. Serious play can be used to train staff or to transmit messages, as in *September the 12th*[36]*.* This title portrays a town in the Middle East filled with inhabitants – among these are some terrorists, armed with guns. Users control a cross-hair on the screen and can decide to launch a missile at any moment. However, there is a delay of a few seconds between the order being given and the missile actually being launched, allowing the terrorists to escape to a safe place. When it explodes, the missile thus misses its intended target completely and creates collateral damage. The relatives of the victims then mourn their loved ones and transform into terrorists themselves. If users repeat the operation, the town soon swarms with terrorists. However, at no point does the application judge or assess performance. Users can also choose not to interact, in which case, the town gradually returns to its original state. The program's designers thus wish to put the message across that *"violence only leads to more violence"*

In another field, *Phun*[37]*,* developed by Umeå University in Sweden, allows children to experiment with the laws of physics by designing and structuring their own elements. Users select physical properties via drop-down menus, and can trigger a series of events. *Phun* could also be considered a type of simulation. The boundary between serious play titles and simulation applications is often very blurred, and formally, there is no difference – the only way they are distinguished appears to be in terms of marketing.



*September the 12th*, News gaming, 2003
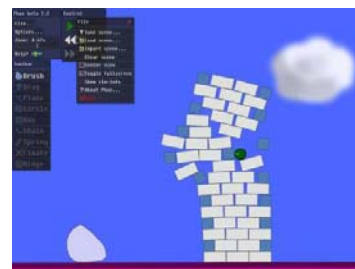


*Phun*, Umeå University, 2007

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[36] http://www.newsgaming.com/games/index12.htm
[37] http://www.phun.at

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# 3.2.  Serious game target audiences

## 3.2.1.    Potential users

IDATE estimates that in 2008, there are between 600 million and 1 billion potential users worldwide. As well as consumers who download games or spend money on them, this figure also includes people who play applications that are already installed on systems when they buy them.

The current average age of the 23.2 million French people who play videogames is 25 (see figure below).

**Figure 1: Distribution of players according to age in December 2007**



Over 24/Under 15/Age 15-24
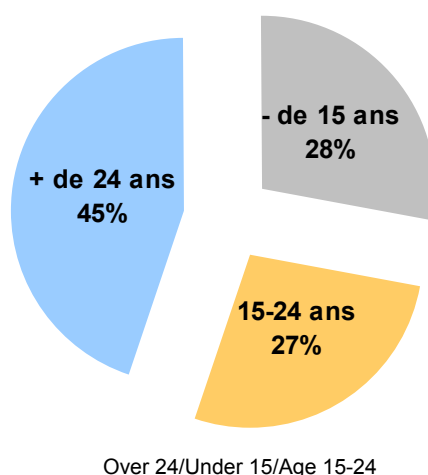
Source: TNS Sofres, December 2007

Breaking down players by age group can serve as a useful initial indicator of different potential user groups for videogame-based applications. These age groups can be further analysed as follows:

- **Under 15s**

From 4 or 5 years old, children are able to identify if an application genuinely offers a gameplay element, or whether the recreation aspect is a simple facade. From 5 or 6, many children can copy URLs of game sites seen on TV shows or printed materials into web browsers. From 6 or 7, they are able to move about in real time 3D environments, with some starting to play FPSs (first-person shooter) and RTSs (real-time strategy) with their elder brothers and sisters. As such, a game-playing culture develops among children at an increasingly younger age, with youngsters soon learning how games operate. Nowadays, some children bemoan the absence of interactivity with their television, and prefer to play on game consoles or computers. Below 9 or 10 years old however, children often need to have an older person present for technical guidance. As regards serious games in the domestic environment, children will tend to ignore titles with a practical, utilitarian element, in favour of pure entertainment, except where the applications feature an attractive brand or license. As a result, the presence of an adult or suitable framework is often necessary if children are to employ serious games correctly. The economic viability of the *Mobiclic* (7-13 year olds) and *Toboclic*[38] (4-7 year olds) edugame CD-ROMs, which have sold around 20,000 to 30,000 copies a month in France, Belgium and Switzerland since first launched in March 1998 and October 2000 respectively, is largely a result of the school environment in which they are distributed.

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[38] Editions *Milan*, mars 1998-2008

- **15 to 24-year-olds**

As the target audience gets older, consumers become increasingly demanding in terms of videogame quality. For 15 to 24-year-olds, this means titles with gameplay or graphics that fall below their expectations are rejected. The group, and particularly boys, use AAA[39] videogames as their frame of reference here, where budgets far outstrip those available for serious games, especially in Europe. Furthermore, in the domestic environment, serious games must compete directly with pure entertainment titles, usually on the three main consoles. In this case, a serious game's utilitarian aspect, which is associated with effort, can limit popularity. However, these obstacles can be removed in the 15-24 age bracket if serious games are employed in a suitable context, such as for teaching or training, or in a domestic environment if they can offer a level of enjoyment equivalent to pure entertainment titles. As a result of this, casual games, which require smaller budgets and are very popular with the target audience, are worth focusing on to achieve success with the 15-24 year old market. (cf. 5.3.2).

- **Over 24s**

Between the ages of 24 and 55, the amount of time people spend playing videogames decreases with age. For 25 to 35-year-olds, the emergence of professional and family obligations is one of the main reasons for this, and this age group only represents around 17% of total gamers (a full 10 points less than the 15-24 age group). The remaining 25% of gamers are found above the age of 35, with games used increasingly infrequently as people approach 55. Members of this age group face the same commitments as those between 25 and 35, though other factors are also responsible for the reduction – one of these if the fact that this generation was not exposed to videogames in their childhood and are thus less interested. Paradoxically however, the game-playing audience starts to grow again above the age of 55, when people have more time on their hands. Many thus begin to discover the world of IT, with the majority of this group playing card games on their own, such as casual game *Freecell*[40], supplied as standard with *Microsoft Windows*. Seniors will also show an interest in videogames in order to establish a link with their grandchildren. Companies such as *Némopolis* develop their products with this dynamic in mind, and produce historical edugames that are twinned with a book: the grandparents read the book and the children play the game, thus forming a bond.

It should also be noted that serious games can be found in retirement homes to help stimulate older individuals. An example of this is the *Riderwood* (Maryland) residence, owned by the American *Erickson* group, where Wii consoles have been fitted as of 2006. French firm *SBT* is also investing in this sector, and has developed the *Happyneuron*[41] portal, which offers a variety of serious games to stimulate the brain in terms of memory, language and spatial perception. The overall winner of the Lépine 2008 competition was also a simplified IT interface, known as "*Magui*", which was designed especially for older people and offers several games.



| *Pong*, *Atari*, 1972 | *Freecell*, *Microsoft*, 1995 version | "*Magui*", Fabrice Guiraud, 2008 |

Serious games are thus enjoyed by all age groups, though most success is enjoyed among people who have grown up with videogames.

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[39] AAA: term designating video games with major financial backing, similar to big-budget blockbuster films.
[40] *Microsoft*, 1990-2008
[41] http://www.happyneuron.fr

## 3.2.2.    Potential backers

### Defence

The main funder of serious games at present is the American army, and by extension, the American government, which is behind major productions such as *America's Army* and *NTE[42]*. The organization also supports *SGSC* and other competitions, as well as serious games that have no military application: *Pulse!* the medical training serious game discussed previously, was financed by the American navy via a federal grant worth 7 million EUR. The NSA has also financed its own serious game, *Ground Truth*, where users must inform the public about how to react to natural disasters and terrorist attacks.

In France, on a much smaller scale, the *Paraschool* company (*Editis* group) was contracted to produce a defence-related serious game. Known as *Mission Défense*[43] *(Defence Mission)*, the game was developed to teach school pupils about the different missions the French army carries out. *Script'game studio* has also developed several training applications such as *INSTINCT* and *IPCA,* which are used by the armed forces.

In a similar field, *TruSim* in the UK recently developed *Interactive Trauma Trainer* (*ITT*) for military doctors.



*Mission Défense*, *Paraschool*          *IPCA*, *Script'Game Studios*          *Interactve Trauma-Trainer* (*ITT*), *TruSim*

### Politics

Disregarding serious games produced for free by activists (e.g. *José Bové: le jeu*[44] "José Bové: the game"), the political sector also funds the development of serious games. Howard Dean employed the technology for his campaign in 2004, when attempting to win the Democratic presidential nomination. The strategy was also used back in 2001 in France, by Philippe Douste-Blazy when running to be mayor of Toulouse.



*José Bové: le jeu !*, *Pro-M*, 2003          The *Howard Dean for Iowa Game*, 2004          Untitled serious game produced for Philippe Douste-Blazy's campaign to be Toulouse mayor, 2001
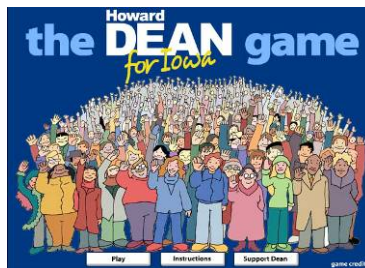
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[42] http://nte.navy.com/
[43] http://www.mission-defense.defense.gouv.fr
[44] http://www.la-vache-folle.com

Political parties also employ edumarket games (cf. informative videogames) to tackle social issues and to associate their name with them. *Constitution, the game* was developed by *Red Division*[45] for French party *UDF* to educate young people about the European community. Similarly, *Cyber-budget*[46], developed by *Paraschool*, was commissioned by Jean-François Copé, then minister for the budget, public accounts and public office, to illustrate how public finances are managed.

However, it remains to be seen whether these titles are mere exceptions. None of the French political parties have commissioned a serious game since 2006.

## Businesses and private institutions

Serious games commissioned by businesses and private institutions are either produced for professional training or communication purposes. The latter is made up of advergames and edumarket games, and often sees communications agencies acting as a link between the company and the development studio. When producing training programs, businesses contact developers who are able to add an educational dimension to serious games. *Daesign* is one such studio, and developed *Ava formation*[47] *(Ava Training),* a program that simulates interviews, for companies including *Axa insurance*, *BNP-Paribas*, *Orange* and *SFR*.

## Public institutions

Message-based serious games and training serious games are also commissioned by public institutions. In 2003 in Italy, for example, the department of justice funded *Incident Commander*[48], a serious game focused on civil security. More recently, the Science Museum in London commissioned several games to attract younger visitors[49], while there are numerous examples in France. These include *Ecoville*[50] *(Ecotown)* and *Réflexe planétaire*[51] *(Planetary reflex)*, developed for *Ademe (*the environment and energy agency), as well as edumarket game *Technocity*[52], commissioned by the Toulouse education authority in 2005 to promote industrial study courses among school pupils. Hospitals, universities, educational establishments, cultural centres and community organizations in a number of western countries are similarly interested in serious gaming. In fact, public institutions, including charitable associations and private/public foundations, appear to represent one of the most significant groups of serious game commissioners on today's market.

## Publishers

Whether linked to videogames, edugames or any other market, publishers internationally represent an important sector in terms of potential serious game backers. They can call on a wide range of development studios, and have been responsible for titles such as *Space Station: SIM*[53] (a game dedicated to space missions), *Warning code de la route*[54] (*Warning: Highway Code,* designed to teach people the Highway Code) and *Les Monstronautes à Collectiville*[55] (*Monstronauts in Collectiville,* which focuses on waste treatment).

The wealth of different areas in which serious games can be employed means that it is highly likely that a selection of publishers will emerge over time who position themselves in different sectors of the market. As such, some serious games publishers will specialize in biotechnologies, while others concentrate on aeronautics, or health, etc. One current example of this is Alfamultimedia, a Spanish publisher that operates in the medical field[56].

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[45] http://www.reddivision.fr/businessgame_politique.php
[46] http://www.cyber-budget.fr
[47] http://www.avaformation.com
[48] http://www.incidentcommander.net/
[49] http://www.sciencemuseum.org.uk/launchpad/launchball/
[50] http://www.ademe.fr/particuliers/jeu2/ADEME/sommaire.html
[51] http://www.ademe.fr/particuliers/jeux_2006/REFLEXE_PLANETAIRE/sommaire.html
[52] http://pedagogie.ac-toulouse.fr/technocity/Technocity.swf
[53] http://www.spacestationsim.com/
[54] http://www.atari.com/pc/warning-618.html
[55] http://www.interaction-production.com/demo.htm
[56] http://www.alfamultimedia.com/en/index.html

# 3.3.  The lifespan of a serious game

It is important to distinguish between the idea of "lifespan" and "usage time". The latter refers to the average amount of time a user spends on an application before closing it down to do something else. Of course, the user may then decide to return to it later on: as such, the application has not yet reached the end of its lifespan. This occurs when the number of potential users becomes negligible. However, when a product reaches the end of its lifespan, there are opportunities to revamp or relaunch it, as can be seen with *Pacman*, a title that was first released in the early 80s. Since then, a series of revamped versions have been released, including *Ms Pacman*, *Pacman plus*, *Baby Pacman*, *Professor Pacman*, *3D Pacman*, and *Pacman Championship Edition*, with the latter appearing in June 2007. When a game is relaunched, the same title is released on new platforms: *Pacman*, which was originally released as an arcade game, has thus been ported onto game consoles, computers, mobile phones and the internet. Each of these ports leads to a surge of interest from the public, though if the approach is to be successful, the original title must have been popular from the outset.

## 3.3.1.  Three key factors

To estimate the lifespan of a serious game, three key factors must be taken into account: the freshness, interest and richness of the application's content.

* **Freshness** is linked to the novelty of the serious game's content. If the title focuses on a contemporary issue, it will come to the end of its lifespan when the topic/event becomes obsolete. Thus, *Constitution, the game,* discussed previously (cf. 3.2.2), reached the end of its lifespan as soon as France held its referendum on the European constitution in May 2005.

* **Interest** is the appeal the content holds among its users and its ability to form ties with the target audience. For example, a game that focuses on sporting events will hold more appeal among the general population than one that looks at the latest advances in science. Thus a serious game based on football will undoubtedly attract more people than one based on astrophysics.

* **Richness** refers to the quantity and quality of content included in the serious game. The greater these are, the longer the application's lifespan. However, though the idea of richness does combine to some extent with that of complexity, it is important to note that serious games can lose their appeal if they are overly complicated.

## 3.3.2.  Multi-user serious games

If the serious game is distributed online and features a multi-user structure, its usage time can stretch to several hours, in the same way as a videogame of that type. In terms of its lifespan, a fourth factor must be added to those of freshness, interest and richness – the vitality of the community that uses the application. The only real example of this type of game is *America's Army*, which was first released on 4 July 2002, and to this day boasts a significant number of players.

## 3.3.3.  Serious games on CD-ROM and DVD

Serious games can also be distributed on CD-ROM and DVD, either through commercial or non-commercial channels. These supports are usually to the benefit of the richness of the content, though can also have a detrimental effect on its freshness. It is important to remember that these supports can be combined with an internet connection however, offering regular updates, and possibly even a multi-player element. With the rise of high-speed connections, the added value that was once seen in a physical support is becoming ever less significant. Some serious games, such as *Food Force*, are available both via the internet and on CD-ROM.

## 3.3.4.  Serious games on other supports

Serious games are also available on supports that are not traditionally associated with conventional computing. Mobile phones, multimedia units, and event systems and installations can all serve as serious game supports. Their usage time varies from a few minutes (checking a museum exhibition unit) to several hours (rally using mobile phones). The lifespans of these serious games are linked to the event they apply to. For permanent installations (museums, theme parks, industrial tourism, etc.) an update will usually be necessary every two or three years.

# 4.    The industry and the market

## 4.1.  Organization of the industry

The serious game industry is polymorphous as it groups together all the niches and markets that use videogames for purposes other than pure entertainment. As such, it includes companies who work in the fields of education (*Némopolis*, *Bayard*, *Milan*), marketing (*B2B*), industrial training (*Break Away*, *Daesign*), medical training (*Alfa multimédia*), health (*SBT*, *Nintendo*), and defence (*Script'Games studio*).

If serious games are considered as applications that combine a gameplay element with a utilitarian purpose, their horizontal production process can be divided between the following four phases:

- **Strategy**: this is the first phase and is characterized by two main issues:
    - The purpose: this relates to the marketing approach to be employed. What is the aim? What is the context? What is the objective? Which business model is to be followed? This determines the type of serious game that will be produced: i.e. advergame, edugame, edumarket game, etc.
    - The resources: this refers to the means available to carry out the project. Financial resources, staffing, authors' rights, licenses and patents must all be considered here.

- **Design**: serious games are created around two major areas:
    - Game design: the controls, rules, spatial and temporal structures, and the plot of the videogame base of the serious game must all be defined.
    - Content: multimedia (text, animations, video sequences, etc.) relating to the utilitarian dimension must also be decided upon.

- **Development**: once the key aspects of the serious game have been defined, it is then ready to enter the development phase. This involves constructing and sometimes creating the system it will operate in. There are two key areas here:
    - Technical development: this involves the programming, integration and testing phases, carried out on the following two environments:
        - Hardware: this concerns the electronic systems, IT devices, digital networks, etc. that the serious game will run on;
        - Software: the hardware must receive commands from IT programs, while the serious game can also make database-type requests. Development software and sometimes middleware (whether proprietary or not) is also necessary to produce the title.
    - Artistic development: each serious game features its own environment and interactive sequences. Resources are thus required to develop the following two aspects:
        - Graphics and sound: computer graphic artists, 3D modellers, musicians, and actors are just some of the artistic resources involved in the development of a serious game;
        - Level design: the videogame aspect of a serious game is usually divided into several different levels. Each one of these requires its own scenario and testing, drawing on specific human resources.

- **Usage**: here, developers can test their serious game with a panel of users, to see what they think and if the objectives laid out in the strategy have been achieved. When organising the tests, two major issues must be considered:
    - The profile of the testers: their culture, whether they are alone or in a group, their age, their sex, and their knowledge of videogames, are just some of the aspects to bear in mind when evaluating the pertinence of a serious game with a panel of testers.
    - The context of the test: this concerns the manner and the environment that the serious game is used in. There may be a major difference between the test site and the place in which the serious game will actually be employed, which can have a major impact on the effectiveness of the operation. The following questions must thus be asked: is this the kind of location the serious game will be used in? Should a mediator be on hand to ensure users get the most out of the application? Have social interactions been taken into account that are relevant to the use of the serious game?

# 4.1.1.    The serious game industry value chain

The serious game industry value chain is similar to that of a videogame. However, it features an additional link – "serious game dimension developer". This refers to the designers, publishers and developers who have a thorough understanding of the practical purpose of the application, be that related to education, communications, politics, health, etc.

**Figure 2: The serious game value chain**
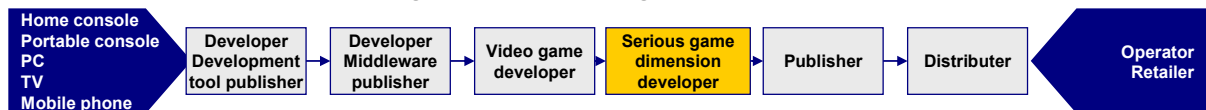


Source: IDATE

Horizontally, the following parties are involved in the value chain:
- Development tool suppliers,
- Technology and middleware suppliers,
- Videogame developers,
- Serious game dimension developers,
- Serious game publishers,
- Serious game distributors and online serious game operators.

Vertically, the following parties are involved in the development and operation of the serious game's terminals or platform:
- Home console manufacturers,
- Portable console manufacturers,
- Electronic component suppliers,
- Mobile telecommunication operators,
- Interactive television content operators.

As the parties involved vertically are exactly the same as in the videogame value chain, this study only examines the horizontal aspect. This features three main groups: developers, publishers and distributors.

- **Developers**
  Serious game developers produce the content for serious games, or customize it according to the B2B, B2C or B2B2C sectors. Currently in the USA and Europe, these tend to be SMEs or VSEs/freelancers, and – except for *BreakAway Games* in the USA – none of the major videogame companies have as yet clearly positioned themselves in the sector. This contrasts starkly with Japan, where several major players, including *Nintendo*, *Square Enix*, and *Sony,* have already invested heavily in the serious game market.

- **Publishers**
  Publishers cover the costs involved in marketing and packaging serious games, both for physical and electronic sales. This group also includes developers/publishers who produce their own titles internally. *Nintendo* is one such example, and produces *Wii Fit*, a serious game that helps users improve their physical condition via videogame applications.

- **Distributors**
  Serious games often do not follow traditional retailer-based distribution models – the American army and the NSA for example, distribute their products directly to the public. Distribution may also not be directed at the general public (B2C segment), with *Pepsi Invaders* (1982) for example, distributed internally to staff at *Coca-Cola*.

The following table identifies companies involved in serious gaming around the world, specifying their geographical location, their areas of specialization, their leading products, and whether they act as a developer (Dev), publisher (Pub) or distributor (Dis) (the latter can be physical or electronic, internal or external). Note that some of these organizations may be unaware that they are involved in the serious gaming market.

| Name of structure | Country | Areas | Leading products | Dev | Pub | Dis |
|---|---|---|---|---|---|---|
| 3D2+ | France | Virtual communities | Kidnet | x | x | x |
| 3DSolve | USA | Simulation | America's Army | x | | |
| Actiplay | France | Communications/ Education | Chocapic, Carrefour.fr | x | | |
| AD-Invaders | France | Communications/ Simulation | Toyota Auris | x | | |
| Alatrace | France | Education | Lemo | x | x | x |
| Alelo-TLT | USA | Education | Tactical Language & Culture | x | x | x |
| Alfa Multimédia | Spain | Education/ Communications | Evra | x | x | x |
| Anuman Interactive | France | Videogames/ Education/ Utilitarian | Tout savoir, Warning code de la route | | x | |
| Archimage | USA | Videogames/ Education | Infection - Nanoswarm: Invasion from Inner Space | x | | |
| Atari | Europe + USA + Japan | Videogames/ Education | Tout savoir, E=M6 défi cérébral, Warning code de la route | x | x | |
| B2B | France | Communications | Kellog's open kart… | x | x | x |
| Besier 3D Edutainment | Germany | Education/ Simulation | 3D Driving School | x | x | x |
| BBN Technologies | USA | Military | Darwars Ambush! | X | | |
| Beneese | Japan | Education | Tanoshiku Mainichi Bunsyouyomi Training | x | x | |
| Bip Media | France | Communications/ Education/ Health | Ma ferme 3D, Brain Coaching | x | | |
| Blue Label Intertainment | Italy | Videogames/ Education | Q.I. Quiz | | x | |
| BlitzGames Studio | United Kingdom | Videogames/ Communications | PoketBike Racer (Burger King) | x | | |
| Bohemia Interactive Australia (BIA) | Australia | Military | VBS1, VBS2 | x | | |
| BraveHearts | Australia | Education | Ditto's Keep Safe adventure! | x | x | x |
| BreakAway games | USA. | Communications/ Education | Pulse! | x. | x. | |
| BT Group | United Kingdom | Education/ Simulation | Better Business Game | x | x | x |
| C4M Prod | France | Videogames/ Communications | Nike: kiss the ball | x | | |
| Capcom | Japan | Videogames/ Education | Kabu Trader Shun | x | x | x |

| Name of structure | Country | Areas | Leading products | Dev | Pub | Dis |
|---|---|---|---|---|---|---|
| *Caspian Learning* | United Kingdom | Education/ Simulation | *Volvo Sales Force Training…* | x | | |
| *Chrysis* | France | Education | *5, rue Sésame* | | x | x |
| *Cisco Systems* | USA | Education | *The Binary Game* | x | x | x |
| *Cornelsen* | Germany | Education | *Genius* | | x | |
| *Creative Patterns* | France | Videogames | *Building & co* | x | | |
| *D3 Publisher* | Japan | Videogames/ Education | *THE Eye Training to be smart* | x | x | |
| *Daesign* | France | Education | *Ava formation* | x | | |
| *DarkSkyne* | France | Videogames/ Communications | *The Last City of Heaven* | x | | |
| *DESQ* | United Kingdom | Education | *Life quest, Skillswise* | x | | |
| *Digitalmill* | USA | Communications/ Education | *Virtual U* | x | | |
| *Discovery Software* | United Kingdom | Education/ Simulation | *FloodRanger* | x | x | x |
| *Dorasu* | Japan | Simulation | *Raku Raku Shiatsu Navi* | x | x | |
| *Dupuis Ed. (Dargaud)* | Belgium | Communications | *Spirou.com* | x | x | x |
| *Education Arcade* | USA | Education | *Revolution* | x | x | x |
| *Electronic Arts* | USA | Education/ Videogames/ Simulation | *Sommelier DS, The Sims, Rail Simulator* | x | x | x |
| *EMME* | Europe + USA | Education/ Culture | *Boowa et Kwala* | | x | x |
| *Enspire Learning* | USA | Education | *Rise of the Shadow Specters* | x | x | |
| *Erebus Interactive* | France | Education | *Planksters, le trésor des indiens* | x | x | |
| *e-TF1* | France | Communications | *Tfou.fr, Ptifou.fr* | x | x | x |
| *Forterra Systems INC* | USA | Simulation | *OLIVE* | x | x | |
| *Gakken* | Japan | Education | *Eiken Oh* | x | x | |
| *Game2Train* | USA | Education | *The challenge* | x | x | |
| *Gameloft* | France | Videogames/ Communications/ Education | *Brain Challenge* | x | x | |
| *Gargul Studio* | France | Videogames/ Communications | *Simbad, Quest* | x | x | |
| *Génération 5* | France | Education | *7 épreuves de Kstet* | x. | x | x |
| *Globz* | France | Videogames/ Communications | *Kid Bike* | x | x | |
| *HopeLab* | USA | Education | *Re-Mission* | x | x | x |
| *IBM* | USA | Communications/ Education | *PowerUp* | x | x | x |
| *Idealys* | France | Communications | *Bushnell* | x | | |
| *IE Institute* | Japan | Videogames/ Education | *Master of Illusion, TOEIC test* | x | x | |
| *ImaginEngine (Foundation 9 Entertainment)* | USA | Videogames/ Education | *Alphabet Circus* | x | x | |
| *ImpactGames* | USA | Communications/ Education | *PeaceMaker* | x | x | |

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| Name of structure | Country | Areas | Leading products | Dev | Pub | Dis |
|---|---|---|---|---|---|---|
| *Institute For Creative Technologies (ICT)* | USA | Education/ Simulation/ Military | *Full Spectrum Warrior* | x | | |
| *Interaction multimédia* | France | Communications/ Education | *Les Monstronautes à Collectiville* | x | x | x |
| *Interchannel-Holon* | Japan | Education | *Alc English Master* | x | x | |
| *Ja.Games* | France | Communications/ Education | *Technocity, Spirou.com* | x | x | |
| *Kellog Creek Software* | USA | Videogames/ Simulation | *Power Politics III* | x | | |
| *Koei* | Japan | Education | *Shaberu! DS Oryouri Navi Marugoto* | x | x | |
| *Konami* | Japan | Videogames/ Education | *Yumemihada: Dream Skincare* | x | x | |
| *Kuju Entertainment* | United Kingdom | Videogames/ Simulation | *Rail simulator* | x | | |
| *Kutoka* | Canada | Education | *Mia* | x | x | x |
| *Lateral visions* | United Kingdom | Simulation | *Engineering – Racing Academy* | x | | |
| *Le caillou* | France | Videogames/ Education | *Mission moto: jouez la sécurité* | x | | |
| *Les Tanukis* | France | Communications | | x | | |
| *Lexis numérique* | France | Videogames/ Communications | *Conduite 3D* | x | x | |
| *Linden Lab* | USA | Virtual communities | *Second Life* | x | x | x |
| *Magic Lantern* | United Kingdom | Videogames/ Simulation | *Brain Train* | x | x | x |
| *Melody Healthcare (Groupe Publicis)* | France | Communications | *Petites histoires de dents* | x | | |
| *Micro Application* | France | Videogames/ Education/ Utilitarian | *Conduite 3D* | | x | |
| *Microvision* | Japan | Education | *Vizimo* | x | x | x |
| *MIT Games-to-Teach program (Microsoft)* | USA | Education | *Environmental Science – "Environmental Detective"* | x | x | x |
| *Milan Ed. (Bayard)* | France | Education | *Mobiclic, Toboclic* | x | x | x |
| *Mindscape* | Australia, France, France, Netherlands, France | Videogames/ Education | *Les incollables* | x | x | |
| *Mindweavers (Oxford University)* | United Kingdom | Education | *Phonemena* | x | x | x |
| *Minerva Software (Cyberlore studios)* | Canada | Education/ Simulation | *Minerva* | x | x | |
| *Muzzy Lane Software* | USA | Videogames/ Education | *Making History* | x | x | x |
| *Mycom Games* | Japan | Videogames/ Education | *Proper Japanese DS* | x | x | |
| *Namco Bandai* | Japan | Videogames/ Education | *Wakabayasi Fumie No DS Kabu Lession* | x | x | |

| Name of structure | Country | Areas | Leading products | Dev | Pub | Dis |
|---|---|---|---|---|---|---|
| *National Geographic for kids (National Geographic society)* | USA | Education | *GeoBee Challenge, Xpeditions Hall, Bookmark Factory* | x | x | x |
| *Netdivision* | France | Communications | *L'Oréal, la Française des jeux…* | x | x | |
| *Némopolis* | France | Education | *Versailles Mysteries, Oscar and the Athanor* | x | x | x |
| *News Gaming* | USA + Uruguay | Information | *September the 12th* | x | x | x |
| *Nintendo* | Japan | Videogames/ Health | *Sight Training* | x | x | x |
| *Numicom* | France | Communications/ Education | *Majook* | x | | |
| *Onramp Arts* | USA | Education | *Tropical America* | x | x | x |
| *Ouat Entertainment* | France | Videogames/ Education | *Les incollables* | x | x | x |
| *Paraschool (groupe Editis)* | France | Education | *Mission défense* | x | | |
| *Persuasive games* | USA | Communications | *Fatworld* | x | | |
| *PixeLearning* | United Kingdom | Education/ Simulation | *LearningBeans* | x | x | x |
| *Planet Nemo Production* | France | Education | *Planet Nemo* | x | x | x |
| *Play2Learn* | Netherlands | Education | *NitroGenius, Splash* | x | | |
| *PlayGen* | United Kingdom | Education | *Nano Mission* | x | x | x |
| *Red redemption* | United Kingdom | Communications | *Climate Challenge* | x | | |
| *Rocket Company* | Japan | | *Sûken DS* | x | x | |
| *SBT* | France | Health | *Happyneuron* | x | x | x |
| *Script'Games studio* | France | Military | *INSTINCT, IPCA* | x | x | |
| *SEGA* | Japan | Videogames/ Education | *Shikaku Kentei DS* | x | x | x |
| *Serial Clicker* | France | Education | *Adiboud'Chou* | x | | |
| *Serious game agency* | Sweden | | | | | x |
| *Serious Games Interactive* | Denmark | Education | *Global conflict Palestine* | x | x | |
| *Square Enix* | Japan | Videogames/ Education | *DS Gardening Lite* | x | x | |
| *Smoby Interactive* | France | Education | *Mia* | x | x | x |
| *Sony* | Japan | Videogames/ Education | *Talkman* | x | x | x |
| *Spike* | Japan | Videogames/ Education | *Gotôchi Kentei DS* | x | x | |
| *Strass Productions* | France | Videogames | *Ushuaïa: à la poursuite des bio-trafiquants* | x | | |
| *Succubus Interactive* | France | Communications/ Education | *@doc Scanswao* | x | | |
| *Sumo-Digital (Foundation 9 Entertainment)* | USA | Education | *Zombie Division* | x | | |
| *Symetrix* | France | Education | *Société générale* | x | | |
| *Tabula Digita* | USA | Videogames/ Education | *DimensionM* | x | x | x |
| *Taito* | Japan | Videogames/ Education | *My Happy Manner Book* | x | x | |

| Name of structure | Country | Areas | Leading products | Dev | Pub | Dis |
|---|---|---|---|---|---|---|
| *Testaluna* | Italy | Communications/ Education/ Culture | *Pizza Hut* | x | x | x |
| *Tf1* | France | Communications/ Videogames/ Education | *Ushuaïa: à la poursuite des bio-trafiquants* | | x | x |
| *Kinetic Science (The American association for the advancement of science)* | USA | Education | *The car lab, Mission to Vearth !* | X | x | x |
| *The Fabrikmen* | France | Communications/ Simulation | *Peyragudes, Le Boardercross* | x | | |
| *The university of Southtern California* | USA | Education | *Mission Max* | x | x | x |
| *Tika* | France | Education | *ANASTASE* | x | x | |
| *TPLD* | United Kingdom | Education | *EduTeams, Gyst* | x. | x | x |
| *Transmedia Production* | USA | Education | *Objection !* | X | x | x |
| *Tribal Nova* | Canada | Videogames/ Education | *Kid-Studio* | | x | x |
| *Trois fois plus (3x+)* | France | Videogames/ Communications/ Education | *zoologie* | x | | |
| *TruSim (Blitz Games)* | United Kingdom | Military | *Interactive Trauma-trainer (ITT)* | x | | |
| *Tygron Serious Gaming* | Netherlands | Simulation | *Simport* | x | | |
| *UbiSoft* | France+France | Videogames/ Communications | *Food Force, Mon Coach Personnel: J'enrichis mon vocabulaire* | x | x | x |
| *Umeå university* | Sweden | Education/ Simulation | *Phun* | x | x | x |
| *Virtual Heroes* | USA | Military | *America's army* | x | | |
| *VirtuoFacto/Virtual IT* | France | Simulation | *SNCF* | x | | |
| *Vocabelum Inc* | France | Videogames/ Education | *LETTRIQ* | x | x | x |
| *VT MÄK* | USA | Military/ Simulation | *Battle Command 2010* | x | | |
| *Will Interactive* | USA | Education/ Military/ Health | *Gator Six, Generation Rx, Interactive Nights Out* | x | | |
| *Yamago* | France | Videogames/ Communications | *Advergames pour LEGO* | x | | |
| *Yudo* | Japan | Simulation | *Kenkou Kentei* | x | x | |
| *Zipland Interactive* | USA | Education | *Earthquake in Zipland* | x | x | x |

Source: IDATE

This table shows the organizations involved in the serious gaming value chain are distributed in a pyramidal fashion: 90% work in development, 55% publish titles, and 28% look after distribution.

In terms of positioning in the different market sectors, 60% of the companies featured here are involved in education, 37% in communications, 9% in simulation, 5% in defence, 3% in virtual communities and 2% in culture.

The figure below shows the backgrounds of the different companies involved in serious gaming.

**Figure 3: The various backgrounds of companies involved in the serious gaming market**
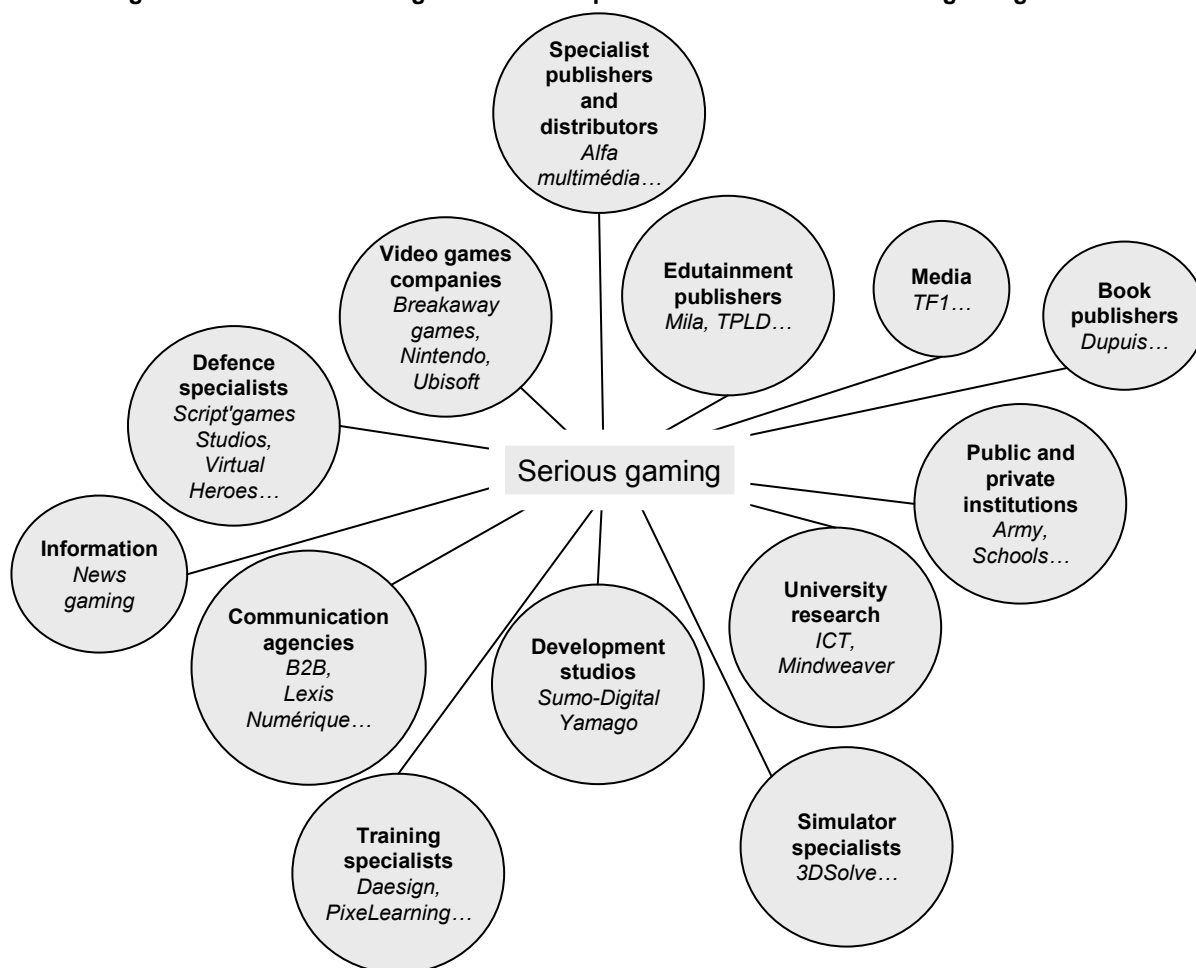


Specialist publishers and distributors / Edutainment publishers / Media / Book publishers / Public and private institutions / University research / Simulator specialists / Development studios / Training specialists / Communication agencies / Information / Defence specialists / Videogame companies

# 4.2.  The challenges involved in developing a serious game

Though specifying the usage context of a serious game distributed to the general public may not always be straightforward, creating a serious game clearly involves the development of both a pleasurable (*satisfaction*) and utilitarian (*efficiency*) dimension. If developers are to achieve this, they must tackle a range of challenges on both a human and technical level. This section discusses the most important issues they face.

## 4.2.1.  Combining utilitarian and videogame scenarios

Serious games feature a videogame base, with a *utilitarian* or *educational* scenario added on top. The objectives of these two components must tally, if the serious game is to be coherent and effective. For example, if the objective of a serious game is to educate young drivers as to the dangers of speeding, it would be counter-productive to produce a driving game where one of the challenges was to reach checkpoints as quickly as possible. The game should rather connect risk factors with speed: i.e. the faster users drive, the more likely they are to crash and lose the game. Ensuring the objectives of both the gameplay and utilitarian dimensions are fully coherent is no easy feat. In France, the *Ludoscience*[57] university research team is currently developing tools to help developers analyse and evaluate the pertinence of this relationship, which is essential to a serious game.

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[57] www.ludoscience.com

## 4.2.2.    Three ways of adding a utilitarian dimension

When developing a serious game, there are three different approaches for combining the videogame dimension with that of the utilitarian, each derived from advergaming: *associative*, *illustrative* and *demonstrative*[58].

- **Associative**: the application promotes a message via specific graphical or audio elements at the centre of the videogame world. *Velvet-Strike*[59] for example, lets users spray messages of peace on to the walls of the *Counter Strike* first-person shooter arena. A more traditional example of the approach can be seen by the advertising hoardings placed next to the track in *Pole Position* (cf. 2.2.2.).

- **Illustrative**: the application conveys a message by giving it an interactive dimension. However, in this case, the message remains incidental and is not a key part of the challenges included in the game. Examples here would be arcade game *Out Run*[60], or more recently, the *GTA IV*[61] videogame, where users can select their own radio station.

- **Demonstrative**: the application is completely dedicated to conveying a message or training users. The videogame base is thus specifically designed and developed with this in mind. Serious games such as *Darfur is dying* (discussed previously) and *Pulse!* (cf. 3.1.2.) both feature this approach, as every aspect of the gameplay is designed to denounce the situation in Darfur, and to teach emergency care techniques respectively.

The *associative*, *illustrative* and *demonstrative* approaches are increasingly significant to the utilitarian aspect of the game. The more immediate the utilitarian scenario, the more the application can clearly be defined a serious game, as can be seen below:
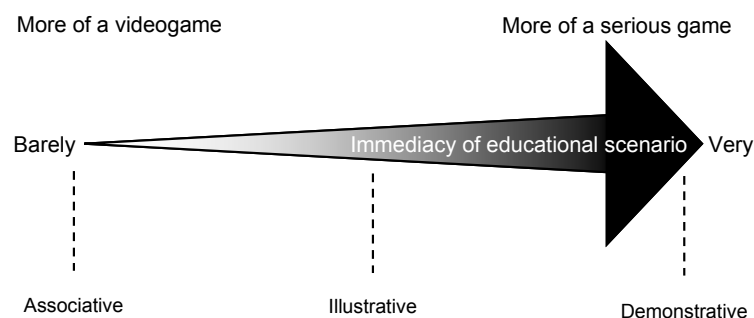


The less immediate the educational scenario, the more the videogame tends towards being a pure entertainment title. And the more immediate the scenario, the more it tends towards being a serious game.

## 4.2.3.    Gameplay: a key component of any serious game

When the demonstrative route is taken, it is the gameplay that provides the link between the videogame base and the utilitarian scenario. Gameplay can be defined by the following five points[62]:

1. *A set of rules*: this first point covers the rules of the game, the general and local objectives, and the action and freedom offered by the videogame world.

2. *Command modes*: this second point corresponds to the way in which the user interacts with the input interface, i.e. via keyboard, mouse, control pad, webcam, etc. The term "input interface" is different to that of "ouput interface", which designates the equipment that allows the user to perceive the videogame world, i.e. the screen, speakers, video projector, etc.

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[58] Terms proposed by Chen and Ringel, 2001
[59] http://www.opensorcery.net/velvet-strike
[60] Yu Suzuki /Sega, 1986
[61] GTA IV, Rockstar Games, 2008
[62] J.N. Portugal, 2006

3. **Spatial organisation**: all games take place in some sort of world and require spatial organisation, even if this is as minimalist as a simple block of colour, as for the card game *Freecell* (cf. 3.2.1.). Spatial organisation is generally classified within three major categories: 2D, isometric 3D and 3D. There are then subcategories according to the type of world the videogame offers, e.g. maze, platform, circuit, etc.

4. **Temporal organisation**: all games offer a timeframe of some description, even if there is no planned end, such as in *World of Warcraft* or *Simcity*. Temporal organisation can be realistic, as in *Desert Bus*[63], a game that gives players eight hours to drive a bus 500 km through the Nevada desert, or cinematographic, by using ellipsis, as in the majority of adventure games (e.g. *Monkey Island*[64], *Day of the Tentacle*[65], and *Phantasmagoria*[66]).

5. **Dramatic organisation**: this last point concerns the way in which the plot develops during the game. It can be predetermined, as in *Myst,* where the story is written in advance, or self-generating, as in *Facade*[67], where the story develops according to the user's choices within the game.

Thus when designing the utilitarian and entertainment aspects of a serious game, each of these points must be taken into consideration and be fully coherent.

## 4.2.4.    Testing

Designing a serious game can be a delicate process. Even if the videogame and utilitarian scenarios are fully coherent, this does not guarantee that the finished title will be a good one. One criterion is more important than all others if a game is to be a success – it must be fun to play. Ralph Koster believes that the human brain takes pleasure in playing as long as it identifies new game mechanisms necessary to win. Koster calls these mechanisms "patterns". If the patterns are too easily identifiable, users will quickly stop playing the game. This is what happens with noughts and crosses, for example – you quickly discover the different options and stop playing. However, if the patterns are overly complex, users may not be able to identify them, and may also stop playing the game. This is the case in certain puzzles. As such, good games have a manageable level of difficulty that lets users discover patterns but not too easily – this is why videogames usually become more difficult as they progress. However, each individual has a different sense of exactly what is fun, depending as much on subjective (user's cultural background, tastes, etc.) as objective (complexity of the challenges according to age, absence of feedback, etc.) criteria. It is thus important to assemble a panel of testers that represent the target audience. The tests carried out should analyse each of the five points that make up gameplay.

## 4.2.5.    The concept of game flow

A long and complicated phase during the development of a serious game is focused on finding a balance between the pleasure that playing the application brings, and the constraints that doing this places on the user. This balance plays a key role in the emergence of fun and is known as "game flow". The term "flow" was introduced by Hungarian psychologist Mihaly Csikszentmihalyi, and refers to: "*the state people enter into when completely absorbed by an activity that seems to matter above all else. When they forget about their surroundings and enjoy the task at hand, feeling a sense of pure pleasure while doing it.*" If a title is to offer this kind of experience, it must provide the following nine factors:

1. The task must be realistic, even if it represents a challenge that requires certain predispositions

2. It requires the user's attention

3. Its objective is clearly defined

4. Carrying it out offers immediate feedback

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[63] *Penn and Teller*, 1995

[64] *Lucas Art*, 1990

[65] *Lucas Art*, 1993

[66] *Sierra-On-Line*, 1995

[67] http://www.interactivestory.net

5. It induces total involvement where all effort is forgotten
6. It causes users to forget all everyday worries
7. It offers a feeling of control over the action
8. It reinforces the feeling of self
9. It alters the sense of time

To ensure serious games offer good *game flow*, the developers often employ an empirical approach made up of several different test phases. It is very difficult to accurately anticipate the duration of this development phase, and it can take longer than the time required to write the actual game engine. American company Blizzard, for example, spent several years developing the game flow of its real-time strategy games (RTSs) *Warcraft*[68] and *Starcraft*[69].

## 4.2.6.    Usability criteria

Game flow necessitates that users have the skills required to carry out the challenge offered by the serious game. In particular, this means that the application must be easy to employ, i.e. that the input and output interfaces (cf. 4.2.3) have been fully analysed in terms of usability and practicality. There are eight key criteria to take into account here[70]:

1. **Compatibility**: the content and the input and output interfaces of the serious game must be appropriate for the target users and usage contexts.
2. **Guidance**: the serious game must effectively guide users in what they should do when playing.
3. **Explicit controls**: the serious game must show users that their different commands have been responded to and provide suitable responses.
4. **Appropriate rules, denominations and behaviour**: the serious game must present content with appropriate frames of reference.
5. **Workload**: the serious game must feature an interface that facilitates the completion of tasks.
6. **Adaptability**: the serious game must be redefinable to some extent, so that it can be adapted to different user profiles and usage contexts.
7. **Homogeneity/coherence**: the serious game interface must form a coherent whole.
8. **Error management**: the serious game must allow users to avoid errors, and to easily correct them if they do make a mistake.

## 4.2.7.    Importance of the mediator

The use of a mediator is recommended to fully convey the utilitarian dimension of a serious game to users. This is because it the users who choose how to employ or interpret the application[71]. The mediator (also known as a tutor or mascot) acts as a guide and gives importance to the serious game's message or training function. The mediator can either be a person who is physically present with the user, a Wizard of Oz[72] style avatar, or be managed entirely by the computer with a degree of artificial intelligence (AI). Past experience in school contexts and cultural spaces has proven the importance of mediation in guiding users towards the utilitarian aspect of serious games. However, this approach is far from infallible: users can equally choose to ignore the mediator's recommendations[73].

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[68] Blizzard, 1995 - 2002
[69] Blizzard, 1998
[70] Criteria defined by academics Bastien and Scapin in 1993. In 2004, these criteria were adapted to virtual environments by Bach.
[71] Gonzalo Frasca, 2001
[72] A Wizard of Oz avatar is actually controlled by a human being (without the user's knowledge), and ensures users employ a system or application correctly.
[73] To find out more about the importance of the mediator role, see section of the thesis: Du jeu vidéo au serious game, approches culturelle, pragmatique et formelle (*From the videogame to the serious game, cultural pragmatic and formal approaches)*, by J. Alvarez, downloadable at: http://www.jeux-serieux.fr/wp-content/uploads/THESE_SG.pdf

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# 4.3. Serious game business models

Previously, three types of segment within the serious game industry were identified: B2B, B2C and B2B2C. The following section discusses the business models behind them.

## 4.3.1. The B2B segment

### The order-based model

Serious game *Pulse!*, discussed previously (cf. 3.1.2.) is one notable example of this business model. It is where a client (either a business, association, or public or private institution) hires a contractor (any type of business except a private individual) to design and develop a serious game. This product is for the exclusive use of the client, and can have a range of applications, such as in education, communications, health, etc. When drawing up the contract between the parties, the following issues need to be addressed:

- **Marketing approach**: what is the objective of the serious game? What is the target audience? What human or technical constraints need to be followed?
- **Scenario**: how is the utilitarian scenario of the serious game defined? What are the categories, options and content to be presented?
- **Design**: what is the serious game's gameplay? What are the rules of the game? What are the controls? What are the characteristics of the in-game world? How are the graphics and audio to be designed?
- **Tests**: which types of tests should be carried out to analyse the serious game from a technical, functional, and human standpoint? Who will assemble the different user/tester panels, and what criteria will they use?
- **Planning**: which tasks need to be carried out in the design and development of the serious game? How will these tasks be divided along the production chain? How much time should be assigned to each task? Which tasks can be carried out in parallel? What restricting factors are there? How can we best anticipate unforeseen problems?
- **Budget**: what budget will this kind of production require? Does the client have sufficient funds? If not, which options can be removed?
- **Aftersales service**: will the serious game require follow-up services after delivery? Are updates, modifications, localisations, etc. likely?
- **Legal**: what will happen if production times are not met, or if the client does not provide the necessary data or resources in good time? What recourses are available? Are confidentiality agreements necessary?
- **Appendices**: developing a serious game requires the contractor to listen to the client and to understand certain vocabulary, corporate bodies, mindsets, contexts, etc. Any document that will be of assistance in these areas is an important addition to the conditions of contract.

### The licence-based model

This is where titles produced by any kind of publisher, company, independent, association or public or private institution (though not a private individual) are made available for a fee. The application is either a ready-to-use serious game (customized or non-customized), such as *AVA formation* by *Daesign,* a piece of development software to produce a serious game, such as *Virtools*[74]*,* or a serious game integrated within another application or product.

Within the framework of a commercial licence, the entity that acquires the licence is able to make use of the application's functionalities within its structure. However, the acquisition of the licence does not generally allow the entity to modify, distribute or profit from the application's source code, or even part of it. Commercial licences are different from what are known as free licences, where the application's source code is accessible and modifiable. Free licences do not necessarily escape all business

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[74] http://www.virtools.com/

models, though they usually fall in to the "order-based model" or "publisher/developer model" within the B2C segment, as will be discussed below.

## The consulting/training model

This business model is where a public or private institution's designers/developers are trained in all the different stages of serious game development on-site. An example here is the Toulouse Ecole Nationale d'Aviation Civile (ENAC, *National School of Civil Aviation*), which has contracted ergonomists and game designers to add videogame elements and serious gaming approaches to their computer training devices and development software.

## 4.3.2.    The B2C segment

### The publisher/developer model

This business model is where a publisher, company, independent, association or public or private institution designs and develops a serious game, then offers it for sale directly to all types of consumer, without any prior demand or order. The serious games here are ready-to-use, and may or may not be customized. *Némopolis* offers CD-ROM edugames of this type, such as *The Vulture, An investigation under Napoleonic rule*, an educational adventure game where the user is transported to Paris in 1809[75].

This model does not just rely on physical supports (CR-ROMs, DVDs, USB keys, etc.) but also employs electronic supports (internet, mobile telephony, etc.). When distribution is electronic, users acquire the application online via payment. The micro-payment system offers users comprehensive support, or a subscription for a fixed period. Demoware is another distribution option, most commonly carried out online, where users download applications free-of-charge, but with certain levels or options restricted. To enjoy the full version or the additional functionalities, users are asked to pay a fee. This is the case in the edugame *Gcompris[76] (Understood)*, which runs in *Windows*. Serious games are also available free-of-charge, with authors either appealing to the generosity of users to make a donation, or benefiting from advertising revenues generated.



*The Vulture, An investigation under Napoleonic rule, Némopolis*, 2006



*Gcompris*, Bruno Coudoin, 2004-2008

With the advent of web 2.0, a publishing approach referred to by some journalists and university researchers as "game 2.0" is starting to emerge: the idea here is to establish a community system that allows customers to improve titles via the internet, by adding levels, scenarios, objects and updates. These improvements can then be downloaded for free, allowing all users to benefit from the creativity of others. The *Little Big Planet[77]* game by *Sony* is a prime example of this type of marketing strategy.

The "game 2.0" concept also invites consumers to create and offer new games. In this area, *Microsoft* has made the *XNA Game Studio Express* development kit available for free download[78] since late

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[75] http://www.nemopolis.net/jeux_videos.php?educatifs=catalogue
[76] http://gcompris.net
[77] http://www.littlebigplanet.com/
[78] http://msdn2.microsoft.com/fr-fr/xna/default.aspx

2006, an application that allows private individuals to develop their own games for the *Xbox 360* console.

If a videogame application attracts the attention of major industry players, it may also be published traditionally. The operator *Orange* has launched the *Whosegame* website as part of this marketing strategy[79]. The serious game market should take interest in the game 2.0 approach – perhaps in a few years time the term "serious game 2.0" may also be commonplace.



*Little Big Planet*, *Sony*, 2008

## 4.3.3.    The B2B2C segment

### The order-based model

This economic model is very similar to that discussed in the B2B segment. The difference being that the backer does not use the serious game exclusively and offers it to others.

### The licence-based model

This economic model is very similar to that discussed in the B2B segment. However, the application is not necessarily produced by the publisher, company, independent, association or public or private institution, but may simply be acquired by them, with the organization then reassigning the licence. Further to this, the entity that acquires the licence is not restricted to employing the application's functionalities within the framework given. The entity may also distribute the application to customers specified in the contract, and in some cases may be able to localise the application.

### The consulting/training model

This economic model is very similar to that discussed in the B2B segment. The key difference is that the serious game developed is not exclusively for internal use, but also made available for sale.

## 4.4.  Distribution models and services

Serious games can be distributed in three different ways:
* Free-of-charge distribution,
* Semi-free-of-charge distribution,
* Commercial distribution.

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[79] http://www.whosegame.com/

# 4.4.1.   Free-of-charge distribution

Webmarketing, a term that covers all the various marketing strategies linked to the internet, represents the main way of distributing serious games without a fee. Serious games generally serve the following purposes here:

- Traffic-generating content,
- Community developers,
- Viral marketing,
- Online advertising/competitions.

## Traffic-generating content

Certain TV or radio programmes are produced specifically to generate ratings. This is done principally to increase advertising revenues or to serve other marketing strategies. Some internet sites are designed with a similar purpose in mind. To generate traffic, the content of the site must interest web users and videogame applications, and by extension serious games, do exactly this. Any type of serious game, be it an advergame (*Ponkey Bong*), edumarket game (*Technocity*), "military game" (*America's Army*), or serious play (*Second Life*) can provide the site with interesting content capable of attracting internet users.

Sites featuring serious games can be focused on a single title – such as *Food Force,* which offers the program for download as well as information and forums on the United Nations' food programme – or may offer a selection of games, as do portals such as *Tfou*[80]*, Spirou.com*[81] and *JayIsGames*[82].



*Food Force*, United Nations, 2005 - 2008

## Viral marketing

Viral marketing relies on consumers to circulate advertising. This principle is used by Hotmail, which adds an advertising message to the bottom of each email sent. A serious game or its internet address (URL) can also be distributed like this by email. With viral marketing, the idea is that the attractiveness of the videogame base will lead users to share the application with their network of contacts. One of the first companies to have employed this approach is *NVision Design*, since renamed *NStorm*[83]. On 1 April 1998, it distributed the application G*ood Willie Hunting* online (to mark April Fools' Day), where users played a version of whack-a-mole but with graphics and characters taken from the Monika Lewinsky affair. G*ood Willie Hunting* was produced in order to playfully promote *NVision Design,* which at the time was a new company. The advergame focused on the Monika Lewinsky affair as it was a contemporary event and was enjoying considerable media coverage – this in turn gave the application extra visibility. Celebrities often appear within applications' gameplay to make users react emotionally (laughter, shock, etc.). This is how viral marketing operates: the emotion then triggers users to share the application with their contacts, with the final objective being that some of the people who have played the game will contact the company featured in it.

More recently, following the 2006 World Cup, Zidane's head butt on Materazzi gave rise to a number of similar applications, such as *The Real ButtHead* and *Lanzamiento de italiano*.

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[80] www.tfou.fr
[81] www.spirou.com
[82] http://jayisgames.com
[83] http://www.nstorm.com

*Good Willie Hunting*, *NVision Design*, 1998



*Lanzamiento* de italiano, Clicknaranja, 2006



*The real ButtHead*, Alberto Zano, 2006

## Online advertising/competitions

The term "advergaming" is a combination of the words "advertising" and "game". These serious games are designed to promote a brand or a product, and are very common within digital networks. The advantage of an advergame is that is can be just as enjoyable and interesting as a videogame without advertising, and the boundary between advergaming and certain videogames is often blurred. The term "in-game advertising" is used to refer to all types of brand or product placement within a videogame that do not impact the main objective of the application. For example, in the online multiplayer adventure game *Everquest II*[84], there is an option to order real pizza online from *Pizza Hut*. As discussed previously with the concept of edumarket games (cf. 3.1 2), advertising can also appear in other types of serious games, such as informative games, edugames, and military games. Advergames and other edumarket games are not distributed exclusively electronically. As part of promotional campaigns, or cultural or sporting events, serious games can also be distributed free-of-charge via physical supports (CD-ROMs, DVDs, USB keys, etc.). In 2002, *Petite histoire de dents* (*A Little Story About Teeth)* was distributed in school classrooms in this manner. Developed on behalf of Fabre laboratories, the application was produced to teach children about dental hygiene.
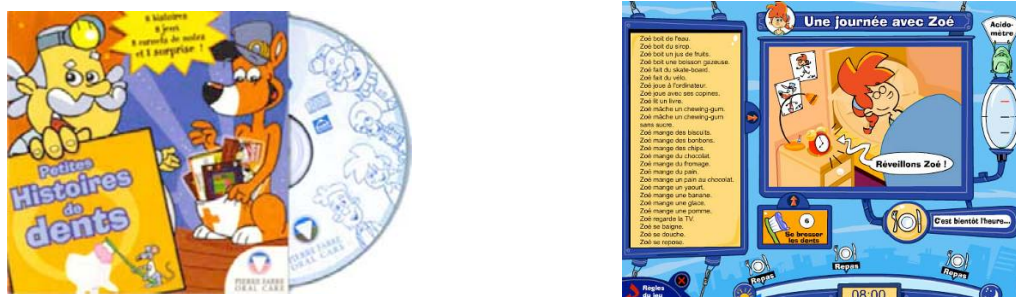




*Petites Histoires de dents*, Pierre Fabre/Melody/Ja.Games, 2002

Competitions, such as those offered by the site *Firstowin*[85]*,* often take the form of advergames twinned with an instant draw (or one at a later date). Technically, the draw is generally made when the game is complete, with users asked to enter their details in a database from which the winner is selected. There are also competitions where the best scores win a prize.

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[84] http://everquest2.station.sony.com/
[85] http://www.firstowin.com

## 4.4.2.    Semi-free-of-charge distribution

### Bonus products

Bonus products are gadgets, surprises and small toys that are often associated with children's meals in fast food restaurants, or fast moving consumer goods such as boxes of cereal. The aim of bonus products is to boost sales of the product they are twinned with. At present, companies such as *B2B Games* are starting to appear that specialise in videogame bonus products: this includes videogames with in-game advertising, advergames and edumarket games. The marketing approach of this distribution type has a lot in common with that of "online advertising/competitions": the use of a videogame base to attract consumers, the promotion of brands or products via this game, etc. However, there are differences: with this approach, the application is always supplied on physical supports (CD-ROMs, DVDs, USB keys, etc) and its usage duration is intended to be longer (at least one hour). These applications are rarely original productions, and are usually commercial successes that have been recycled or customized.



Selection of CD-ROMs provided in French *Kellogg's* cereal boxes, *B2B Games*, 2006

### Demoware, shareware and trialware

Serious games in the form of demoware, shareware and trialware can be distributed via the internet or magazine CD-ROMs. These types of application are either fully accessible for a set period of time, or feature certain restrictions or constraints: some inaccessible options, levels or categories, untimely messages requesting the purchase of a licence, extended waiting times to access the application, etc. The user must thus pay a fee to enjoy the full functionality of the application. *Collection Maternelle*[86] (*Maternal Collection*) by *Génération5* is an example of demoware.

Another approach offered by *Génération5* is to supply free-of-charge serious games that supplement commercially-distributed CD-ROMs: for example *Jeu de trait (Line Game)*, *Jeu du puzzle* (*Puzzle Game)* and *Jeu du Takin* (*Takin Game*) supplement the edugame *Je découvre l'ordinateur N°2* (*I Discover the Computer 2*).

### Distribution by virtual communities

Communities are created in order to develop loyalty among visitors to websites. Ensuring regular visits allows site owners to establish marketing strategies and thus increase revenue streams. There are two main ways of creating a community using videogames or serious games:

- **Regularly renewing content**: when the site only offers one title, this renewal can take the form of updates to the application. When the site is a portal, a common strategy would be to regularly introduce new titles.

- **Maximizing interest**: this can be done via forums, information, collaborative spaces, etc. related to the serious games offered by the site.

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[86] http://www.generation5.fr/telechargement/logiciels-educatif-gratuit.php

Virtual communities are currently witnessing a number of innovations, and there are thus several possible approaches. The two examples below illustrate how serious games can play a role within these:

- *Vacheland (Cow Land)*: massively multiplayer videogames distributed over the internet generally offer scenarios in which users must collect objects, acquire experience (level up), develop an activity, make animals evolve, construct buildings, etc. All these objectives are connected by the fact that they are all linked to the passing of time: the longer users play the game, the more they will progress in their quests. However, impatient users or those with less time may prefer not to have to spend as long carrying out these quests. Services are now offered to respond to this demand. "Farming" or "gold farming" is when someone carries out quests, collects objects and wins experience points on behalf of another person, who pays them in return. In 2005, 100,000 Chinese gamers were said to be employed in gold farming, earning an average monthly wage of 120 USD (75 EUR at present). This business model has led some online games, such as *Kochonland*[87] (*Pig Land*) to integrate an equivalent service to gold farming, whereby on demand, users are given objects that are difficult to obtain or brand new, or experience points that allow them to access more interesting quests, via a micro payment system. In this case, nobody actually carries out the farming, and an IT program instantly attributes the elements required upon receipt of funds. In *Kochonland,* players rear pigs, and the site currently boasts one million registered users, while offering a number of paying services via SMS and phone.

  In 2004, the authors and the Poitou-Charentes Regional Council launched a version entitled *Vacheland*[88]. The game here involves cows, but also features a marketing aspect with the aim of promoting livestock farming and associated products. As such, it is a serious game[89].



*Kochonland* Olivier Coudre/Ludovic Sarrazin/3NKO, 2002 - 2008



*Vacheland*, Poitou-Charentes Region/Olivier Coudre and Ludovic Sarrazin, 2004

- **Second Life**: this is a three-dimensional *virtual world* which each web user, known as a resident, can explore freely. However, as soon as residents wish to build a home, they have to pay for the site and possibly also for a home designed by another resident. *Second Life* is thus like a huge sandpit, where residents pay to speak freely to other avatars, and to undertake personal projects such as building training centres, shops, embassies, exhibition centres, etc. It is not a videogame as the application does not assign final objectives to residents, in the way that *World of Warcraft*[90] for example, does. As certain web users offer useful information within the application, it thus has more of a serious play dimension (cf. 3.1.2.). At present, residents can offer utilitarian aspects in a gaming way as part of the *virtual world*. For example, they can organize a kind of treasure hunt, by inviting avatars to find information on companies or institutions based in *Second Life*. Something similar to this is *Exchanging Cultures*[91], a game that takes place within *Second Life* where the

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[87] http://www.kochonland.com
[88] http://www.vacheland.com
[89] To find out more about Vacheland: http://www.sgseurope.fr/data/document/sgse-2007-transfert-jeu-realite-helene-michel.pdf
[90] http://secondlife.com
[91] http://interactive.usc.edu/members/jmfernandez/2006/03/ec_game_mechanics.html

objective is to get players to discover or promote different cultural approaches. This could certainly be described as a serious game. Japanese *virtual world* Vizimo should also be mentioned, as it offers a concept where residents are invited to submit their own games[92], and features a mobile phone version. Similarly, French firm 3D2+ has just announced the creation of a virtual community dedicated to children, known as Kidnet[93]. This also offers serious games.



*Second Life*, Linden Lab, 2003,



W*orld of Warcraft*, Blizzard Entertainment, 2004

Targeting a different age group, *IBM*'s serious game *Innov8*[94] was developed by students as part of a competition. Its aim is to help users better understand and manage professional processes. Users play businesspeople who must improve their organizations by talking to colleagues and modifying procedures during the game. At the end, a score is awarded based in the results obtained. The *Innov8 virtual world* represents a collection of virtual offices, and in time, should be accessible via the *IBM* island in *Second Life*.



*Innov8*, *IBM*, 2008

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[92] http://vizimo.jp/entrance.html
[93] http://www.kidnet.fr
[94] http://www-306.ibm.com/software/solutions/soa/innov8.html

## 4.4.3.    Commercial distribution

Three main types of commercial distribution can be identified:

### Physical sales

Physical sales cover serious games that are distributed on physical supports. Since the 1970s, videogame applications that could be classified as serious games have been sold in shops, either in the form of ROM cartridges, such as *Brain Games* (1979), audio cassettes, such as *Wall Street Challenge* (1979), or diskettes, such as *Lemonade Stand* (1979), discussed previously (cf. 2.2.2). Another form of distribution, which disappeared towards the end of the 1980s, was the listing of code for IT programmes in specialist magazines, which readers could copy onto their computer.
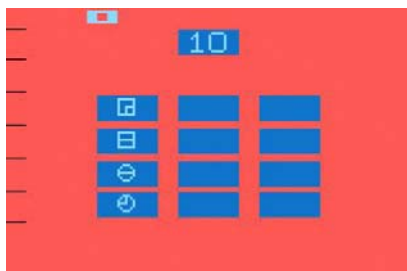


*Brain Games*, *Atari*, 1979



*Wall Street Challenge*; *Image Computer Products*, 1979

At the start of the 1990s, serious game-type applications began to be distributed on CD-ROM, such as edugame *Read With Asterix – Asterix and Son* by *Eurotalk - Worldwide* (1991), a title to help children learn to read. The change in media saw storage capacity rise from the 1.44 MB that had been available on disks, to some 650 MB. CD-ROM thus cleared the way for multimedia features that were emerging at the same time: videogame titles could offer higher-definition graphics, audio with high-quality sampling, and video and cinematic sequences to supplement the content, as in *Versailles 1685: Complot à la Cour du Roi-Soleil* ("*Versailles 1685: Plotting in the court of the Sun King",* 1996).

The second half of the 1990s saw the arrival of the DVD-ROM, and an increase in storage to 4.7 GB, with up to 17 GB possible. *Ushuaïa le jeu: à la poursuite des biotrafiquants* (*Ushuaïa the game: tracking down bio traffickers)* is an environmental adventure game that could be classified an edumarket game, and has been available since November 2007 on this format. In 2006, *Memorex* and *Sony* launched the *Blu-Ray Disc* format, which offers storage of up to 50 GB, and allows developers to provide even more content. However, though this channel is offering ever-increasing storage capacity, it is beginning to be rivalled by another distribution channel: electronic sales, discussed below.



*Versailles 1685: Complot à la Cour du Roi-Soleil*, Cryo Interactive and Canal Plus Multimedia, 1996



*Ushuaïa le jeu: À la poursuite des biotrafiquants*, Nicolas Hulot foundation/Mindscape, 2007

Generally, physical sales rely on major superstores such as, in France, *Carrefour*, *E. Leclerc*, *Auchan*, and *Intermarché*, cultural stores, such as *Virgin Megastore* and *Fnac*, specialist video game stores, such as *Micromania* and *Game*, and sometimes mail-order companies such as *La Redoute* or *Les 3*

*Suisses*. These retailers also offer online sales of different IT applications, via sites that either clearly show their ownership, e.g. *Fnac.com*, or that use other branding, e.g. *Cdiscount.com,* which is part of the *Casino* group. There are also businesses that offer nothing but online sales, such as *Rueducommerce.com*. These organizations are known as "pure players". It should be noted that serious games can also be sold in shops located in museums, theme parks, and other historical monuments.

Faced with this hard core or retailers, there are other distribution approaches. One of these consists of selling serious games via the press. The most established company here is the *Milan* publishing house (*Bayard* group), with monthly titles such as *Mobiclic* and *Toboclic,* discussed previously (cf. 3.2.1.). The idea here is to move away from traditional distribution routes and recuperate margins by offering users a subscription system, similar to that of newspapers and magazines. However, a certain amount of legal juggling is required for this approach, whereby the CD-ROM is considered as a bonus product (cf. 4.4.2.). As such, a newspaper or press document must be published to accompany the application.

Another possible approach for distributing serious games on physical supports which avoids traditional distribution routes, is that of direct sales. Publisher *Interaction multimédia* for example, approaches communities directly to sell them their *Les Monstronautes à Collectiville* CD-ROM. The development and advertising costs are shared by the communities, with the title sold for a very attractive price (25 EUR). This solution appears far more pragmatic that looking for a single community that would be prepared to pay the entire development costs of an application. To give visibility to each community, *Interaction multimédia* also offers an option to customize the introduction to the CD-ROM by inserting a video of the town or region that is buying the title.
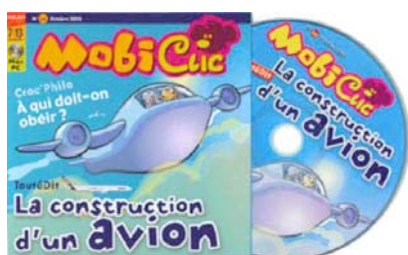


Mo*biclic*, Editions *Bayard*/*Milan*, 1998-2008



*Les Monstronautes à Collectiville*, *Interaction multimédia*, 2006-2008

## Electronic sales

The distribution of physical content, either sold online or in stores, involves a number of additional costs for transportation, stock management, and unsold units. When distribution is international, customs taxes are also levied, as well as costs for special packaging. On top of this, intermediaries always generate revenue at the distribution chain and store level, which makes up around 60% of the application's sale price. Electronic sales, a term that refers to the sale of downloadable data from a web server, is free of a number of these constraints. It also offers a range of new commercial options, such as selling titles level-by-level rather than in their entirety, and makes updates and corrections much easier. As yet, there haven't been any studies carried out into the importance of the role of this type of sale in the videogame industry. It is estimated though that electronic sales account for 5% of all sales in the USA and in Europe (with physical sales accounting for the remaining 95%). The current success of VOD (video on demand) and the online sale of music tracks are indicators that suggest electronic sales of video games are set to rise significantly in coming years. This theory tallies with recent experiences at a number of companies, such as:

- The rise from 10% to 30% in monthly activity recorded by French firm *Metaboli,* which manages electronic sales of videogame products;

- The 145% increase in *Xbox Live arcade* users reported last year by *Microsoft*, a pioneer in console downloads. A total of 400 million downloads have been recorded by the company since 2005 via the *Xbox 360*, representing 250 million USD in electronic sales. It should be noted that downloads do not correspond exclusively here to videogame titles, but also include different types of cultural products, such as films and music.

Alongside these trends, it is important to point out that some publishers have reported that they are making greater profits, while charging lower unit prices, as a result of electronic sales. This sales technique thus seems to have a very promising future.

As regards business models, there are currently two types:

- **Download to own**: after paying the required price, users download the videogame application onto their hard disk and use it as they wish for as long as they wish;

- **Rental**: users pay a subscription and have access to a library and to as many titles as they wish. Once the subscription is terminated, access to the games is suspended. The titles offered are not necessarily brand new, and thus allow publishers to make money from applications that they have pulled from the market. Publishers are paid royalties according to the length of time their program is used.

The main players in electronic sales are *Boonty*, *Metaboli* and *Nexway* in France, and *Xbox Live*, *Steam* and *Oberon* in the USA.

Regarding the electronic distribution of serious games, Canadian firm *Tribal Nova* offers the *Kid Studio*[95] concept. The revenue model is that of rental: for a subscription of 7 EUR per month, users can access edugames and advergames produced by *Bayard, Dupuis,* and other publishers. The site is targeted at children of 3 to 12 years, both boys and girls, and payment is carried out via *Orange*.

M*ilan* publishers (*Bayard* group) are currently studying how to distribute *Mobiclic* and *Toboclic* electronically while lowering the price, and have just launched a "connected newspaper"*. Alm@nak*[96] is a bi-media system that combines a monthly 68-page paper magazine with an internet site, where users can access a blog and every day can download new data such as articles, results of games and edugames.



*Kid Studio*, *Tribal Nova*, 2007-2008



*Alm@nak*, *Milan* publishers/*Bayard*, 2007-2008

## Accessing serious games in a restricted area

Serious games are also distributed in specific contexts such as training centres, businesses, museums, events, etc. These applications can also be tied to proprietary technology such as medical devices, simulation units, or other confidential systems.

Designing serious games as specific as this often means integrating people currently or previously employed in that sector into the design team. *Script'Games studio* for example, which positions itself within the defence sector, features former servicemen among its directors. All the army's procedures, vocabulary and tactics are thus familiar to them. This knowledge of the industry is also a valuable plus when it is necessary to train staff or soldiers in the use of the serious game.

When distributing titles for specific contexts, quantities are generally limited and thus higher prices must be levied – usage licences for some serious games can exceed 100,000 EUR per unit. The cost can be even higher when the serious game is developed on behalf of a single client or when suitable adaptations are required. The use of specific videogame development software such as *Virtools*, or of real-time 3D game engines such as from *Unreal Tournament* or *Neverwinter Night,* is thus very common in the development of serious games. Firstly, this type of software allows companies to

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[95] http://www.kidstudio.com
[96] http://www.almanak-mag.com

reduce production costs, by shortening the production chain. Secondly, they offer an excellent quality-price ratio. Free-of-charge development software also exists, such as *Blender*[97]. Without this, specific serious games would be even more expensive.

Lastly, it should be noted that universities and research centres can also be included in the production process, as an R&D dimension is often involved in this type of title. Working with public bodies offers attractive costs and advantageous conditions. Indeed, a recent IDATE report carried out on behalf of the Ministry of the Economy, Finances and Industry – Department of Business, recommended that more should be done to bring together businesses within the industry and research institutes[98].

# 4.5.  The main markets for serious games

## 4.5.1.  Description of the market

As discussed previously (cf. 4.1.), there are several different approaches for defining a serious game. One of the main differences of opinion is whether the use of development software employed in the videogame industry automatically makes a title a serious game. Some people believe simulations produced using development software such as *Virtools,* or real-time 3D game engines, such as *Unreal Tournament,* are serious games whatever their structure. Others think that this is not enough, and state that the presence of gameplay and a utilitarian dimension is essential if the term serious game is to be applied. Furthermore, some disagree with the different categories of application included under the serious game umbrella, and think advergames should be excluded. These differences in opinion make it difficult to interpret data on the current size of the serious game market. According to *IDC,* the market can be said to be worth between 1.5 and over 10 billion USD per year, according to different interpretations and what exactly is understood by the term: i.e. whether simulations and advergames are included, whether only B2B titles are analysed, if productions for the general public are looked at, etc.

Currently, serious games are usually produced by small or medium-sized development studios, as well as independents. This is largely a result of the budgets allocated to serious games, which generally range from 1,000 to 100,000 EUR. Looking at serious games featuring a gameplay element, only a few exceptions such as *Pulse!* and *America's Army* have benefited from significant development budgets (7 and 10 million USD respectively). Thus, even if some videogame companies have produced serious games for lower sums, such as Ubisoft's development of *Food Force* for 350,000 USD, this size of budget does not usually interest North American or European majors (who are used to budgets of several million euros). This leaves the field open to small and medium-sized operators. The only major organizations to be involved in serious games are Japanese firms such as *Square Enix*, *Nintendo* and *Sony*, which is a result of government support to bring universities and businesses together and has seen major investment in the serious game market on a publishing level, as will be discussed later (cf. 5.3.2).

Today, it would seem that Japanese firms' positioning is a profitable one, having seen the success *Nintendo* has encountered in the health field (*Dr. Kawashima's Brain Training: How Old is Your Brain?*, *Sight Training*, *Wii Fit*, etc). To give an indication of this success, the brain fitness market in the USA alone has grown from 100 million USD in 2005 to 225 million USD in 2007[99], with *Nintendo* applications playing a significant role. In France, *Nintendo's* breakthrough has been confirmed by French firm *SBT,* which has been offering brain training applications for a number of years. The company's directors have seen a significant rise in sales of their products over more than a year, and credit the success partly to *Nintendo,* whose advertising is also benefiting them. It is worth noting that these Japanese serious games often take the form of casual games (video games with short usage durations), which are not too expensive to develop and are currently experiencing significant commercial success.

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[97] http://www.blender.org
[98] R&D et innovation dans l'industrie française du jeu vidéo, 2007
[99] Etude de SharpBrains, 2008

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Though statistics on the size of the market may be imprecise as yet, a number of indicators suggest a bullish trend. The number of visitors to Lyon's *Serious Game Session* for example, has risen every year since its founding. 17% of English and Scandinavian clients expect to use serious games within the next two years, with the figure rising to over 60% when the period is extended to five years. The number of articles, conferences and study days dedicated to serious gaming is also increasing each year, while training courses and masters degrees, such as that offered by MSU (Michigan State University)[100] are also starting to appear.

## 4.5.2.    The serious game market in the USA

When the first *Serious Game Summit* was held in Washington in 2004, 70% of visitors were from the military. The SMEs present took part in conferences that focused mainly on subjects like how to attract funding from *DARPA* (*Defense Avanced Research Projects Agency*)[101], an organization funded by the ministry of defence in order to issue defence-related contracts and to identify and promote innovations from SMEs. Today, both the CIA and NSA have ordered or released their own serious games, and the American government is a major backer of the market. This is largely a result of the *Small Business Act*, which specifies that each government department, (be it defence, space, agriculture, justice, etc.) must spend 10% of its budget on SMEs. The size of contracts awarded to SMEs generally varies between 2,500 USD and 100,000 USD, though in some cases can exceed these figures, with the legislation introduced in order to aid the development of SMEs. A large number of American ministries have commissioned, or plan to commission their own serious game: these orders represent substantial budgets and have had a significant effect on the market, and are why serious games such as *Pulse!* and *America's Army* have enjoyed development budgets worth millions of dollars.

The large public market does not mean that a private equivalent does not exist however, and a large number of serious games have been commissioned in the fields of health, training, advergaming and e-learning by private bodies.

In parallel to this, in order to move away from a largely order-based business model (cf. 4.3.1), the American army organizes events such as the Serious Games Showcase. Discussed previously (cf. 2.2.3), this takes the form of a competition and promotes the best serious games for the defence sector, as well as in teaching, industry, etc. This may well lead to new publishing models.

Business is also involved in this area, with *Microsoft* launching a competition for university students to develop serious games for the teaching industry in 2007. *Microsoft*'s marketing approach here is that of "game 2.0" discussed previously (cf. 4.3.2.). It should also be noted that this competition is international.

The synergy that currently exists between the government, industry and universities should see the rapid expansion of the serious game market in the USA. Despite this, the major players in the videogame industry, with the exception of *BreakAway games,* are yet to position themselves on the market. This is a clear sign that the financial incentives are not yet sufficiently appealing.

## 4.5.3.    The serious game market in Europe

The European serious game market is mainly based in the United Kingdom, Scandinavia, Germany and France, with less representation in Southern Europe, Spain and Italy, and more of an anecdotal scene in Eastern Europe, such as Ukraine. There is no real political support in Europe to help develop the market, and thus there are few examples of serious games developed for European governments: in France, *Cyber-budget* is really the exception. Furthermore, support programmes are rarely adapted to SMEs, and often ask them to meet unrealistic conditions (to be profitable for more than three years, to already have generated significant finds, etc). This leads smaller organizations to carry out serious game projects independently, with can often be difficult financially and means they have to rely on their own funds before finding investors. Venture capitalists can also be quite cautious as they generally do not know a lot about the videogame industry and associate it with the bursting of the internet bubble in April 2000. As a result, few serious game projects currently reach maturity.

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[100] http://seriousgames.msu.edu
[101] http://www.darpa.mil

Despite these significant constraints, local initiatives do exist such as in the Hesse region of Germany, which has just organized the first *Serious Game Award*. Other examples are in economic centres such as the Rhône-Alpes region in France and the West Midlands in the UK, which have introduced initiatives to ensure that the market develops locally at least. The Pacte PME should also be noted, as this is a French equivalent of the Small Business Act, and was introduced on 1 August 2006.

However, links between universities and business do not appear to be establishing themselves, particularly in France. Each side has a fairly negative view of the other, and this is undoubtedly hampering the synergies that would facilitate government support at national and European level for serious gaming.

Mindsets are beginning to change though. In France, following the publication of "*R&D et innovation dans l'industrie française du jeu vidé*o" (*R&D and innovation in the French videogame industry),* which was carried out by IDATE in 2007 on behalf of the French Ministry of the Economy, Finances and Industry – Department of Business and advocated greater cooperation between the academic world, industry and the government, an academic consortium dedicated to videogaming[102] is currently being established. Known as Gameconsort, its aim is to bring together universities, businesses and public and private institutions, so that each party can better understand one another and find solutions to work together. The organization includes a number of parties interested in serious games.

It should not be forgotten that though the publisher/developer business model (cf. 4.3.2) has seen little support in Europe, the order-based business model (cf. 4.3.1) is increasingly common in the e-learning, industrial training and advergaming. Europe thus offers a market that is similar in structure to that of the USA, but is on a much smaller scale.

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[102] www.gameconsort.com

# 5.    Outlook and challenges

Advertising for the world's first ever home game console, the *Odyssey* by *Magnavox,* released in 1972, made great play of the device's educational potential. One year later, in 1973, American universities created the *Minnesota Educational Computing Consortium* (*MECC*) and developed the first edugames (*Lemonade Stand* and *The Oregon Trail*). That same year, the first tentative steps were made in the advergaming industry, with the release of *Moon Lander* a game produced to promote a graphics card (the DEC GT40 vector graphics terminal). As such, the serious games approach of combining a utilitarian dimension with a videogame base is far from new. In fact, it is as old as the videogame industry itself. It is thus fair to say that the term "serious game" is above all a marketing strategy, and it is worth analysing the added value in terms of communications and advertising it brings. Though it can now be said with confidence that videogames are no passing fad and can genuinely be considered cultural objects, they remain a source of unease. One of the main fears is that applications will have little credibility if introduced into industrial or training contexts. This is why the term "serious game" has an important role to play: it helps videogames leave the "candy[103]" era to move into a second, more mature phase, where development and distribution into new areas – something that is increasingly necessary – can take place easily. Once this stage has been reached, the term "serious game" will probably fall out of use (within 10 years or so). After having played an important transitional role, the term, which is an oxymoron, will probably be less useful to society. However, the approach itself of combing practical benefits with videogame technology will undoubtedly last as long the "traditional" videogame industry, and will represent an evermore identifiable market segment with specific business models.

The maturation of the videogame industry that serious games are currently bringing about opens up a number of interesting opportunities for the future. These can be classified in three main areas:

- **Distribution,**
- **Technology,**
- **Interfaces and employment.**

## 5.1.  Distribution outlook

At present, the serious gaming market is based primarily in Western countries and Japan. This is largely a result of the wide number of technological devices currently found in these countries, be they mobile phones, game consoles, or PCs. Each has an essential role to play in the distribution of serious games, with the outlook for the technologies analysed below.

### 5.1.1.    The mobile telephony segment

**The market**

As of April 2008, according to the *Association of GSM Operators*, there were 3 billion *GSM* mobile phone users worldwide. This means one in two people owns a handset. Of this number, developing countries account for a third of users, with half of these being Chinese (i.e. 500 million). As a comparison, the number of computers in use around the world is close to one billion, meaning there is one computer for every three mobile phones.

Almost all young residents of Western countries have their own mobile phone. A study carried out by *Médiamétrie*, shows that in May 2008, 98% of French families have at least one child under 15 with a mobile phone. As for older age groups, 94% of 15-17 year olds, and 95% of 18-24 year olds had their own device at the end of 2005. And yet France has fewer subscribers than some countries: in April 2006, according to *Informa Telecoms & Média*, France was in last position out of the 10 countries with the most subscribers, behind countries including the USA, Germany, Italy, and the United Kingdom. In terms of usage, *Médiamétrie*'s study describes young French people as being "addicted" to their

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[103] This is how game designer Chris Crawford refers to the period when video games only offered basic challenges, such as shoot-em-ups and driving games.

mobile phones, particularly outside of school periods when their use becomes a hugely important way of communicating, listening to music, watching videos and playing videogames. According to *GfK m2,* 2007 saw 13.3 million game downloads in France, the equivalent of 56.7 million EUR (inc. tax), with an average spend of 4.26 EUR (inc. tax) per user. This places videogames in first place in terms of mobile phone revenues, ahead of ring tones. It is worth pointing out that among the 10 most downloaded games of 2007, the fourth-placed title is a serious game: *Brain Challenge* by *Gameloft*. This publisher is the world's leader in mobile phone games and recorded total sales of 25.3 million EUR in the first quarter of 2008 (94% of these sales are related to mobile phone gaming, with the remaining 6% accounted for by console games). *Brain Challenge* does not appear to be an isolated case either, with other types of serious game finding popularity with the public. Examples of these are *100 contre 1 (100 against 1)*, *E=M6 le jeu (E=M6, the game)* and *My English Trainer*.



| | | | |
|---|---|---|---|
| *Brain Challenge* | *100 contre 1* | *E=M6 le jeu* | *My english trainer*<br>*Gameloft*, 2007-2008 |

On a technical level, mobile phones' graphic performance is regularly improving, with larger screens, improved visibility in ambient light, and better management of real-time 3D calculations. Processors are getting ever faster, while constant improvements are being made to RAM and storage space.

Taking into account the high penetration rate of mobile phones worldwide, the high levels of adoption among younger people, and the increased performance of the devices (which better allows them to support multimedia content), it is increasingly conceivable that they will emerge as a major support for serious game applications. In developing countries such as Morocco, mobile phone-based e-learning programs are already in development.

## Obstacles to be overcome in mobile phone serious gaming

Though the current situation points towards an excellent future for serious games on mobile phones, there are some obstacles. In terms of the general public, three main challenges need to be overcome:

- **Introducing a low-cost mobile phone plan that offers unlimited internet access**: with the current system, most users are afraid to download videogame applications for their mobile phone, as they don't really know how much the final cost will be, when all taxes are included. An unlimited internet access plan for mobile phones would transform consumption in the same way as unlimited internet access plans for PCs transformed internet usage in the home: more people connected, longer time spent online, increased online business, the appearance of new services such as virtual communities, VOD… and of course the downloading of serious games. Operators however, probably feel the situation is similar to that at the end of the Minitel information service in France: offering unlimited internet access at attractive prices risks killing the goose that lays the golden egg; instant messaging could kill SMS, IP telephony could kill paid-for calling, etc. In the meantime, mobile phones are increasingly integrating WiFi technology, which could represent an alternative way of enjoying fast, low-cost internet access. In fact, the emergence of free WiFi points in public places and fast food restaurants means accessing the internet could even be completely free-of-charge in the future.

- **Advertising functionalities**: making mobile phones more accessible in terms of technology, showing exactly how the devices can make people's lives simpler, and replacing acronyms and jargon with easy-to-understand explanations of just what mobile phones can offer, should ensure the general public can make better use of new technology. This is the logic behind the advertising campaign for *Apple's iPhone*, which focuses on the functionalities offered.

- **Showing the real added value of mobile telephony**: if mobile phones show added value that is not already offered by computers, portable game consoles, digital cameras, electronic diaries, and digital camcorders, the general public may well have a different, more positive view of them. Again, *Apple's iPhone* has shown the way here. Offering a multipoint touchscreen for example has added value in terms of usability that no other technological device compares to. Added value can also be in the nature of services offered: the company Lexis Numérique for example, has just developed a mobile phone breathalyser test for MAAF insurance policyholders. The mobile phone is probably the most appropriate device for this technology if people are going out for a meal: the likelihood of them carrying a phone is far higher than that of them taking their PC.

For serious game developers, there are also technical challenges that need to be overcome to facilitate the production and distribution of serious games on mobile phones.

- **Being able to use *Flash<sup>TM</sup>* technology on mobile phones**: games for mobile phones are currently developed in Java. However, the vast majority of serious games distributed on the internet are produced using *Flash<sup>TM</sup>* development software, by *Adobe*. This solution is particularly popular due to the range of applications integrated within it, which shortens the production chain by homogenizing it, and thus reduces development costs. *Flash<sup>TM</sup>* also offers a proprietary format (swf) that can be read by internet browsers with the *Flash<sup>TM</sup>* plugin. This is an extremely common plugin, and at present, between 85% and 100% of internet users have it. Another significant advantage is the fact that *Flash<sup>TM</sup>* offers a vector graphics mode. As such, the same application can adapt itself automatically to different screen formats and resolutions. Furthermore, *Flash<sup>TM</sup>* is increasingly being used in real-time 3D animations. Therefore, if a *Flash<sup>TM</sup>* plugin is ever developed for all mobile phones, a host of serious games already available online would quickly be available for mobile phones. Adaptations would need to take place – graphic changes would be needed to ensure readability on small formats, while technical changes would be necessary so that the application could be run on telephone keypads and multipoint touchscreens – but this work would take just a matter of hours in the best cases. Developers would also be able to produce applications in the same software environment, even if there is the inconvenience of it being proprietary. Developing this kind of plugin is far from easy however, and there are a range of technical issues that would need to be resolved if the application is to function properly on mobile phones. The variety of different makes and models of phone on the market mean the technology is very heterogeneous. 2007 saw *Adobe* launch version 3 of *FlashLite<sup>TM</sup>*, a light format of the *Flash<sup>TM</sup>* plugin especially for mobile phones. However, the technology only works with a limited number of handsets, while its regular updates suggest that it still suffers from a range of problems. Despite these limitations, companies such as Mobitween are adopting *FlashLite<sup>TM</sup>* technology to develop games specifically for mobile phones. These companies are banking on the advent of the *Flash<sup>TM</sup>* plugin, and are ensuring they have a catalogue of games ready for when it is used more widely.

**Figure 4: Examples of *Flash<sup>TM</sup>* format games developed by *Mobitween***



This could well take place sometime in 2008 or 2009 however, largely as a result of the *iPhone*. Steve Jobs, CEO of Apple, is reticent to install Adobe's plugin on his mobile device, as he does not wish it to feature proprietary solutions. However, as time goes by, this position is becoming increasingly untenable. Owners of the *iPhone* are unable to access any of the numerous *Flash<sup>TM</sup>* documents found on the internet, most notably videos on *YouTube* and *Dailymotion*, which is leading to widespread criticism. Parallel to this, the competition is launching a range of mobiles – such as the *AnyCall Haptic* from *Samsung* – which strongly resemble the *iPhone*, and competitors may prove more willing to work with *Adobe*. It is a certainly risk for Apple to take, though it is worth

pointing out that sales are not as high as had been hoped for in some countries – by May 2008, just 100,000 units had been sold since its launch in France. Two recent press releases seem to offer hope for the future: the first states that *Adobe* is in the process of developing a *Flash^{TM}* plugin for the *iPhone*, while the second announces that the swf code is now open to all. As its technical specifications are now available on the *Adobe* website[104], all developers are now, in theory, able to write an swf plugin for any environment with an operating system.

## Distributing serious games in the current situation

While waiting for the situation to develop, several options are available to distribute serious games on mobile phones, depending on the context.

To distribute serious games that are part of an advertising campaign and intended for the general public, the *Push SMS* solution appears to be the most suitable. This technique involves sending the same SMS to a group of subscribers. It is the text message equivalent of spam, except that in mobile telephony, the sender is charged at around 0.10 EUR per message. Furthermore, there is no option of sending the serious game as an attachment. The SMS thus contains an advertising message with an internet link where the application can be downloaded directly on to the mobile phone or a computer. If users choose to access the link directly from their mobile, they have to cover the downloading costs, even if the game itself is free-of-charge. As such, it is a good idea to ensure applications are as small as possible to minimize expense.

One way of avoiding all costs is to employ *Bluetooth* or *WiFi* technology. Both these solutions allow two devices to communicate with each other free-of-charge via short range radiowaves, across a distance of up to 100 metres. In areas equipped with *Bluetooth* or *WiFi* terminals, several companies offer to send digital data (texts, photos, videos, music, games, etc.) to all compatible mobile phones within range. This type of approach is known as "push marketing", and is particularly well suited to events. The cities of Paris and Rennes are currently testing how best to exploit this technology in terms of offering city services, and are looking at sending out information on traffic and local shows, broadcasting lectures as podcasts within universities, and more. In Japan, *Nintendo* has installed *WiFi* hubs throughout Tokyo. It is worth noting that at present, people under 25 are probably more familiar and comfortable with *Bluetooth* than those who are older. *WiFi* is simpler to use, though telephones featuring this technology are currently more expensive (over 300 EUR on average). Be that as it may, distributing serious games by these approaches is certainly a possibility, particularly for advergames, edugames and edumarket games. This is principally because these titles tend to be produced according to order-based models and are intended for free-of-charge distribution. However, young people often reserve their mobile phones for their personal sphere and free time, meaning that serious games would be in direct competition with applications designed to be purely enjoyable. Educational bodies, communication agencies and publishers should thus think about how best to introduce mobile phones into learning and event contexts so that they can be an effective and attractive distribution tool.

*The Haunted* project, carried out by Quebecois laboratory *MML (Mobil Media Lab)*, is an excellent example of how to win over young audiences in an enjoyable way. The game was organized in 2007 in Mont Royal park, a hill situated in Montreal's city centre, and was targeted at people around 20 years of age. Divided into partners, participants were equipped with a mobile phone connected to a GPS system. The device allowed them to locate other players in the park and to download podcasts in certain key areas. The scenario of the game saw participants communicate with "dead" people, with the aim of finding the head and body of a young girl who was haunting the area. To maximize atmosphere, the game's organizer's held the event at twilight. It is interesting to note that the concept proved particularly popular among women.

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[104] http://www.adobe.com/openscreenproject/developers

## 5.1.2.    The game console segment

**The market**

In May 2008, the main game consoles available for sale were distributed worldwide as follows[105]:

| Console | Manufact urer | Type | Year of release | Total units sold (millions) | Penetration in the USA (%) | Penetration in Japan (%) | Penetration in Europe and other countries (%) |
|---|---|---|---|---|---|---|---|
| *Nintendo DS* | *Nintendo* | Portable | 2004 | 71.06 | 32% | 32% | 36% |
| *Wii* | *Nintendo* | Home | 2006 | 25.46 | 44% | 23% | 33% |
| *Playstation 2* | *Sony* | Home | 2000 | 120.00 | 22% | 40% | 38% |
| *PSP* | *Sony* | Portable | 2004 | 33.67 | 37% | 27% | 36% |
| *Playstation 3* | *Sony* | Home | 2007 | 12.37 | 39% | 17% | 56% |
| *Xbox 360* | *Microsoft* | Home | 2005 | 18.72 | 62% | 3% | 35% |

Source: IDATE

Globally, around 281 million game consoles have been sold, of which 105 million are portable and 176 million are for the home. These figures do not take into account older-generation consoles that are still in use.

In May 2008, the penetration rate of game consoles, mobile phones (3 billion) and PCs (1 billion) could be compared as follows.

**Figure 5: Worldwide distribution of game console, PC and mobile phone penetration rates in May 2008**



Game consoles (6.5%)

PCs (23.5%)

Mobile phones (70%)
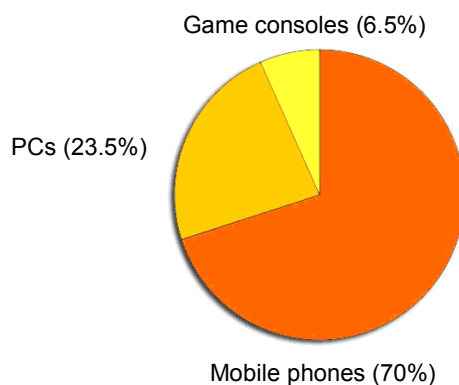
Source: IDATE

This distribution highlights the fact that game consoles represent a small part of the market for the distribution of serious games. However, owners of consoles obviously play games, which is not necessarily true of PC internet users or mobile phone owners. It is also a very lucrative sector. In 2007, of the 20 billion EUR generated in sales by the entire videogame industry[106], *Nintendo,* which mainly focuses on the console segment, enjoyed profits of 4.7 billion USD.

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[105] Sources: http://www.vgchartz.com/
[106]    Source    NPD    (http://www.commentcamarche.net/actualites/2007-l-annee-de-tous-les-records-en-jeux-video-4754737-actualite.php3)

The game console segment, despite a penetration rate that is inferior to PCs and mobile phones, thus still represents a significant part of the videogame market. As such, it should not be ignored as a serious game distribution platform.

## Consoles: a market defined by manufacturer approval

When planning to distribute serious games on consoles, it is important to remember that titles must be submitted to the three main manufacturers, *Microsoft* (*Xbox 360*), *Nintendo* (*Wii* and *DS*) and *Sony* (*Playstation 2* and *3*, and *PSP*) for approval. The manufacturers have the right to oversee any videogame applications produced by different publishers. This is thus a very different situation to that of the PC world, where no such system exists, particularly when distributing serious games online. Whenever a title is developed for a console, the manufacturers specify the following:

- **The title meets the publishers' quality criteria**: applications must offer good-quality graphics and gameplay, and be free of bugs;
- **The publisher's charter and philosophy is respected**: games must tally with the manufacturers' values, e.g. not feature pornographic images;
- **Technical and ergonomic criteria are followed**: each game developed must conform to the technical and ergonomic characteristics of the machine (memory size, processor speed, graphic performance, gamepad design, etc.);
- **The manufacturers' business models are adapted**: console games must respect the manufacturers' business models (particularly physical sales, and as of late, electronic sales via their distribution channels).

Several million USD are usually required to develop a serious game for consoles and distribute it physically. Examples are those focusing on health (*Wii Fit*, *Sight Training,* etc.) and edugaming (*Tout savoir CP "*Know it all CP", *Les incollables* "The Unbeatables", etc).
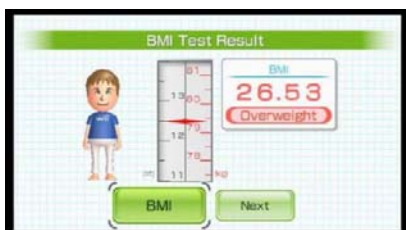


*Wii Fit*, *Nintendo*, 2008

*Sight Training*,
*Nintendo*, 2008

Tout savoir CP, *Atari*, 2008

If these kinds of funds are not available, another approach can be pursued: distribution via the internet.

### Distributing serious games by internet

As computers and mobile phones let users connect to the internet, so does the latest generation of game consoles, whether portable or for the home. The table below summarises the different options available.

| Console | Server name | Services | Web browser |
|---|---|---|---|
| *Nintendo DS* | | Online gaming, Friends list | Yes (*Opera* browser at additional cost) |
| *Playstation 3* | *Playstation®Network* (PSN), *Playstation Store* | Online gaming, Friends list, Paid-for game downloads | Yes (included) |
| *PSP* | *PlayStation®Network* (PSN), *Playstation Store* | Online gaming | Yes (included) |
| *Wii* | *Wii* channels, *Wiiware* | Online gaming, Friends list, Paid-for game downloads | Yes (Specific *Opera* browser at additional cost) |
| *Xbox 360* | *Xbox live* | Online gaming, Friends list, Paid-for game downloads | No |

Source: IDATE

Though distributing a serious game via the *Xbox live*, *Wiiware* or *PlayStation®Network* servers requires prior registering/approval from the corresponding manufacturers, applications developed in *Flash*[TM] 7 can be placed on the internet, where they can be accessed via the integrated browsers (*PSP* and *Playstation 3*) or *Opera* (*Nintendo DS* and *Wii*). Only the *Xbox 360* does not allow this at present. Websites have already been established in this regard, such as *Wiiplayable*[107], which since the start of 2007 has offered a selection of casual games (cf. 4.5.1) playable with the *Wiimote* (the *Wii* console's specific controller). One slight drawback to flag up from a technical standpoint is the fact that the "A" button on the *Wiimote* can sometimes react slowly according to some users.

Among the titles proposed, very few are serious games. The business model of *Wiiplayable* is based on advertising and the sale of related products, such as T-shirts featuring characters from well-known games. Though this site offers a selection of games with seemingly exclusively industrial backgrounds, others, such as *Jeuxwii.c.la*[108] openly invite internet users to expand their catalogues. This would thus seem to be a worthwhile channel for distributing serious games, when publishers are unwilling to set up their own site.

## 5.1.3.   The PC segment: networking

Serious gaming is already firmly established in the PC sector. However, there are still a variety of development opportunities, particularly in terms of networks. Overall, there are two clear approaches to networking.

### The multi-player approach

The serious game *America's Army* features an option to play as part of a network over the internet. This allows users to join a group of up to 32 gamers, who will either fight each other or work together. The network element increases interest in the game and has a major positive impact on its longevity. Network gaming can generate a community of users, and if this forms, the lifespan of the game will last as long as the community. As discussed previously with virtual communities (cf. 4.4.2), it is also in the developer's interest to provide regular updates and new content. As such, the *America's Army*

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[107] www.wiiplayable.com
[108] http://jeuxwii.site.voila.fr

community can employ a level editor made available to them to create new missions. Furthermore, this community supplies the military staff that also use *America's Army* with a pool of opponents for training purposes.

## The MMO approach

In January 2008, NASA requested information to assist them in the development of an educational MMO game[109] (massively multiplayer online game). This type of game allows several hundred, or even thousand, gamers to share the same *virtual world* and play together. *World of Warcraft* belongs to the MMO game category. The department of *Learning Technologies* (LT) at *NASA* is aiming to combine the possibilities offered by virtual worlds with massively multiplayer elements and videogame elements to discover what educational benefits there may be for children.

*PowerUp*[110]*,* launched by *IBM* in February 2008, already employs this approach. It is an educational MMO game that aims to develop children's awareness of ecology. The virtual world featured is that of the planet Helios, which is threatened by an environmental disaster. Children form teams and must play the role of engineers, replacing the existing energy systems with non-polluting solutions, such as solar panels. Like the *Food Force* website, that of *PowerUp* also reaches out to parents and teachers so that they are aware of the application, and encourages them to accompany their children. Combining a virtual world, an MMO game and an educational dimension, *PowerUp* gives the first real indication of just what serious games may offer over the next decade.
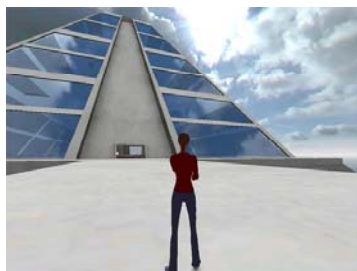


*PowerUp*, *IBM*, 2008



*NanoMission*, *Playgen*, 2007

From a business perspective, MMO serious games also offer some interesting opportunities. IDATE estimates that by 2010 there will be around 20 million subscribers to MMOs. It should be pointed out that for traditional MMOs, business models are changing, moving from a model whereby users paid to acquire and practice the game, to a model where they neither pay to acquire nor to play it. The games are profitable at present thanks to advertising revenues, and revenues generated by the sale of virtual goods, though the value of these is difficult to assess at present. If the subscription model is discounted here, it is likely that two business models will prevail:

- The first favours in-game advertising or sponsorship, like the *NanoMission*[111] edugame developed by English studio *Playgen*. This covers the costs of developing the application, however, in some learning contexts, it may well go against certain ethics. As such, this approach can not be applied systematically to all applications.

- The other will is that of the order-based model. Institutions that turn down the advertising option and have the means necessary can, like NASA, cover the financial costs of the MMO serious game themselves. It is important to remember *Interaction multimédia*'s business approach here, with the company spreading development costs for its serious games among several different institutions and communities (cf. 4.4.3).

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[109] http://ipp.gsfc.nasa.gov/mmo
[110] http://www.powerupthegame.org
[111] http://www.nanomission.org

# 5.2.  Technological outlook

## 5.2.1.   Technology likely to be developed

### The interactive whiteboard

The interactive whiteboard (IWB) looks like a traditional whiteboard and has digital images retro-projected on to it. A digital marker, such as the *Activpen* from *Promethean,* allows users to interact with the IWB. The benefit of the IWB is that is allows an entire group to collaborate interactively on the same digital document. The device costs around 1,500 EUR. According to DTC, there were 1 million units in use at the end of 2007, and this figure should have doubled by the end of 2008. The main IWB manufacturers are *Promethean*, *Hitachi*, *3M*, *Interwrite Learning*, *ELMO*, and *Smart Technologies*.

The whiteboard can also be accompanied by accessories such as Activote, distributed by *Promethean*, a remote control costing around 150 EUR that lets children interact with the IWB from distance. In the framework of edugaming, the IWB and the different peripheries undoubtedly offer new interaction possibilities.

Interactive whiteboard (IWB)                                    *Activore* and *ActivPen* from *Promethean*

### *Kindle* and *Read&go* electronic books

*Orange* is currently testing an e-book called *Read&go* that works like a piece of electronic paper and allows users to download newspapers, books, and comics in digital format via WiFi or the 3G telephone network. With a 1 GB capacity, *Read&go* can store up to 200 newspapers. In the USA, *Amazon* launched a similar electronic book called *Kindle* in November 2007.

Though *Read&go* and *Kindle* are not designed to offer any videogaming interactivity, their interest resides in the fact that they feature systems that let them connect to the internet wirelessly and a large screen that lets users read written documents comfortably. As such, they are a suitable device for the concept of push marketing discussed previously (cf. 5.1.1), while offering the opportunity to read genuine PDF documents – something that cannot be done with mobile phones due to the small size of their screen.

*Read&go*, *Orange*/iRex Technologies, 2008                        *Kindle*, *Amazon*, 2007

## 5.2.2.    Hybrid devices

Technology from different devices is starting to be combined. This is resulting in hybrid devices that offer a range of possibilities in the field of serious gaming. Game consoles and mobile phones are a good example, as they begin to compete in the videogame market. It is thus highly likely that the next portable game consoles will feature telephone functionality, or some sort of communication facility. This will mean portable console users can be offered the same electronic sales services as are currently available to home console users. Furthermore, game consoles should also begin offering ubiquitous possibilities by integrating GPS systems.

As regards mobile phones, which already integrate GPS and communication systems, these will undoubtedly begin to move closer to the *iPhone*, with multipoint touchscreens, better graphical resolutions, etc.

The mobile game console/telephone *N-Gage* from *Nokia* has been exploring the boundaries between consoles and phones as of 2003. It is yet to find any real popularity though, perhaps indicating that the general public is not yet ready for this kind of device.

Devices of this nature are undoubtedly well suited to running serious games, particularly during bus or train journeys, or in waiting rooms.



Source: *N-Gage*, *Nokia*, 2007

## 5.2.3.    The ubiquitous dimension

The expression "ubiquitous IT" refers to the establishment of an environment that combines both the real world and an IT dimension. The latter may well be hidden from the eyes of users. An extension of this is the "ubiquitous game", the idea of which is to use a real environment such as a park, while integrating an IT dimension. *The Haunted*, discussed previously (cf. 5.1.1) is an example of this approach. The ubiquitous dimension offers a wide range of opportunities in the context of serious gaming, particularly in the fields of museography and industrial tourism. Two examples follow.

- *Pacmanhattan[112]*
  Since 2004, *Pacman* has been played on a huge scale on the island of Manhattan. The idea is to use the grid layout of the streets to reproduce the maze of the iconic 1980s videogame. On the ground, one *Pacman* and four ghosts played by people in costumes respond to commands received by mobile phone from players in a control room. The latter have a top-down view of the entire maze, with the position of the characters on the ground. The aim is to guide *Pacman* to collect all the pills spread through the streets of Manhattan, without being caught by one of the four ghosts. In terms of serious gaming, the *Pacmanhattan* approach could be an original way of organising rallies in cultural or industrial environments. It could also be adopted in restricted areas, in a similar way to the videogame experience that was carried out at the Tokyo Science Museum.

- **Tokyo Science Museum[113]**
  In 2004, a ubiquitous game was organised at the Tokyo Science Museum. Visiting children were given a device to hold in their hand similar to a Tamagotchi. Known as the "wallstone", this device guided the children to different exhibitions. If the children visited the exhibition, the wallstone reacted and unlocked a virtual creature. These were collectable, in a similar manner to *Pokémon*, and the game was complete once children had collected them all. The approach was developed by

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[112] http://www.pacmanhattan.com
[113] www.ijvr.org/issues/issue2/05!hirose_latest.pdf

Professor Michitaka Hirose, and was very much one of serious gaming, with entertainment and educational elements clearly combined.



*Pacmanhattan*, 2004



Wallstone device, 2004

Ubiquitous games are not necessarily limited to large spaces and events. The following example shows what can be done simply around a table.

- *Majook*

  *Majook*, developed by French firm *Numicom*, features an interactive board connected wirelessly to a computer. It detects the nature and position of communicative objects or phicones (physical icon) (various communicative objects, checkers, cards, figures in the case of the interactive board game) and brings them to life in real time. Some communicative objects feature an on-board memory and are able to evolve. Users interact collectively with *Majook* in two different ways:

  - Offline use: players play around a table (board game setup), with the board offering a specific layout for each game. *Majook* communicates wirelessly with a multimedia PC that guides users, can save the game, and offers easily-accessible enriched game mechanisms;

  - Online use: an internet connection offers content updates and lets users play with other players around the world.

*Majook* thus employs ubiquitous technology, with IT becoming transparent. This trend is likely to grow over the next decade.
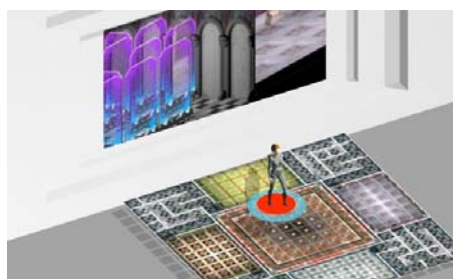


*Majook*, Numicom, 2007

The videogame industry is also increasingly looking to ubiquitous possibilities, with the *Eye Toy* from *Sony* and the *Wii* console from *Nintendo* both employing the technology. This example illustrates how ubiquitous gaming is reaching the *Playstation 3*.

- **Magic *Playstation* cards**

Appearing at the end of 2007, ubiquitous game *The Eye of Judgment* invites users to play a type of magic card game[114], with creatures appearing on the cards. Though the cards are real, the creatures are virtual, and the images superimposed via the screen. A webcam films the cards so that the console can recognise them, and the console then places the appropriate creatures on the different cards, showing the results onscreen.

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[114] Hasbro publishers
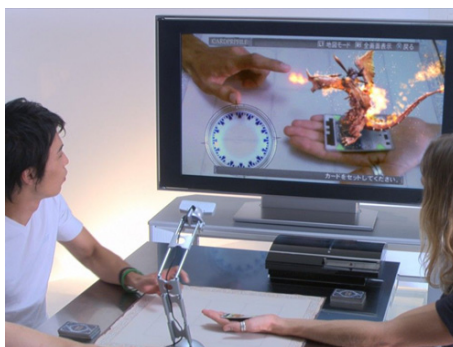
*The Eye of Judgment* for *Playstation 3*, *Sony*, 2007

Educationally, this type of approach is very interesting as it allows users – particularly children – to manipulate real objects and discover the consequences of certain acts virtually. The technology might be used to educate children about dangers in the home for example: if users moved their hand too close to a physical object representing a naked flame, virtual burns would appear on their hand.

## 5.3.  The outlook for the industry

The overall serious game market can be considered a portfolio of differently-sized smaller markets, some of which will succeed, and some of which will fail. Several peaks of growth can be identified in the history of serious gaming. In 2002, the defence sector set the tone with *America's Army*, and a serious of significant serious game orders from American authorities were received in the wake of this release. Four years later, in 2006, there was a craze surrounding the brain training concept. This has led to the recent appearance of new applications such as *Wii Fit* to help people stay in physical shape. In 2009 or 2010, there may well be a peak in professional training or teaching in general, with *IDC* estimating that 40% of the USA e-learning market will employ serious games in 2008. However, some areas of serious games will undoubtedly experience a downturn in the short to medium term. This may be a result of unprofitable business models, or of an oversaturation of titles in one specific domain that offer little added value.

This section will now analyse the consequences of the development of the serious game market on the main parties in the horizontal chain, particularly in the B2B and B2C sectors.

### 5.3.1.    The repositioning of B2B companies

In light of the major profits generated by *Nintendo* in 2007, major videogame companies should show an increasing interest in serious gaming. *UbiSoft* is one example, distributing edugames such as *Mon Coach Personnel: j'enrichis mon vocabulaire* (*"My professional coach: broadening my vocabulary"*). Publishers of this nature boast the technology and expertise necessary to bring serious games up to the graphical and technical level of videogames, and will thus be able to rapidly take over and develop the market. However, they do not necessarily have all the skills necessary to come up with utilitarian scenarios. As such, there may well be numerous B2B collaborations between major videogame companies and SME/VSEs or university research centres specialized in the design and production of utilitarian dimensions. This type of collaboration may also be beneficial to small businesses who are currently looking to survive in the videogame industry. Faced with the globalisation of the market, a considerable number of studios do not have the necessary resources to act independently – the serious game market however offers opportunities for repositioning.
Several studios are thus recruiting education experts to create specialized serious gaming teams, such as *Sumo-Digital* in the United Kingdom. These are different to IT consultancy firms specialized in developing or publishing very specialized content, who are starting to look for game designers to move into serious gaming. By complementing their skills in this manner, these businesses should be able to acquire sub-contracting work from the major publishers and directly meet orders from institutions or industries with limited budgets or short deadlines.

All small and medium-sized businesses could also, in the framework of the order-based business model, specialize in the development of serious games based on game engines from previous generations. This market may well prove profitable, as in contexts such as learning or professional training, applications do not need to be at the cutting-edge of videogame technology.

These same companies could also move into other segments. For example, the serious game market offers opportunities in middleware and in the development of specific peripherals.

## 5.3.2.    The repositioning of B2C companies

In the videogame industry, less than 20 publishers account for 95% of the global market share. These are the only organizations that are able to cover production costs that run to 10-15 million USD, plus advertising costs of around 10 million USD. This level of financing is necessary in an environment where competition is fiercer than ever and where shareholders expect excellent results every year. Though the return on investment in this sector is very quick when products are a success, the failure of just a few titles can threaten the very existence of the business.

In this context, development studios and some publishers state that there is far less risk in taking on a licence than developing an original title. With licences, such as Marvel's (which are particularly sought after), the target audience is already interested and excited by the content, and is thus far easier to win over. This is not the case with an original title.

As serious games often require the development of an original title, which is more risky than using a licence, major companies are unlikely to get heavily involved in publishing big-budget serious games. It is more probable that they will follow the market if a licence produced by the competition breaks through. Thus there are very few serious games that rival AAA videogames from the same generation (cf. 3.2.1).

However, the success enjoyed by casual games has been very interesting to major companies, who hope to sell large numbers of games that are inexpensive to produce. An example of this, discussed previously, is the *Touch! Generations* range from *Nintendo*. This is a particularly interesting business model, as it features serious games based around easy-to-produce casual games. However, more diversification is needed: though the brain training segment may be fashionable at the moment, there is increasing saturation of this type of game, making new titles evermore risky. Asian publishers have already anticipated this. Between 2004 and the end of 2007, *Toru Fujimoto*[115] identified some 278 serious games on the Asian market for console and PC. These include applications focused on business training, such as *Kabu Trader Shun*[116], accountancy, such as *Chou Kantan Boki Nyumon DS*[117], magic, such as *Master of Illusion*[118], dieting, such as *Kenkou Kentei*[119], facial gymnastics, such as *Otona no DS Kao Training*[120]*,* botany, such as *DS Gardening Lite*[121], acupuncture, such as *Raku Raku Shiatsu Navi*[122], skincare, such as *Yumemihada: Dream Skincare*[123], and cooking, such as *Shaberu! DS Oryouri Navi Marugoto*[124]. These last four titles feature little in the way of gameplay, and are more comparable to guides. However, some would argue that the fact that they are available for portable consoles such as the *DS* or *PSP* is sufficient to term them "serious games". Among the dominance of Asian titles, it is worth highlighting that of Western publisher *UbiSoft,* which offers a musical simulation called *Jam Sessions*.

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[115] University of Pennsylvania, http://www.sgseurope.fr/data/document/sgse-2007-serious-games-asia-toru-fujimoto1.pdf
[116] Capcom, 2007
[117] IE Institute, 2007
[118] *Nintendo*, 2007
[119] Yudo, 2007
[120] *Nintendo*, 2007
[121] Square Enix, 2007
[122] Dorasu, 2007
[123] Konami, 2007
[124] Koei, 2007

| Kabu Trader Shun | Chou Kantan | Boki Nyumon DS | Master of Illusion | Kenkou Kentei |

| Otona no DS Kao Training | DS Gardening Lite | Yumemihada: Dream Skincare | Raku Raku Shiatsu Navi | Jam Sessions |

Though major companies are beginning to position themselves in this area of the market, start-ups and VSEs can also access it thanks to the internet, a distribution channel that is proving particularly popular with the public internationally. The DVD-I (DVD interactive) and mobile phone segments of the serious game market are also still accessible to small studios or new entrants. The advantage of these smaller players is that they can react quickly and can differentiate themselves from the majors by offering specialized knowledge of non-entertainment sectors. The next few years should thus see the advent of a number of publishers/developers around the world specialized in different serious gaming niches. Among these, there are already some edugame specialists who for a number of years have been combining utilitarian aspects with videogame bases. However, these businesses often have difficulty positioning themselves in terms of distribution when faced with purely utilitarian applications, and traditional videogames. As such, the serious games marketing strategy undoubtedly offers an excellent opportunity for these organizations to position themselves within videogame stores, particularly within the framework of casual games, and to profit from old, good quality titles.

# 6. Appendix

# 6.1. Daesign

## 6.1.1. Company details

| Company base | France (Annecy) |
|---|---|
| Management | Executive director: M. Sébastien Beck<br>Commercial manager: M. Claude Houbart: |
| Year founded | 2002 |
| Legal status | Simplified joint stock company (SAS) |
| Year moved into serious gaming | 2005 |
| Serious game type | Virtual role playing games for professional training |
| Segment | B2B |
| Development model | Internal + sub-contracting of sound and some educational content |
| Prices | 100,000 to 150,000 EUR to develop a new game-based training tool; 10,000 to 15,000 EUR to improve an existing tool. |
| Serious game clients | 40 major French accounts, including Air France, BNP Paribas, Orange |
| Capital | 253,100 EUR |
| Sales (2007) | 800,000 EUR for serious games (training) |
| Website | http://www.avaformation.com/Current/index.html |
| Staff | 17, of which15 are permanent: 1 CEO, 1 project manager, 3 commercial staff, 3 C++ software engineers, 3 multimedia developers, 3 graphic artists, 3 educational designers. |

## 6.1.2. Company profile

*Daesign* is a simplified joint stock company and was founded in 2002. It is the successor of a previous company, In Visio, which was founded in 1994 and specialized in multimedia production. *Daesign* has positioned itself in the serious game market since 2005, and it produces virtual role playing games to be used in professional training. After having developed videogame products on behalf of publishers, the company now operates in the B2B market, meaning it deals directly with end clients and manages their orders. In light of the success it is currently enjoying, the company plans to focus uniquely on the training market and to discontinue its other activities as 3D modelling subcontracting.

## 6.1.3. Description of products

### Ava formation

*Daesign's* main work is currently centred on the development of serious games using their proprietary engine, *Ava formation*. These applications are specifically to train people in carrying out interviews in the areas of sales, evaluation, recruitment, etc. The programs can be employed remotely or on-site. The company charges between 100,000 and 150,000 EUR to develop a new training tool, and between 10,000 and 15,000 EUR to improve an existing one.

*Daesign* is also regularly approached by other companies who wish to acquire *Ava formation* as middleware. This type of transaction is regularly turned down so as to minimize competition, though when *Daesign* does accept, the buyer must generally have training centre status, such as AFPA, and use the software exclusively to develop applications for internal use. If the centres then wish to sell a serious game produced using *Ava formation*, they must first reach an agreement with *Daesign*.

# 6.2. Lexis Numérique

## 6.2.1. Company details

| Company base | France (Champs sur Marne) |
|---|---|
| Management | CEOs: Eric Viennot and José Sanchis<br>Commercial manager: Thierry Hilaire |
| Year founded | 1990 |
| Legal status | Public company (SA) |
| Subdivisions | Lexis Agence and Lexis Game |
| Serious game type | Advergaming, edumarket gaming and edugaming |
| Segment | B2B and B2C |
| Development model | Largely internal |
| Capital | 150,000 EUR |
| Sales (2007) | 6.6 million EUR |
| Serious game clients | Amblin-Ubisoft, AstraZeneca, Brossart, CIDIL, Dargaud, Disney, La Grande Récré, Laboratoires Genévrier, Micro Application, Norauto, Pharmacia Olphtalmologie – BOZ, Société Générale |
| Distribution of sales (2007) | 35%: Lexis Agence, 65%: Lexis Game |
| Breakdown of activities (2007) | Development and publishing of videogames, edugames, advergaming and edumarket games (advertising). |
| Website | http://www.lexis-numerique.fr/ |
| Staff | 60 (15 Lexis Agence/45 Lexis Game)<br>1/2 2D and 3D design, 1/2 developers/projects. |

## 6.2.2. Company profile

Initially, in 1990, Lexis numérique was a communications agency that specialized in paper publishing. Today, the company is made up of two subsidiaries. The first, Lexis Game, develops videogame applications for children (e.g. *Le fabuleux voyage de l'Oncle Ernest – "Uncle Ernest's Fabulous Voyage"*) and an older audience (e.g. *In Memoriam*, *Expérience 112*). The second, Lexis Agence, of which Thierry Hilaire is commercial manager, is an agency that advises on and develops interactive and multimedia communications. As part of this, it develops advergames. Lexis Game accounts for around 65% of total sales, with Lexis Agence responsible for around 35%. A move onto the *Wii* and *DS* consoles has given revenues a major boost recently, rising from 3.2 million EUR in 2006 to 6.6 million EUR in 2007.

## 6.2.3. Description of products

### Advergames and edumarket games

Lexis Agence develops advergames (advertising videogames) and edumarket games (advertising videogames that also offer educational and marketing aspects). One example of a videogame designed specifically for advertising purposes is *Savane en Folie ("Crazy Savannah")*, a CD-ROM offered as an in-pack free gift to promote the *Brossart* brand. A recent edumarket game featured a 3D simulation of an injection of a dry knee, the application helping users train for this type of procedure. This program was produced to promote the *Genévrier Katana* laboratory.

### Conduite 3D

Lexis game also develops serious games to be published. *Conduite 3D* (*3D Driving)* is one example that helps users learn to drive and gain their licence.

# 6.3.  SBT

## 6.3.1.   Company details

| Company base | France (Villeurbanne) |
|---|---|
| Management | Franck Tarpin-bernard, Bernard Croisile and Michel Noir |
| Year founded | 2000 |
| Legal status | Public company (SA) |
| Development model | Internal development + co-production |
| The *SBT* group | *SBT* (Lyon), 60% of Arnava (Paris), 86% of CREASOFT (Toulouse), 91% of HAPPY Neuron INC (USA) |
| Serious game type | Brain training |
| Segment | B2C |
| Sales (2007) | 3.1 million EUR, 1 million of which is accounted for by the parent company |
| Net results (2007) | 363,373 EUR |
| Main shareholders as of 31 December 2007 | Founders (Franck Tarpin-bernard, Bernard Croisile and Michel Noir) 36.6%, reference pool 21.5%, Vedior France group 6.9%, BPI group 3.7%, lqualified investors 21%, public 10.3% |
| Websites | http://www.*SBT*.fr and www.happyneuron.fr |
| Stock market listing | Euronext free market (ISIN: FR0004175222 / mnemonic: MLSBT) |
| Staff | 37 at the group in total – 15 at the parent company, distributed as follows: 6 in production; 6 in commercial services; 3 in administration and finance |

## 6.3.2.   Company profile

*SBT* (Scientific Brain Training) was created in 2000 by Franck Tarpin-Bernard, Bernard Croisile and Michel Noir, a team of scientists and neuropsychologists. The company designs and develops game-based programmes to evaluate, develop and maintain cognitive skills, using paper, CD-ROM, DVD, mobile phone and internet supports. *SBT* is now positioned as a group, integrating *Arnava* (Paris), *CREASOFT* (Toulouse), and *HAPPY Neuron INC* (USA). *SBT* has been listed on the Euronext Paris free market since 5 May 2006 (ISIN: FR0004175222 / mnemonic: ML*SBT*).

## 6.3.3.   Description of products

### happyneuron.fr

Website www.happyneuron.fr offers a monitored cognitive training and stimulation space for the general public. Boosted by *Nintendo's* advertising for brain training products, *SBT* recorded excellent growth in 2007.

*SBT* also targets health professionals (speech therapists and retirement home staff) by offering them specialized products for re-education work and pensioner care. Consultants and human resource services are further target audiences, with *SBT* offering evaluation applications that are used in recruitment and in the management of jobs and skills.

# 6.4.  Script'Games studio

## 6.4.1.   Company details

| Company base | France (Montpellier) |
|---|---|
| Management | Stéphane Urbinati (director of marketing/development), Stephan Rocoplan (2D/3D manager), Michel Hernandez (administrative/financial manager) |
| Year founded | 2006 |
| Legal status | Public limited company (SARL) |
| Development model | Internal + subcontracting + client training for customized development |
| Serious game type | Defence (simulation and communications to aid combat situations) + game consulting |
| Segment | B2B |
| Sales (2007) | n.a. |
| Website | http://www.scriptgames.net |
| Staff | 8 |

## 6.4.2.   Company profile

*Script'Games studio* was founded in 2006. The team is essentially made up of former military staff, and thus knows the structure of the army, as well as how it functions and its specialized vocabulary. This lends the company a significant advantage in the market over competitors. *Script'Games studio* is positioned exclusively in the military serious gaming sector, and develops urban and extra-urban combat simulations. *Script'Games studio* also creates specialist scenarios, produces three-dimensional environments for training purposes, and carries out a range of modelling. Parallel to this, the company is often contracted to offer game consultancy, particularly by publishers and videogame studios developing titles based on military themes, such as *Ghost Recon* by *UbiSoft*.

## 6.4.3.   Description of products

### INSTINCT® and IPCA®

*Script'Games studio* has produced a combat simulator for the French infantry, INSTINCT®, and for European forces, IPCA®. These applications were evaluated over a four year period by the French army, in order to approve their functionalities. The applications feature open architecture that allows the armies to model their own weaponry and terrain, thus respecting military confidentiality issues. *Script'Games studio* also provides specialist programming training to military staff.

# 6.5. Némopolis

## 6.5.1. Company details

| Company base | France (Poitiers) |
|---|---|
| Management | Antoine Izarn |
| Year founded | 2003 |
| Legal status | Simplified joint stock company (SAS) |
| Development model | Internal and subcontracting |
| Serious game type | Edugaming |
| Segment | B2C |
| Sales (2007) | 179,339 EUR |
| Website | http://www.*Némopolis*.net |
| Staff | 6 |

## 6.5.2. Company profile

*Némopolis* was founded in 2003 by CEO Antoine Izarn. It now employs six full-time staff, and has a network of around 40 subcontractors. *Némopolis* operates in the B2C sector, and develops and publishes edugames, the majority of which are focused on the history and heritage of European regions. Their approach is similar to that of French film *Welcome to the Land of Shtis*, with the subject of each edugame based on a local culture. This structure has proved popular with American publishers, who continue to produce a number of titles of this nature. Antoine Izarn decides which titles and subjects to focus on by identifying gaps in the market, with everything from the scenario design to the development subcontracted for each edugame. *Némopolis* thus employs a network of around 40 subcontractors and development studios. Initially, titles are distributed nationally in France, and then internationally. The company is currently focusing its international efforts on Canada and Germany.

## 6.5.3. Description of products

### The Vulture, An investigation under Napoleonic rule

This educational adventure game takes place in the Paris of Napoleon, in 1809. Users carry out an investigation that takes them from the Rue de Rivoli to the Vendôme Column, passing through the Carrousel du Louvre, Malmaison palace and Saint-Cloud on the way. The title combines an adventure game with a number of challenges that require dexterity and logic, and has a usage time of around 10 hours. It is also available with a 115-page encyclopaedia, produced with historians and Napoleonic specialists. The idea of this is that it helps users with their investigation, and also offers an intergenerational link between older people who prefer to work with paper, and youngsters who prefer interactive supports. *Némopolis* also offers two other historical/cultural titles: *Versailles Mysteries, Oscar and the Athanor* and *L'Émerillon (The Merlin)*.

### Les débrouillards

*Némopolis* also publishes a collection known as *Les débrouillards (Smart Kids),* which focuses on scientific issues. The collection currently features: *L'étrange disparition du professeur Scientifix (The Strange Disappearance of Professor Scientifix)* which covers bacteria, and *Eau secours! Professeur Scientifix (Water Emergency! Professor Scientifix),* which covers environmental and humanitarian problems connected to water.

# 6.6.  Breakaway Ltd

## 6.6.1.    Company details

| Company base | USA (Hunt Valley, Maryland) |
|---|---|
| Management | Founder and CEO: Doug Whatley |
| Year founded | 1998 |
| Development studio | Maryland and Texas |
| Serious game type | Professional training |
| Segment | B2B and B2C |
| Foreign subsidies | France (Lyon) |
| Sales (2005) | 12 million USD |
| Serious game clients | DARPA, United States Air Force, Institute for Defense Analysis, Boeing, Lockheed Martin, Texas A&M University – Corpus Christi, Washington Hospital Center, International Center for Non-Violent Conflict, Believe in Tomorrow Children's Foundation |
| Websites | http://www.*BreakAway*ltd.com - http://www.mosbe.com |
| Staff | Over 100. |

## 6.6.2.    Company profile

*BreakAway* develops videogame applications, with a back catalogue of over 100 titles (strategy games, spy games and sports simulations), as well as products based on videogame technology (modelling tools, simulation tools and visualisation tools). The company was founded in 1998 by Doug Whatley, who was named entrepreneur of the year by Ernst and Young in 2004. The parent company is situated in Hunt Valley, Maryland, while *BreakAway* also boasts a sales office in Suffolk (Virginia) and a development studio, Corpus Christi Studio, based on the A&M campus in Texas. In total, the company employs over 100 people, while a French subsidiary is set to be established soon in Lyon, France. Clients include government organizations and the American army, as well as a range of representatives of the industrial, medical and humanitarian sectors.

## 6.6.3.    Description of products

### MösbëTM (Modeling and Simulation Builder for Everyone)

*BreakAway* employed several different game engines to create MösbëTM, a development suite that allows users to model 3D environments and implement a range of different events. The program has been used to develop applications for military and medical training, most notably *Pulse!*, a serious game to train casualty staff that featured a 7 million EUR budget.

# 6.7. PixeLearning

## 6.7.1. Company details

| Company base | United Kingdom (Coventry) |
|---|---|
| Management | Kevin Corti |
| Year founded | 2002 |
| Serious game type | Professional training |
| Segment | B2B and B2C |
| Serious game clients | Coca-Cola, European Innovation, Henley College |
| Development model | Internal and sub-contracting |
| Serious game type | Edugaming |
| Sales (2006) | 1.5 million EUR |
| Website | http://www.*PixeLearning*.com |
| Staff | 10 |

## 6.7.2. Company profile

*PixeLearning* was founded in 2002 by Kevin Corti. An English company based in Coventry, it employs a staff of ten and specializes in developing games and simulations for commercial teaching and professional training. The organization's biggest clients include Coca-Cola, European Innovation, and Henley College, while it also publishes educational products based on its proprietary LearningBeans® engine.

## 6.7.3. Description of products

### LearningBeans®

In 2007, *PixeLearning* invested over 600,000 EUR in the development of LearningBeans®, a proprietary engine for business simulations that work online. Using this, *PixeLearning* has developed three serious games that work on the internet via *Flash$^{TM}$* player version 7:

- *The Business Game:* this is targeted mainly at business studies (or similar) students. *The Business Game* was developed to act as a learning aid or as an online self-training tool. Students manage a virtual business where they must make as much profit as possible over a five-year period. As part of this management, they must consider a range of factors such as marketing, product quality, and the competition, with five virtual competitors controlled by the computer.

- *The Enterprise Game* (TEG): this application is aimed at new managers and young entrepreneurs. There are lots more challenges than in *The Business Game,* with a far wider variety of options available, particularly in terms of marketing.

- *The Finance Game*: this product is aimed at managers who have not studied finance, and is intended to educate them in the field. The scenario features existing businesses that need to be turned around in a given market. Users must evaluate different financial factors to stabilize the company and then make it profitable.

*PixeLearning* is also currently developing the three following titles:

- *The Social Business Game*: features a non-profit organization

- *The Export Game*: focuses on the fundamentals of international business

- *The Retail Game*: simulates a retail environment

# 6.8.  Virtual Heroes

## 6.8.1.  Company details

| Company base | USA (Research Triangle Park, North Carolina) |
|---|---|
| Management | Jerry Heneghan (CEO and founder), Randy Brown (technical director), Bob Pickens (financial director), Henry F. Schwetzke (executive producer) |
| Year founded | 2004 |
| Serious game type | Defence (simulation and communications to aid combat situations) + game consulting |
| Segment | B2B |
| Sales (2007) | n.a. |
| Website | www.virtualheroes.com - www.americasarmy.com |
| Staff | ? |

## 6.8.2.  Company profile

*Virtual Heroes Inc.* (*VHI*) was created in January 2004 by Jerry Heneghan, who is CEO of the company today. The *VHI* team is made up of specialists in videogames and defence simulations. *VHI's* parent company is based in Research Triangle Park in North Carolina. *VHI* specializes in developing serious games for training purposes on behalf of federal bodies, such as the American army. *VHI* also develops applications in the areas of health and corporate management. *VHI* developed legendary serious game *America's Army*, and in 2005 and 2006 was named on of the 100 best companies by *Military Training and Technology*.

## 6.8.3.  Description of products

### America's Army

Developed on behalf of the American army and distributed free-of-charge over the internet, this application is based on the engine of videogame *Unreal Tournament*[125] (*UT*) and offers simulations of military training exercises and combat missions. Designed to improve the image of the army and to act as an attractive recruitment tool, the game takes the form of a first-person shooter (FPS) and can be played over a network, with 5.6 million players currently registered. Every day, 1.2 million missions are downloaded, with a total of 1.34 billion downloads since 2002. *America's Army* continues to be regularly updated, with the developers integrating new versions of the *UT* engine (currently version 3), offering supplementary missions, and providing an editing tool that lets users design their own levels and distribute them. Further to this, *America's Army* is no longer restricted to the PC, and is now available on the *Xbox* and *Playstation* consoles, as well as in arcades and on mobile phones.

### HumanSim

This serious game is targeted at the hospital sector and sees users train and manage teams in crisis situations.

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[125] Epic, 1999

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# 6.9. Playgen

## 6.9.1. Company details

| Company base | United Kingdom (London) |
|---|---|
| Management | Kam Memarzia (director), Mathew Henson (programmer), Annah Hutchings (artistic direction) |
| Year founded | 2001 |
| Serious game type | Edugaming and training simulations |
| Segment | B2B |
| Serious game clients | BBC 2, British Airways, US Department of Defence, US Air Force Europe, Royal Air Force, Oxford and Cambridge Universities, UNESCO |
| Sales (2007) | n.a. |
| Website | http://www.playgen.com - http://www.nanomission.org |
| Staff | 3 |

## 6.9.2. Company profile

*Playgen* was founded in 2001 as a serious game development studio, and is based in London. It exclusively develops 3D applications that are either serious games, simulations or development software programs for training and evaluation. *Playgen* clients include the British government, the army, and a number of training centres.

## 6.9.3. Description of products

### Nano mission™

*NanoMission*™ is one of the first edugames to be based on nanotechnologies and nanosciences. The application is for 12 to 16 year olds, and is designed to promote this branch of science and careers within it. It was developed with the assistance of scientists and features different modules that cover medical aspects (*NanoMedicine V1 & V2 modules*), the concept of scale (*Learning Scale module*) and the discovery of microscopic organisms (*NanoImaging module*). *NanoMission*™ The modules are sponsored so that they can be distributed free-of-charge to educational institutions.

# 6.10. LindenLab

## 6.10.1.  Company details

| Company base | USA |
|---|---|
| Management | Philip Roservald (CEO) |
| Year founded | 1999 |
| Capital | 11 million USD |
| Website | www.lidenlab.com |
| Staff | 31 |

## 6.10.2.  Company profile

Linden Lab was founded in 1999 by Roservald, who previously set up *Real networks*. The venture received significant support from individuals such as Omidyar, the creator of Ebay, who provided capital, and Ishibashi, the former deputy CEO of EA Games, who offered strategic advice. In 2003, Linden Lab formed *Second Life*, a virtual reality game where players create an alternative existence. With its *Second Life* virtual company, Linden Lab is one of the few MMO publishers to genuinely recognise the copyright of players who create content for the in-game world. In 2005, Linden announced the release of a version of *Second Life* especially for younger users: *Teen Second Life*.

## 6.10.3.  Description of products

### Second life

*Second Life* is an ongoing role playing game (MMORPG) in a permanent 3D world. Players are invited to create a second life with which they can explore this world, create anything they like, connect with other players, fight, steal, and even build their own home with their own designs.

In terms of pricing, several options are available. The first "Basic" account is free and offers access to events, shopping, etc. After this free account, all others cost 9.95 USD and upwards. The Premium account costs 9.95 USD a month and gives users a 512-m2 plot of land to build on. If users want more land, they must pay more per month. For example, for 195 USD/month, users can have a plot of 65,000 m2.

Another aspect of the game is the buying and selling of goods (as well as other business) via the virtual money system, the Linden dollar. Items created within the game are legally protected by Creative Commons licences and can be marketed freely. There is also a stock exchange that defines the exchange rate between the Linden dollar and the US dollar in real time. Each day, the game generates around 500,000 USD in sales. There are currently around 65,000 *Second Life* subscribers and 300,000 residents.

Designed specifically for 13-17 year olds, *Teen Second Life* has the same pricing structure as standard *Second Life*.

# 6.11. Nintendo

## 6.11.1. Company details

| Company base | Japan (Kyoto) |
|---|---|
| Management | Satoru Iwata (CEO) |
| Year founded | 1889 |
| Development model | B2C |
| Foreign subsidiaries | South Korea, China, USA, Canada, France, Spain, Belgium, Italy and Russia. |
| Serious game type | Health: brain training, body training and edugaming. |
| Sales (2007) | 8.19 billion USD |
| Net profit (2007) | 4.7 billion USD |
| Website | http://www.*Nintendo*.co.jp (Japan) - http://www.*Nintendo*-europe.com (Europe) - http://www.*Nintendo*.com (world) |
| Staff (2008) | 3,768 |

## 6.11.2. Company profile

*Nintendo* is a multinational company that was founded in 1889 by Fusajiro Yamauchi near Kyoto in Japan. It boasts subsidiaries in South Korea, China, USA, Canada, France, Spain, Belgium, Italy and Russia. Initially, the company produced Japanese playing cards. At the start of the 1960s, *Nintendo* began to diversify, running a taxi company, producing toys, manufacturing instant rice, and more. In the 1980s, *Nintendo* moved into the video game and console market, and it is currently, alongside *Sony* and *Microsoft*, one of the three market leaders with its *Nintendo DS* portable console and *Wii* home console. The company began producing serious games in 2005, when it launched *Dr. Kawashima's Brain Training: How Old is Your Brain?* on the *Nintendo DS*.

## 6.11.3. Description of products

### Dr. Kawashima's Brain Training: How Old is Your Brain?

*Dr. Kawashima's Brain Training: How Old is Your Brain?* offers a serious of cognitive challenges, such as Stroop tests (named after American psychologist John Ridley Stroop, these bring the left and right-hand side of the brain into conflict by, for example, making people read the word "red" written in yellow), mathematical questions and sodoku puzzles. The idea is that these different tests stimulate various parts of the brain. For the *Nintendo DS* version, users interact via the touchscreen and the console's microphone. The title is part of the *Touch! Generation*s collection, which also features other serious games such as *Sight Training*, *Professor Kageyama's Maths Training: The Hundred Cell Calculation Method*, and *English Training*.

### Wii Fit

*Wii Fit* is a serious game designed to improve the physical fitness of the user. It functions with the *Wii Balance Board* peripheral, which is sold with the title. This device acts like a set of bathroom scales, but has four weight sensors that can calculate the user's stance and centre of gravity. *Wii Fit* begins by calculating the user's boy mass index and then categorizes him as either obese, overweight, ideal weight, or underweight. A personal objective then must be set, such as losing x kilos in n weeks. To do this, *Wii Fit* offers around 40 different exercises for suppleness, physical training, gymnastics and balance. Some of these exercises take the format of videogame challenges such as ski-jumping, slaloming and hula-hooping. Most of the games are unlocked either as time passes or following the user's results.

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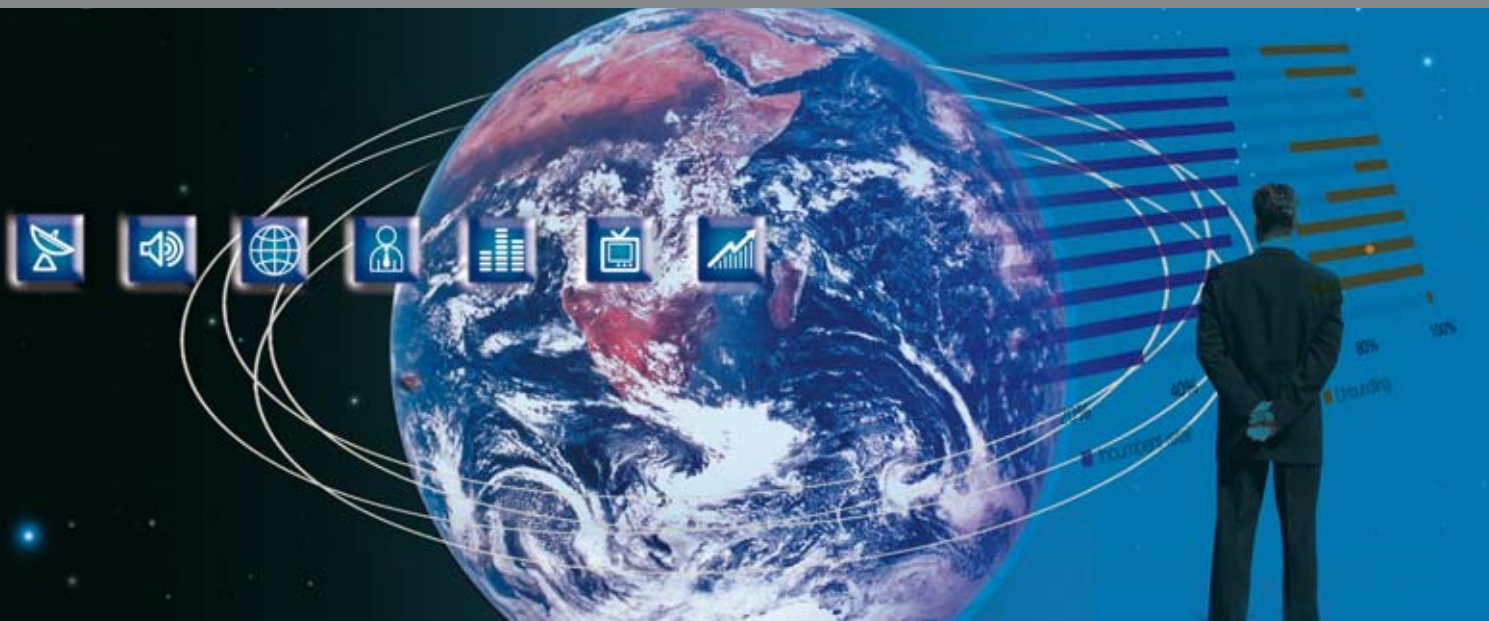
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- Telecom Strategies
- Mobile
- Broadband / FTTH
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- Internet Services
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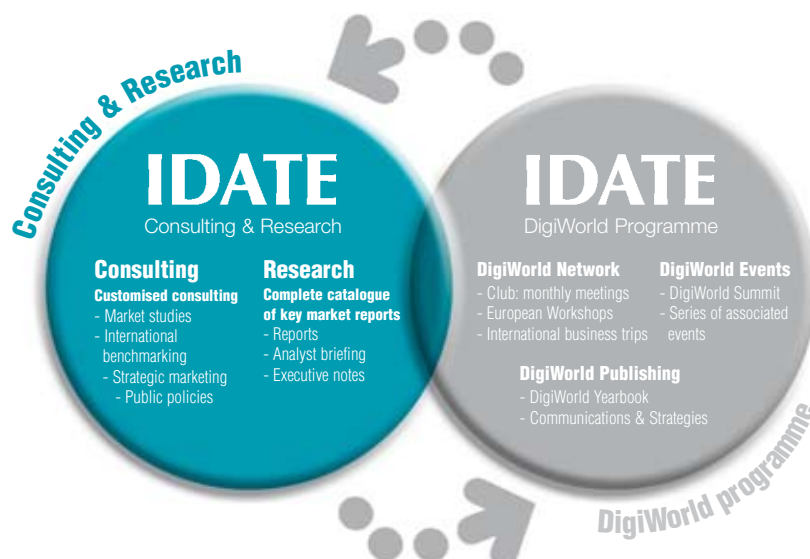*Reports are available in French and /or English versions*

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