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Edutainment, Technotainment and Culture

Cività Annual Report 2003, Florence: Giunti, 2004 (25 pp, In press).

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1. Introduction

The notion that education and learning can be linked with ludic, playful and pleasurable experiences is not new. Cicero linked teaching, delight and having an effect on persons.¹ Huizinga has explored dimensions of its long history in *Homo ludens*.² The introduction of computers and the Internet has affected this tradition for the past half century. For at least the past twenty years, concepts such as edutainment and technotainment have been radically transforming the relationship between learning and play.

Edutainment is a neologism ..., similar to infotainment, that expresses the marriage of education and entertainment in a work or presentation such as a television program or a Web site. The most educationally effective children's programs on television (Sesame Street, The Electric Company, Mr. Rogers) could be classed as edutainment. Outstanding Web sites that "edutain" include Learn2.com and HowStuffWorks.com.³

Although the advent of the new media is frequently linked with notions of globalisation as if they were having a uniform impact around the world, it is striking that we can discern at least three quite distinct lines of development in Japan, the United States, and Europe. Each of these will be considered in turn in order to show that their differences are closely connected with culture. Given limitations of space we can only acknowledge without further analysis that there are many other initiatives around the world, such as the the international KDE Edutainment Project,⁴ or the Latin American⁵ and Australian Edutainment Portals.⁶ Nor shall we discuss special meanings of edutainment such as a method of making political messages attractive by packaging them in satire and irony through a so-called "dressing-space."⁷

A basic distinction needs to be made between activities within the cultural memory institutions such as museums and using surrogates of cultural contents for activities outside memory institutions. We shall see that up to now it is particularly in the latter that edutainment plays a role. In the final part of the paper, we suggest that a future role for

Europe may lie in coupling much more closely activities inside the walls of memory institutions and those beyond the walls through grids for culture. Paradoxically the European trend which allows free access to culture introduces incentives for tourism that also have major economic implications.

2. Japan

In Japan, edutainment has a serious academic dimension. There is, for instance, an Edutainment Research Institute, which holds a forum dedicated to the use of edutainment in schools.⁸ On the commercial side in Japan, Sega, Nintendo and Sony are the big players in edutainment. From 1996 onwards Fujitsu and Sega have been working together qua: 1) network-based entertainment services, including role playing games; 2) on line shopping services and 3) edutainment and other educational services.⁹ In Sega's edutainment the "content of products provides users with specific skills development or reinforcement learning within an entertainment setting. Skill development is an integral part of product".¹⁰ For instance, Sega has games such as *Pico: the Computer that thought it was a Toy*, that focuses on learning basic skills.¹¹

One characteristic of Japanese commercial edutainment is a combination of figures from popular culture with phantasy worlds in order to achieve serious educational goals. For instance in *Elmo's Number Journey* (Sony), Elmo and his friends from Sesame Street® take preschoolers "through a variety of fantastic 3D worlds, each hosted by a different character" in order to help "children ages 3-6 with number recognition and basic math skills."¹² At the same time not all their edutainment is focussed on the purely intellectual. Nintendo has some of the top edutainment/family games such as *Wario Ware* and *Mario Party 3* and *4*,¹³ which focus on the play side.

In the West, robots are often associated with Frankenstein-like mechanical monsters that are a menace (Robot is a Czech word meaning 'drudgery worker'). By contrast, in Japan robots are very much perceived in the more classic sense of machines that serve as extensions to man. They are, moreover, frequently anthropomorphic and 'animalomorphic.' It is not surprising, therefore, that in Japan edutainment has evolved quite dramatically into an emerging field of robotic edutainment. As Toshi Doi, Vice President of Sony Corporation has pointed out, this new field entails four main domains of play, education, information and entertainment:

We are creating a new industry out of electronic dogs and cats, and toys that can serve both as a technology playground and, potentially, as a platform for consumer electronics.

Entertainment Robots offer a proving ground where engineers in software, computers, sensors, communication - all things electrical and mechanical - can test, develop and apply their latest technology....Rather than give a definition of what an "edutainment robot" might be we may have a look at clusters of products marketed today that show some form of autonomy of artificial intelligence:

- electronic toys ("electronic pets"), Kits ("Lego Mindstorms"), computer game (targeting "Play/Hobby")
- robotic kits, electronic components, control software, robot teacher (targeting "Education")
- robots impersonating animals/etc. (in entertainment parks), robots in advertising, robot fish, museum guides (targeting "Information/Entertainment").¹⁴

Domain	Edutainment Robotics Companies
Play	Playing, Handicraft, Hobby
Education	Education, Knowledge Transfer
Information	Information, Entertainment
Entertainment	Adventure Parks

Figure 1. Four domains and related edutainment robotics companies.

Toshi Doi's four clusters of products are not just abstract categories. They are areas, which already have a number of commercial companies (figure 1). Most of these are in the United States. Others are in Germany, Japan, with some in Australia, Canada, France, Netherlands, Switzerland and the United Kingdom (see Appendix 1). Striking is that although at a policy level Japan has one of the most advanced government sponsored digital archives projects explicitly designed to prepare cultural materials for education and edutainment, these initiatives do not enter into Sony's vision of the future.

Meanwhile, at least two features of these clusters are quite different than their counterparts in the United States and Europe. First, whereas the West focuses on educational software, in Japan, the edutainment component targeting education entails hardware robot teachers.

Second, whereas the West largely focusses on new intelligent display technologies within museums, and devices to enhance an individual visitor's experiences in museums, the Japanese quest is for electronic versions of the proverbial guide for groups of tourists. To be sure there is also a tradition of using avatars as museum guides in the West -- one thinks of the monk in INA and IBM's reconstruction of the monastery at Cluny in 1991 -- but these are typically aimed at a "personalised" approach for individuals rather than group experiences. A Canadian company linked with TV Ontario also has virtual hosts:

3D-animated characters are gaining in popularity in the world of entertainment, and can serve as friendly hosts to both physical and virtual museum exhibits. Contemporary wireless technology also allows the host to follow individual visitors around a museum and provide appropriately targeted narration.¹⁵

A fascinating area for future research will be to explore how some cultures such as Japan are integrally related to group experiences, whereas Western cultures particularly encourage individual discovery and self-realisation. This is all the more intriguing because in the religious traditions the opposite would appear to be the case: i.e. in Japan there are many individualistic Shinto and Zen monks, while the West has traditionally had the Christian "mass" or Islamic prayer, which brings together the whole community.

Whether or not one agrees with the Japanese approach, there is a clear sense that they are using the new technologies directly to achieve their goals. Technology is seen as a positive extension of man's capabilities.

3. United States

As in Japan, there are wonderful examples of using play for serious educational purposes. In 1980, video-game designer, Warren Robinett, and educators Ann McCormick Piestrup, Leslie Grimm, and Teri Perl founded the Learning Company¹⁶ which created many excellent products. Robinett produced one of the first educational video games, *Rocky's Boots* (1982), which “was a visual simulation that made it possible for upper-grade-school students to design simple digital logic circuits, using a joystick to move around circuit symbols on the screen and plug them together.”¹⁷

Notwithstanding such examples there is, in America, very much a sense of an enormous gap between high educational goals and crass commercial exploitation, which ultimately undermines rather than realizes the potentials of new technologies. This tension between a high dream and everyday reality is probably as old as civilisation itself and was developed at great length in the neo-Platonic and Manichean traditions. And yet the American version has new twists. For instance, one of the early pioneers in associating education with playfulness was Seymour Papert, who came to MIT in 1963. In 1967, he began working with colleagues in Scotland and Sweden on the Logo project “for the express purpose of encouraging children to learn.”¹⁸ He subsequently developed *Lego Mindstorms*,¹⁹ which as we have already seen above also plays a role in Sony's vision.

On the positive side, Papert's approach has led , in US engineering and science universities such as MIT, Carnegie Mellon and Stanford, to a practice of learning by doing, especially with respect to robotics. This attitude, which is also closely associated with research labs such as the Xerox Palo Alto Research Campus (PARC), has led to dictums such as Negroponte's “Demo or die,” with the positive effect that students produce practical results.

At the same time Papert has complained explicitly that “the preoccupation in America with ‘Making It Easy’ is self-defeating and cause for serious worry about the deterioration of the learning environment.”²⁰ Indeed, several decades of work in this field led him to two conclusions:

The first...is echoed by kids who talk about "hard fun."... They mean it's fun because it's hard....learning is essentially hard; it happens best when one is deeply engaged in hard and challenging activities. The game-designer community has understood (to its great profit) that this is not a cause for worry. The fact is that kids prefer things that are hard, as long as they are also interesting.

The second lesson is the opposite of the idea that somehow learning can be encouraged by hiding the fact that it is happening. Frankly, I think that it is downright immoral to trick children into learning and doing math when they think they are just playing an innocent game.... the deception does not achieve any purpose, since cooperative learners who know what they are doing will learn far better than children who go mindlessly through the motions of learning.²¹

In 1983, the first children's theme park opened (see below). In 1984, edutainment took a new turn when Richard Saul Wurman, of Information architecture fame, noted a “powerful convergence between Technology, Entertainment and Design” (TED). This prompted the first TED conference in Monterey that:

included the public unveiling of the Macintosh computer and the Sony compact disc, while mathematician Benoit Mandelbrot demonstrated how to map coastlines with his newly discovered fractals and AI guru Marvin Minsky outlined his powerful new model of the mind. Several influential members of the burgeoning 'digerati' community were also there, including Nicholas Negroponte and Stewart Brand.²²

From this emerged an annual conference on technotainment, which subsequently moved to New York in 1997.²³ In Wurman's vision, technotainment amounts to "a parallel system of learning that will be created by the technology and entertainment industries."²⁴ While this conference, with an entry fee of \$2,500, continues to attract luminaries such as George Lucas and Steven Spielberg, some would argue that it is precisely these powerful media moguls who have joined up with game designers to produce new forms of commercial edu-tainment where the emphasis is largely on the latter part of the term and where there is much more technology push than user or market pull.

In the past decades, several kinds of edutainment have evolved. First, there is serious edutainment, which is linked to new forms of learning. Second, there is the commercial edutainment, which Papert associates with game designers. This has led far beyond games to entertainment centres and theme parks. Third, there are many activities within memory institutions and museums that are developing in parallel with, but separately from, the above.

Edu-tainment and New Forms of Learning

Once upon a time, it was assumed that the advent of television would introduce extraordinary new potentials for learning. Instead the "market" has favoured the rise of soap operas, talk shows and "reality"²⁵, which consists largely of placing individuals in "unreal" situations such as "Temptation Island"²⁶ and Big Brother.²⁷ Nonetheless, the Discovery Channel and the National Geographic Channel have confirmed that there is a world-wide market for well produced programmes with solid educational content. The US also has the Learning Channel and recently the History Channel made a deal with Southpeak²⁸ Interactive to produce serious edutainment programmes. There are numerous lists of edutainment examples.²⁹ While many are directed at children³⁰ a number are explicitly edutainment titles for adults.³¹ Edutainment is sometimes linked with unexpected subjects ranging from puppetry³² to philately.³³ Some, including Dee Dickinson of new Horizons for Learning, associate "edutainment," with "accelerated learning, immersion techniques, learning styles, multiple intelligences, learner-paced exploratory learning, learner driven studies, team learning and various technology-based learning enhancements."³⁴

In North America, Houghton Mifflin produced a number of edutainment products, which is said to be one of the reasons why Vivendi sought to acquire it.³⁵ McGraw Hill bought Tribune education³⁶ for its edutainment aspects. Pearson bought the Family Education Network,³⁷ an interactive learning and edutainment site that links children, parents and teachers.³⁸

Meanwhile, initiatives such as the Teacher Education Programme (TEP) at MIT are developing a healthy critical stance with respect to the products offered through edutainment, ranging from educational software through more popular games such as *Civilization II* and *Sim[ulation] City*.³⁹

The theme of simulation, often linked with scientific visualization, has proved to be one of the most fertile fields for serious edutainment. For instance, the *Virtual Frog*⁴⁰ as part of the *Virtual Creatures*⁴¹ project introduced the idea of learning the lessons of dissection without needing to kill millions of frogs each year. This principle has spread to the *Visible Human*,⁴² and the *Virtual Human* with 3D anatomy,⁴³ the *Virtual Hospital* with dissections of the brain⁴⁴ and to a number of other scientific activities such as flight simulation. Roger Shank, who founded the Institute for Learning Sciences in 1989, would have us take this approach much further:

The air flight simulator is a very good piece of educational software; there is no better way to learn to fly that isn't dangerous. Learning by doing is a practical reality given good simulations. The problem is both to build those simulations and to reinvent a curriculum based upon this new technology and the idea of learning by doing.⁴⁵

While rhetorically attractive, this approach entails a danger that students focus so much on doing that the theory underlying their simulations is either minimised or ignored altogether. This is a challenge with most of the P based trends: problem based, project based, product based learning.⁴⁶ Indeed there are interesting parallels between the constructionist notions from artificial intelligence and the more recent trends towards constructivism and deconstructionism. By co-incidence, Roger Shank is a good friend of Marvin Minsky.

Meanwhile, through the notion of virtual laboratories and collaboratories, scientific experiments can increasingly be performed at a distance. This introduces wonderful new potentials. For instance, as was demonstrated at INET 2000 in Yokohama, a student or junior scientist far away from major centres can theoretically use their everyday PC to operate a multi-million dollar electron microscope (in San Diego) or other equipment at a distance.

Some would claim that such activities are far removed from edutainment and belong to the heart of serious science. It may well be that there is a continuum linking the simulations in games, everyday school science experiments and the frontiers of scientific endeavour. One of the challenges of the next generation is to identify and to define where on this continuum the boundaries of these activities lie.

Also needed are new approaches, methods and procedures to ensure that in our passionate dissection of and experimentation with virtual simulations of the physical world we do not lose our sense of "hands on" experience of physical reality which is inevitably messier than our all too clinically pure models and simulations. Already there are jokes about the young teenager who, when confronted by a friend in danger of drowning, desperately presses the escape buttons of his game console and is shocked to see that his virtual action has no physical effect.

Commercial Edu-tainment Games

Meanwhile, the ubiquitous American quest to make money even in education is leading to many examples where the edu- is minimal and the -tainment dominates. Seymour Papert once shrewdly remarked that: "It's easier to throw money at attracting eyeballs than at attracting minds."⁴⁷ His colleague at MIT, Marvin Minsky⁴⁸ expressed similar views in 1986:

Children's Edutainment has become immensely popular and commercially successful with parents, teachers and children. In the past, however, teachers and parents did not see the importance of Edutainment...Educational researchers and psychologists have written extensively about the benefits of play as an integral part of children's learning...Enjoyment, which has been banished to the realm of the entertainment sciences, may be the most powerful influence of all on how each person learns.⁴⁹

Along the same lines, Roger Shank, claims: "Edutainment has meant some silly game that purported to be teaching valuable facts to children."⁵⁰ Isabel Hoffman, an early pioneer of children's edutainment in the form of games claimed that her company Nikolai.com was forced to close in June 2001 as a result of these strictly commercial interests:

The education of our children, their emotional and formative development, have become overshadowed by the vested interests of media giants who are not looking ...only at inundating children with activities that support consumerism and homogeneity. Education, edutainment, exploratory entertainment and activities which provoke a sense of individualism, pride, and self-worth within a diverse social fabric, are all pushed aside....⁵¹

Theme Parks

In the meantime, edutainment in theme parks is an area that has come increasingly to the forefront. One of the great pioneers in this realm was Walt Disney who began to build Disneyland on 21 July 1954, one year before it was opened to the public. At the entrance to the park he built Main Street, U.S.A:

For those of us who remember the carefree time it recreates, Main Street will bring back happy memories. For younger visitors, it is an adventure in turning back the calendar to the days of grandfather's youth.⁵²

Note that the purpose was to relive the typical turn of the century, city Main Street and that the purpose was not to conserve a specific street as an historical site. Walt Disney was not concerned with maintaining specific objects of America's history. He was concerned only in the rhetorical effects and the atmosphere generated by such objects or their surrogates.

This conscious choice to create a world with no direct relation to specific objects and places was part of a much larger vision. In *Adventureland*, he was not interested in reconstructing faithfully a specific place in Asia or Africa. Rather his goal was to produce a generic "exotic tropical place" in a "far-off region of the world." Similarly, *Frontierland*, was designed "to give you the feeling of having lived...during our

<i>Terminator 2</i>	3-D Battle Across Time
<i>E.T.</i>	Adventure
<i>Back to the Future</i>	The Ride
<i>Men in Black</i>	Alien Attack
<i>Jaws</i>	
<i>Earthquake</i>	The Big One
<i>Twister</i>	Ride it Out

Figure 2. Examples of films reconstructed as physical rides and experiences in Universal Studios Florida.

countries [sic] pioneers days.” *Fantasyland* used adaptations from European fairy tales (Anderson, Grimm) such as Peter Pan, Cinderella and the Sleeping Beauty as springboards for the imagination. Meanwhile, *Tomorrowland* considered possible future buildings and scenarios. In the US, the 1980s saw the rise of Childrens Entertainment and Edutainment Centres (CECS). The first of these is said to have been Physical Whimsical in Englewood, Colorado in 1983.⁵³ As early as 1981, Universal Studios had begun plans for a theme park, which finally opened as Universal Studios Florida idea in 1990.

This theme park used a series of recent films as points of departure. Their themes turned around potential danger from space (e.g. *E.T.* and *Men in Black*), time travel (*Terminator 2*, *Back to the Future*) and from nature’s dangers (e.g. *Jaws*, *Earthquake*, and *Twister*, cf. figure 2). There was also a *Game Lab*.⁵⁴ In most of these the focus is not on the edu- and almost exclusively on the –tainment.

In 1999, Universal Studios opened a second theme park called *Islands of Adventure*. It began with a Port of Entry to “reflect the crossroads of a Port town.” As in the original Disneyland, the quest was to reproduce a generic port town, not to conserve a specific, historical port town.⁵⁵ The other islands included comic book/video game figures (*Marvel Super Hero Island*, *Toon Lagoon* and *Seuss Landing*) as well as further reconstructions of two films, *Jurassic Park* and *Lost Continent*.⁵⁶ While highly entertaining, such physical manifestations of the imagination further undermine clear distinctions between the historical events linked with a specific time/place and an a-temporal, generic sense of the past.

Meanwhile, by 1989 Walt Disney had opened his enormous complex at Orlando, which has continued to grow in the past two decades. Disney Orlando took the approach of the original Disneyland to a far more ambitious level. For instance, one of the theme parks includes the *Holy Land Experience* that:

re-creates the city of Jerusalem and its religious importance between the years 1450 B.C. and 66 A.D. (through the Old and New Testaments, from Genesis through Revelation). The “living Biblical museum,” with its themed costumes, dramatic enactments, special music and high-tech presentations, transports guests 7,000 miles away and more than 3,000 years back in time. The newly opened Scriptorium, features some of the finest biblical antiquities on display anywhere in the world.⁵⁷

Oceanography

- SeaWorld Orlando
- Trainer for a Day
- False Killer Whale Interaction Program
- Animal Care Experience
- Sharks Deep Dive
- Sharks Underwater Grill
- Discovery Cove

Zoology

- Disney's Animal Kingdom
- Rafiki's Planet Watch
- Green Meadows Petting Farm

Astronomy

- Kennedy Space Center Visitor Complex
- Dine with an Astronaut program.
- Astronaut Hall of Fame

Drivers Education

- Stallion 51 Corporation's Orientation Flight Program
- Fantasy of Flight
- Richard Petty Driving Experience

History

- Orange County Regional History Center
- The Holy Land Experience

Physical Education

- Golf academies
- Craig Carroll's Cocoa Beach Surf School at Disney's Typhoon Lagoon

International Relations

- Florida Splendid China⁵⁸
- Epcot World Showcase.

Cinematography

- Disney-MGM Studios
- Universal Studios

Figure 3. Categories of Edutainment at Orlando Theme Park.⁵⁹

The Epcot World Showcase recreates “ sights, sounds and cuisines” from ten countries (Canada, China, France, Germany, Italy, Japan, Mexico, Morocco, Norway, the United Kingdom and the United States). The Florida Splendid China is a “76-acre park displaying more than 60 miniature replicas of China's historical landmarks, including The

Great Wall, The Forbidden City and The Tomb of the Terra Cotta Warriors.”⁶⁰ What makes these examples both fascinating and disturbing is that they are creating a new kind of virtual tourism where the “safe” experience of edutainment competes with the “dangers” of experiencing real historical monuments and cultural treasures. This is virtual tourism of a special kind: Once one has seen the copy “theoretically” there is no longer an incentive to see “the real thing.” Indeed by offering a *Holy Land* without the dangers of a “peacekeeping” Israeli army and of Palestinian “terrorists,” the Disney experience implicitly offers something that rhetorically surpasses the real thing: all the “holiness” and none of the danger of the original.⁶¹ By implication, the original is no longer important for tourism: at best it poses a distant competition.

In addition, other cultures are presented through a filter not controlled by the country from which the culture stems. I am reminded of my first visit to the Conference on World Affairs in Boulder, Colorado where one of the organisers proudly boasted: “We are so international that we can speak about the whole world without needing any foreigners.”

Also striking is the enormous range of the 25 edutainment offerings under eight major themes: Oceanography, Zoology, Astronomy, Drivers Education, History, Physical Education, International Relations, Cinematography (figure 3). If the original Disneyland began to map key provinces of the American imagination, Orlando is attempting to map the entire spectrum of science and culture. What poses as edutainment, is effectively a transformation of all experience into an American world-view.

All of the above experiences occur outside museums and memory institutions. To a certain extent they create surrogates that compete with and even threaten to replace functions of memory institutions. They are tourist attractions of a special kind that compete with the original archaeological and historical sites, which they simulate.

In the past years, the Internet is playing an increasing role in all these developments. For instance, America OnLine (AOL) now describes itself as an “edutainment” Internet ISP.”⁶² As one of their executives remarked: “The Internet itself is educational and entertaining. I think almost anything you do through the Internet is going to fall into the edutainment world.”⁶³ In this vision, many distinctions made elsewhere in the world would disappear.

In Japan, we noted that commercial, robotic edutainment remained largely separate from their digital archives projects. Nonetheless, robotic edutainment was used to provide new kinds of physical avatars to serve as guides for groups in museums. By contrast, in the United States commercial edutainment and memory institutions remain different worlds not least for copyright reasons (cf. below).

Inside Memory Institutions

The term ‘museum education’ has 1, 870,000 hits in Google. In the US, as in Europe, museums typically have an education department and major museums such as the Metropolitan have their own educational resources site.⁶⁴ The National Art Education Association (NAEA) has over “22,000 art educators from every level of instruction.”⁶⁵

There is an Association for Advancement of Arts Education (AAAE),⁶⁶ an Art Education Advocacy⁶⁷ group; a Museum Education Roundtable;⁶⁸ National PTA Arts in Education Resource Libraries.⁶⁹ In addition, various states such as Arizona⁷⁰ and Missouri⁷¹ have their own Art Education Association.

There are bibliographies on museum education by groups such as The Association for Living History, Farm and Agricultural Museums (ALHFAM)⁷² and the Exploratorium. Inasmuch as they are committed to making the contents of memory institutions readily accessible, all these organisations are implicitly active in the realm of edutainment. Strikingly enough, their activities have almost nothing to do with the commercial initiatives outlined above. Indeed, if one goes to the National Initiative for Networked Cultural Heritage (NINCH) and enters edutainment via the search function there is not a single hit.

In short, in the United States there is a radical distinction between cultural memory institutions which are typically committed to presenting objects in their historical contexts and commercial companies concerned with edutainment, which are concerned with creating surrogates that often compete with historical sites. A paradoxical consequence is that the US, which lays such emphasis on commercial potentials loses out in the realm of tourism, now one of the most significant sectors of the economy (see below).

4. Europe

Outside the Memory Institutions: In America's Footsteps

Europe's position with respect to edutainment is complex. One trend is simply to follow the US approach. As in the United States, there are many robotics labs in Europe. For instance, the lab at the Politecnico di Milano was founded in 1973 and has a strong section on edutainment "where Lego Mindstorm kits are used to teach basic concepts about project development, programming, sensors, feed-back systems and group work"⁷³

Vivendi Universal Productions, which follows American trends consciously, sees (saw) itself as the no. 2 worldwide in education⁷⁴ (edutainment, elearning) and games.⁷⁵ Vivendi links films, music, games and edutainment in Hollywood style:

Knowledge Adventure is also leveraging Universal Pictures top priorities by creating edutainment PC products for kids. In 2002, for example, Knowledge Adventure will release 'Super Star Rivals' a game involving Universal Music rock stars.⁷⁶

Similarly, Cività (Rome) is working directly with Walt Disney in a project called the *Game of Art (Gioca d'arte)*, which strives to bring children "closer to art playing together with mythical [sic!] Disney personalities."⁷⁷ Why one of Europe's oldest cultures should need the likes of Mickey Mouse and Donald Duck to explain its heritage is a matter for debate. At the same time, Cività has also joined with Acea and Costa Edutainment to found Zètema with an explicit purpose "to collaborate in the most significant manifestations of a social, humanitarian, cultural, artistic or sportive character in order to

Contents	Multimedia Production	Multimedia Distribution
Sports		Live Events
News	Leverage on technology	Television
Corporate	and contents to offer	Satellite Television
Communication	integrated multimedia	CD-ROM/DVD
Edutainment	communications services.	Broadband
Entertainment		Internet
		Wireless

Figure 4. Edutainment as an ingredient for Multimedia Production and Distribution according to Euphon.⁷⁸

bring value to the city [of Rome],”⁷⁹ an approach that is again much more in keeping with the European tradition. In other cases also, Europeans are working directly together with America in creating new edutainment products. For instance, Euphon, one of the largest post-production and edutainment companies in Italy and Spain works directly with Microsoft, Cisco, Olidata, AMD, Telecom Italia, to organize the SMAU ILP - Gaming online", the largest public networked videogame event in Europe linking 1,500 computers in the presence of 300,000 spectators.⁸⁰ And yet this is only one dimension of the European scene.

Commercial Edu-tainment and Games

When Euphon began in 1983, its focus on edutainment was with a “view to creating projects for multimedia pavilions for theme parks, museums and fairs.”⁸¹ In 2002, this had become one of three main areas of Euphon’s activities, namely 1) Broadcasters, Publishers, Rights Distributors; 2) Corporate Clients and 3) Theme Parks, Museums (Edutainment).⁸² In the meantime, edutainment content has become one ingredient for Multimedia Production and Distribution (figure 4). For all this the field remains very much in flux. A clear typology is still needed.⁸³

Mobile services are introducing further changes. A study by Andersen for the European Commission on *Digital Content for Global Mobile Services* contained a section on edutainment. It drew attention to three early examples: 1) Omnitel’s Omni Arte (1996), which was one of the first edutainment services for major tourist attractions based on user-location information;⁸⁴ 2) Mappy (a France Telecom subsidiary), that “delivers tourist information as well as interactive maps throughout Europe”;⁸⁵ 3) Lonely Planet CitySync, “the first stand alone travel guide developed specifically for handheld platforms by a leading travel guide publisher.”⁸⁶

	Edu-Games	Interactive Publications
@Home	Grammar games Math games Science games	Encyclopaedias Dictionaries Cultural books Museum guides
On the Road	Museum discovery Treasure hunt in city	City Guides Museum audio guides Translators, Maps

Creating content	Content provider
Creating application	Application developer
Brokerage	Publishers
Packaging	Publishers, Portals, Handset manufacturers, network operators
Distribution	Portals, Handset manufacturers, network operators
Customer Management	Publishers, Portals, Handset manufacturers, network operators

Figures 5 and 6. Edutainment topology⁸⁷ and a mobile edutainment value map⁸⁸ according to Andersen 2002.

The Andersen study provided both an edutainment topology (figure 5) and a mobile entertainment value map (figure 6). It discussed the cases of music and adult entertainment separately and outlined three areas where public museums, art galleries, and historical sites might use mobile edutainment services, adding that these might also be interesting for national and regional tourism organisations:

- 1) to make reservations and pay for tickets
- 2) to consult rich media content on works of art
- 3) to provide virtual tour guides.⁸⁹

Video Games and Personal Games

In an attempt to understand better the quickly changing field of games, Torben Svane, has created a typology of eight different kinds of games. In addition, he has identified five basic genres, namely, Action, Adventure, Educational, Sports and Role Playing Games (RPG).⁹⁰ If we ask, what is different in European, as opposed to American, Japanese or other games, one of the obvious answers concerns their cultural content. Other differences pertain to new interactive groups and distributed approaches.

We noted that, in the United States, edutainment is typically committed to generic products, which are opposed to historical sites that have a specific time and place. By contrast, Europe has produced a new genre of software, where historical reality and reconstructed edutainment are closely coupled. The *NUovo Museo Elettronico (NUME)* project, led by Francesca Bocchi and her team, which reconstructs the city of Bologna over a millennium from the year 1000 to the present, is an outstanding example.⁹¹

Board/Card Games	Chess Monopoly, Poker	First Person Shooter	Wolfenstein, Doom, Quake, Unreal
Strategy	Age of Empires, Red Alert, Warcraft	Team Shooters	Rainbow Six Counterstrike
Simulators	MS Flight Train, Sim City, Sims	Hack and Slash	Diablo (isometric)
Creative Games	E-Jay	Fantasy	Ultima Underworld, Myst, Anarchy Online

Figure. 7. Game Typology by Torben Svane, Halmstadt University.⁹²

Pioneering in this context was a project by Cognitive Productions called the *Microgallery* (1991) “the first large-scale multimedia production on public view”⁹³ at the National Gallery in London. Montparnasse (1992) produced a CD ROM of the Louvre, which was one of the first CD ROMs of a major museum.⁹⁴ It is estimated that 15-25% of all CD ROMS in Europe are cultural.⁹⁵ Between 1992 and 1995, Infobyte (Rome) created some of the first high-resolution virtual reality environments of major cultural sites using high-end Silicon Graphics Reality Engines. In 1996, three of these reconstructions were combined in a game called the *Holy Grail*:

that allows [one] to visit some of the most important monumental environments. Giotto's Frescoes, *St. Peter's Basilica*, *Nefertari's Tomb* are linked via transit environments in order to form a virtual artistic universe that breaks the barrier of time and space. Two players move around in this parallel world, the hero and the antagonist. The peculiarity of this application is that it can be used by 15-20 people therefore eliminating the limitation of virtual reality, that of being used only by one person at a time.⁹⁶

Date	Title	Company
1991	<i>Micro Gallery</i>	National Gallery, Cognitive Productions
1992	<i>Louvre</i>	Montparnasse
1993	<i>Assisi</i>	ENEL, Infobyte
1994	<i>Nefertari Light of Egypt</i>	Infobyte, Getty, Fondazione Memmo
1995	<i>Colosseum</i>	ENEL, Infobyte
1996	<i>The Holy Grail</i>	Infobyte
1996	<i>Versailles 1685</i>	Canal+, Cryo, RMN
1998	<i>Egypt 1156 BC</i>	Canal +, Cryo, RMN now Moby Games ⁹⁷
1999	<i>China: The Forbidden City</i>	Cryo now Moby Games
2000	<i>Aztec</i>	Cryo Interactive ⁹⁸
1999	<i>Virtual Reality Notre Dame</i>	Digitalo Studios
2000	<i>Louvre. L'ultime Malédiction</i>	Wanadoo Editions
2000	<i>Paris 1313</i>	Wanadoo Editions
2001	<i>Versailles II</i>	Cryo, RMN, Versailles
2002	<i>Jerusalem</i>	Cryo, RMN

Figure 8. Examples of Cultural Edutainment Titles.

Meanwhile, the focus was slowly shifting to France. Also in 1992, Cryo Interactive Entertainment produced a mystery game on the *KGB* and an adventure game based on Frank Herbert's *Dune*. In 1996, Cryo, working together with Canal+ and the Réunion des Musées Nationaux (RMN), produced a murder mystery game, *Versailles 1685*, set in the palace of the Sun Emperor. This led to *Versailles II* (2001), with three consultation modes:

- 1) a cursor-guided tour around the town of Versailles, chateau and gardens
- 2) a trip through history by exploring the documentation/ reference section
- 3) the adventure game itself.⁹⁹

The same group worked together to produce *Egypt 1156 BC* (1998),¹⁰⁰ which Tom Houston has described as being among the best edutainment games. This has since become, *Egypt Tomb of the Pharaoh* by The Adventure Company¹⁰¹ complete with a *Solutions Guide* as a further product. In 1995, the Voyager Company in the United States had produced a CD ROM on the *First Emperor of China* to mixed reviews.¹⁰² In 1999, Cryo produced *China: The Forbidden City* about a murder in the year 1775 for which the Emperor Qianlong wants the player to find the assassin. The game leads one "to meet typical Chinese characters of the epoch, and uncover a net of intrigues."¹⁰³ Cryo went on to produce *Aztec* (2000).¹⁰⁴ Since then this type of game is becoming a genre with recent examples such as *Jerusalem* and *Pompeii*. The company was renamed ERE Informatique and subsequently became DreamCatcher Europe.

In 2000, a merger between Index Publishing and France Telecom Multimedia Edition led to Wanadoo Editions, which produced *Paris 1313* (2000) and *Louvre. L'ultime Malédiction* (2000). The following year saw the appearance of a new film *Belphégor - Le Fantôme du Louvre* and a 26 part animated comic series, *Belphégor*.¹⁰⁵ Consolidation also occurred. That same year the Frenchman, Jean Pierre Nordman, bought the international section of the Learning Company and called it Mindscape,¹⁰⁶ (October 2001), while Montparnasse, Galilea and ITI agreed to produce materials for Microsoft TV.¹⁰⁷ Mindscape then bought the pioneering Montparnasse Multimedia (April 2002). In the next months, Mindscape, Cryo, Hachette, RMN, Vivendi Universal and others joined forces as the SELL (Syndicat des Editeurs de Logiciels de Loisir).¹⁰⁸ Perhaps because of these many mergers and takeovers the French multimedia scene has changed dramatically in the course of a decade from production of isolated CD ROMS to productions which are fully cross media: i.e. CD-ROM, Internet, film, animation, comics, books.

America in Europe's Footsteps

We have already noted that in some areas, Europe is following in America's footsteps. With respect to the cultural scene the converse can be discerned. For instance, in 1999, the Florida based Digitalo Productions, "with the support of the VSMM Society, the Virtual Systems Laboratory in Gifu Japan, Epic Games©, 3DFX©, Matrox©, and independent real-time developers and pioneers from all over the world," announced that they were about to launch *Virtual Reality Notre Dame*, the "First Gaming-Based, Multi-User, Real-time Virtual Experience!,"¹⁰⁹ which they described as a "monumental

endeavor in the field of real-time architectural reconstruction and cultural/world heritage preservation.” The site foresaw multi-user chatting including chat sessions with the Hunchback of Notre Dame and virtual tour guides. It even described how the idea of virtual weddings in the VR model were under discussion.¹¹⁰ Problems at Unrealty¹¹¹ delayed the software. Meanwhile, Disney has produced an edutainment project called *Hunchback of Notre Dame*:

From the catacombs beneath Paris to the bell tower of Notre Dame,
a great reading adventure is calling your name!
Come join your favorite characters throughout 26 incredible screens. You'll help Quasimodo
rescue Esmeralda while playing challenging and hilarious activities that improve reading,
vocabulary and problem solving skills.¹¹²

While suitably dramatic this is a marked contrast to the tone of the European productions, and recalls the caveats of Seymour Papert and Marvin Minsky cited earlier.

We noted how Infobyte’s very detailed reconstruction of the *Tomb of Nefertari* (1994) was incorporated into a virtual reality game, *The Holy Grail* (1996). This led in turn to *Egypt 1156 BC* (1998) which some claim should “properly be recognized as the original [Lara Croft] *Tomb Raider*”¹¹³ (1998)¹¹⁴ Lara Croft can hardly be called edutainment in the strict sense as it deliberately distorts historical accuracy. For instance, in the film version of *Lara Croft* the famous dining hall of the Royal Naval College (Greenwich) is moved to Venice as a meeting place of the Illuminati. Even so, the example is intriguing because it is symptomatic of a trend whereby stories in one medium, e.g. games or books, are adapted and transformed into a series of other media such as film (cf. also *Lord of the Rings*. *Harry Potter*.¹¹⁵) This is also happening at the national level. For instance, the German film *Jimmy Neutron*, has now appeared as an edutainment DVD, *Jimmy Neutron der mutige Erfinder*.¹¹⁶ A new trend called “machinima” whereby game developers use their techniques for low-end movies is adding a new dimension to these developments.¹¹⁷

Interactive Group Audiences

The past decade has seen numerous experiments in the direction of new interactive group audiences. Canada’s IMAX, for instance, has developed 3-D films with 3-D sound which entail new kinds of immersion. Canada has also produced Immersion Studios, which claims to be “the world’s finest, media interactive technology and consulting solutions for museums, educators and businesses.”¹¹⁸

Europe’s “equivalent” is De Pinxi which creates “experiences, from storyboard to integrated solutions for museums, theme parks and communication events.”¹¹⁹ Some of their products, such as the reconstruction of the Grande Place in Brussels or of Aztec cities are painstakingly realistic. So too is a project in the Nestle *Alimentarium Museum* in Vevey, Switzerland which allows interactive travel through a Virtual Human Body reminiscent of the film *Fantastic Voyage* (1966)—cf. analogous work by Immersion Studios in the Mubarak Centre in Cairo.

However, unlike many who strive only for maximum realism, Philippe Chiwy, the president of De Pinxi, is concerned also with creating imaginary spaces that deliberately distinguish themselves from the details of the natural world. Accordingly one of their projects in conjunction with Laval is to combine scanned images of a number of Henri Rousseau (le Douanier's) wild forests in order to create new fictive spaces through which one can walk.¹²⁰ In another context they created the first virtual reality game show happening on a TV set.¹²¹

Such developments are important not only because they are introducing new kinds of group interactivity but also because they are leading to further cross-interface and cross-media experiences between what happens on a computer screen, on the wall of a conference, exhibition or fair, on television and/or on film.

Distributed Audiences

Next logical steps on this continuum of interchangeable media and presentation screens have been long in the making. Already in 1995, IBM and BBC were using blue rooms in order to place moderators/speakers in one location within reconstructions of Pompeii situated in another location. The Distributed Video Production (DVP) project (ACTS 079) developed this idea. In the past years, CINECA working with RAI, has taken this principle one step further, such that virtual sets can take individuals into a reconstruction of the *Casa del Centenario* in Pompeii and put this on television. This could be linked with an existing Cybernarium¹²² and with what Maurizio Forte foresees as Virtual Heritage Centres (VHCs).¹²³

A next logical step would be to put such reconstructions on line and make them available in a classroom. Hence, instead of simply reading a history book about Pompeii, the classroom becomes a virtual set such that students find themselves directly in the site which then changes to accommodate various interpretations. To be sure, this assumes widespread deployment of very high speed networks (e.g. GEANT). As a first proof of concept, Antonella Guidazzoli, with colleagues at CINECA and the Complutense in Spain recently carried out a live demo between Bologna and Madrid in the context of the E-Culture Net Thematic Network.¹²⁴

Meanwhile, pioneering companies such as Vicomtech are exploring new links between interactive digital TV and computer graphics,¹²⁵ that point to new combinations between TV and computer experiences such that one can have common services with local interactivity¹²⁶ or have a: "Virtual Educative Environment whose main element of interaction between the individual and the environment consists of a Conversational Interface of a user, in the form of a three-dimensional avatar, with a capacity of synthesis of speech in real time in Basque and Spanish."¹²⁷

A related project entails a local storybook figure in the form of a cow, Abateus, who is able to interact with users in the local Basque language and dialect.¹²⁸ Meanwhile, in Germany, Manfred Thaller (Cologne), is working on Digital Autonomous Cultural Objects (DACOs), a software protocol that builds on the Open Archive Initiative (OAI), and allows new access to regional and local databases while leaving intact their original structures.

While not nearly as well publicised as the mega-million edutainment efforts of Disney and AOL, such initiatives are potentially revolutionary because they introduce possibilities of standard programmes from the international domain with which one then interacts in one's own language and/or dialect. Conversely they also enable local content to be made accessible in new ways to national and international audiences. This new interplay between local, regional, national and international culture promotes cultural diversity and as such offers an important counterbalance to the McWorld¹²⁹ trend with its dangers of a McDonalised culture.¹³⁰

Edu-tainment and New Forms of Learning

In marked contrast to the United States, where Americans themselves complain of the oversimplistic approach of edutainment, there is a deeper dimension to Edutainment in Europe. For instance, in 2001, the German Chapter of the International Society of Knowledge Organisation (ISKO) organised a conference on Knowledge Organisation and Edutainment.¹³¹ Indeed, Torben Svane¹³² (Halmstadt University, Sweden), who has been working on international co-operation for software design, defines edutainment as "computer based systems for learning and leisure in homes, schools, and at work."¹³³ As such, edutainment covers a wide spectrum of activities including e-learning systems, console and computer games, advertising games, informative multimedia, instruction technology, commercial and military technology.¹³⁴ Meanwhile, a Belgian company, Eduline, also has a goal "to allow children to discover the Net in an educative and entertaining way, accompanying them, guiding them through the New Technology World as well as online learning."¹³⁵

At the same time there is also a higher sense of serious playfulness in the European concept of edutainment. For example, the Intelligent Information Interfaces Network (I cubed or I³ net) introduced a number of projects where play and learning were very creatively combined.¹³⁶ Elsewhere, at Sussex there is a project called *Chromarium* which entails "a mixed reality environment (MRE) to enable children to explore novel ways of creating and mixing colours." Another project at the same university is called *Ambient Wood*:

A playful learning experience was developed where children explore and reflect upon a physical environment that had been augmented with a medley of digital abstractions. The latter were represented in a number of ambient ways, designed to provoke children to stop, wonder and learn when moving through and interacting with aspects of the physical environment. A variety of devices and multi-modal displays were used to trigger and present the 'added' digital information, sometimes caused by the children's automatic exploratory movements, and at other times determined by their intentional actions. To this end, a field trip with 'a difference' was created, where children discover, hypothesize about and experiment with biological processes taking place within a physical environment.¹³⁷

Rather than seeking to replace the physical environment with spaces that are essentially escapist, this approach uses technology to make children more aware of features in the natural landscape.¹³⁸ The German Netzspannung Network and the European artnouveau network are bringing together other players in these emerging fields.

Edutainment Robotics

We noted earlier that edutainment robotics plays a particularly strong role in Japan. It also plays a significant role in Europe. Denmark boasts ‘strong skills in adaptive robot technology and edutainment robotics.’¹³⁹ In Germany, the official, international edutainment robotics portal is maintained by the former GMD (now Fraunhofer) in Sankt Augustin.¹⁴⁰

Thomas Christaller at the Fraunhofer’s Institute for Autonomous Intelligent Systems (AiS), organized the first international workshop on edutainment robotics (27-28 September 2000) and also did an important market study on edutainment¹⁴¹ in which he noted that robots, which were previously limited to automation tasks in industry will play an increasing role in schools and universities and also in everyday life. He drew attention to "The Cool Science Institute", an initiative in Baden-Württemberg and Bavaria, which is developing robotic kits, an educational concept in informatics and engineering disciplines in schools that began some 15 years ago at MIT in order to help students in their understanding of complex systems.¹⁴²

In 2000, LEGO¹⁴³ introduced the RoboCup Junior 2000 Competition¹⁴⁴ along with secondary school classes in 40 Australian schools. This helped them learn to visualise problems and solve problems in teams.

A basic distinction needs to be made between activities within cultural memory institutions such as museums and using surrogates of cultural contents for activities outside memory institutions. We shall suggest that it is particularly in the latter that entertainment has a particular role to play.

Inside Memory Institutions

As in the United States, large European museums have their own education departments. For instance the Hermitage education department has a full time staff of 65 persons. The British Museum has a special Education page.¹⁴⁵ The Louvre initially had two web sites: www.louvre.org which provided access for the general public and www.louvre.edu, which introduced students and teachers to more detailed information, exercises and games on a subscription basis. The essentials of this site were also sold in CD-ROM form. In the near future, the Louvre is combining its .org and .edu functions such that every Internet user will have free, online access to all 120,000 images of the collection in the equivalent of a thumbnail sketch.

Meanwhile, the Centre de Recherche et Restauration des Musées de France (C2RMF), connected with the Louvre, has images of at least 26,000 objects for which there are 150 images per object. At the highest level of research, books are being scanned at up to 767MB per page while paintings are being scanned at 30 GB per image with as many as 24 images per painting. National research councils, such as the Deutsche Forschungsgemeinschaft (DFG) and the Max Planck Institutes are increasingly committed to making terabytes of research results accessible online. Universities are creating thousands

of reconstructions of historical objects, buildings, monuments, sites and even whole cities, cultural landscapes and cultural routes (e.g. the Silk Roads).

Taken together such resources potentially represent thousands of petabytes, i.e. exabytes of knowledge, which can be made available via a Grid for Culture. This has led to an E-Culture Network of Centres of Excellence for Research and Education in Digital Culture, which will have as a central goal the development of a Distributed European Electronic Resource (DEER), wherein these materials can be accessed via a Virtual Reference Room and shared using a Virtual Agora.¹⁴⁶

5. Different Copyright Models

We have noted that developments in edutainment are complex: that in some cases Europe is eagerly copying American models, while in others it is America that is imitating European models. Nonetheless, if we stand back to take a global view of developments over the past half-century it is possible to discern two fundamentally different models for approaching the creative industries which are basic to edu-, info- and techno-tainment.

One model assumes a fundamental distinction between enduring knowledge and collaborative/personal knowledge. In this approach, personal and collaborative knowledge pertain to sharing ideas for collaborative design and the manufacturing industry. By contrast, the enduring knowledge of collective memory institutions (libraries, museums, archives) is seen as original “content” which falls under copyright such that any copy can generate wealth. This assumption leads theoretically to a so-called Content Industry and practically to a Broadcast Industry (figure 9).

Enduring Knowledge	Collaborative Knowledge	Personal Knowledge
Collective Memory Institutions Libraries, Museums, Archives		
Original –Copy Content Industry Broadcast Industry	Draft New-Shared New Collaborative Design Manufacturing Industry	

Enduring Knowledge	Collaborative Knowledge	Personal Knowledge
Collective Memory Institutions Libraries, Museums, Archives		
Original –Copy New Creative Industry	Shared New	Personal New

Figures 9 and 10. Two models for approaching the content industries and the challenges of e-creativity.

Crucial in all this is the question of how far copyright extends. That books published by an author can/should have a copyright is straightforward and obvious. But what about a story, a topic, a theme? Walt Disney adapted the stories of European fairy tales such as *Cinderella*, *Snow White*, and *Sleeping Beauty* and North American legends such as *Pocohontas* without regard to authenticity,¹⁴⁷ let alone copyright, and yet would claim that the copyright concerning those stories now lies with them. American lawyers such as Lawrence Lessig¹⁴⁸ have already drawn attention to some of the legal problems of this approach.

This trend introduced by companies such as Disney is being pushed much further. We have already noted trends to combine real actors with virtual sets representing archaeological reconstructions. This is being applied to theatre such that one can have online virtual reality Greek theatre or regular theatre with virtual reality sets.¹⁴⁹ Since 1988, there has been an emerging field of virtual thespians, or synthespians whereby digital human characters replace human actors.¹⁵⁰ This trend has already been the subject of films such as *Simone* (2002).¹⁵¹ IMAX is releasing *Virtual Actors Featuring The Boxer* (Summer 2003).¹⁵² This has led to the idea of creating virtual celebrities using figures such as Sammy Davis Jr., James Cagney, Marlene Dietrich, Vincent Price, George Burns, W.C. Fields, and Groucho Marx, analyzing video clips of their movements "to create realistic animated 3D likenesses of them for commercials, television, film, and Web sites."¹⁵³

Rather than just copyrighting a particular image or specific film of an actor or actress, there is now a quest to copyright all the possible movements, which a virtual thespian or synthespian could possibly have made in the past or make in the future.

While this makes sense logically, the experience of history points to another conclusion. There is general agreement that the Renaissance was one of the most creative periods in history. It produced enormous numbers of masterpieces by painters from all over Europe ranging from Van Eyck and Dürer in the North to Botticelli, Leonardo, Michelangelo and Raphael in Italy. Their paintings and drawings used common themes such as the *Annunciation* and figures such as the Virgin Mary. Paradoxically, it was precisely because everyone knew these themes, that painters were able to produce Tuscan, French, Flemish, Spanish, Catalan and many other variants, which are now the subject of art history.

What would have happened if the theme of the *Annunciation* was copyrighted?¹⁵⁴ What if the figures of Christ, the Virgin Mary, the Apostles or the Saints were copyrighted? How many *Virgins* would there be if we had to pay for every one? Very simply: there would have been no Renaissance. There would have been no Baroque, no Rococo nor any other of the periods of art history. Indeed, there would effectively be no cultural heritage as we know it today. In the West, most of the great expressions of art have been commentaries on the *Bible* and a handful of classics and epics such as the *Metamorphoses* and the *Divine Comedy*. Similar principles apply in all the high cultures of the world: be it the *Mahabharata* and *Ramayana* in India, the *Three Kingdoms* in China, or the *Tale of Genji* in Japan.¹⁵⁵

Culture comes in many forms. It is essentially about what persons have in common. Initially, in pre-literate, oral cultures, this may be in terms of food, basic rituals, or beliefs, which are shared. In literate cultures, this sharing is increasingly about key texts which eventually form an evolving corpus or a canon, the boundaries of which are usually a subject of debate. Fundamental to all literate cultures, however, is the idea of interpretation and commentary.

From a narrow viewpoint, these commentaries are in the form of manuscripts and books. From a larger viewpoint, drawings, paintings, sculptures, indeed most of what we associate with cultural heritage can be seen as interpretations and commentaries on a sacred text, epic or other classic of that culture. In this context, the richness of a literate culture is measured by the richness of commentaries on its original texts. This means that culture necessarily has an historical dimension whereby it is essentially cumulative. This sets it apart from pure science, where an advance in a law or formula means an abandonment of earlier solutions.

To return to our subject: this is not to say that a particular edition or a specific high-resolution image of the *Annunciation* should not be copyrighted. It does mean, however, that if we try to copyright everything, we effectively destroy the premises for literate culture. Cultural heritage needs to be seen as a cumulative corpus of examples which creative individuals are constantly invited to use as a starting point for new expressions. Merely copying a Leonardo or Breughel painting is boring. Using such a painting to produce a variant can be interesting. Using such a painting as a starting point for an entirely new expression is interesting and potentially fascinating.

From this emerges a second model for dealing with the enduring knowledge/expressions of collective memory institutions (e.g. libraries, museums, and archives), namely that the original and copy are generally available free of charge in the public domain, open-source *avant la lettre*, in order to produce new personal and new collaboratively shared expressions that lead to a new creative industry (figure 10).

This model keeps intact and increases the value of the original such that it becomes an object of tourism. In addition, it makes scholarly study of the history of an object, its original time, place and context, sources for further educational materials. In this model, contextualisation is not just about the original location in space and time of a painting or a statue. It is also about where, how and ultimately why, that work of art stands in relation to literary sources and all the other expressions, which these have inspired. This leads potentially to new encyclopaedic approaches, which are very different than the atmospheric contexts of American theme parks.

The first model has been championed by the United States: the second is championed by at least some factions in Europe. It would be simplistic and wrong to see this as a strict dichotomy or opposition, for as we have noted there are trends in Europe to follow America and conversely. What interests us, however, is to draw attention to one paradox arising from these two choices.

6. Edutainment and Tourism or versus Tourism

The American trend, which attempts to own the original source, leads to owning some version of the source and paradoxically to an erosion of any concept of an historical original. One is so fixed on the quest to own the theme of *Sleeping Beauty*, the atmosphere of a Main Street in general, that the historical study of the original specific place become uninteresting. Indeed one creates edutainment in the form of theme parks, which actively compete with the value of the original. In this model, the incentive for tourism to visit original places and objects is undermined and potentially destroyed altogether.

By contrast, the European tradition, which makes the original freely accessible for all to use and develop, generates copies, variants, sometimes hundreds of versions, which have a cumulative effect of increasing fascination for the original that inspired them. There is no copyright on the theme of *Mona Lisa*, but the fascination to see the original in the Louvre continues to grow, Paradoxically, by not controlling versions of the original,¹⁵⁶ the importance of the site of the original increases. In this context, seeing the original becomes a source for tourism.

The first model has obvious attractions. The American trend means that any historical site anywhere in the world can theoretically be used to create a competing site. To take specific examples. Saint Nicholas was born in Bari (Italy) and became famous as a Bishop of Myra (Southern Turkey). In America, he has become Santa Claus and with the latest edutainment effects at Radio City Music Hall “takes audiences on a 3-D sleigh ride through New York City.”¹⁵⁷ Implicitly, if one has “done” the ride, one can spare visits to Bari and Myra as a tourist.

Santa Claus is not an historical figure in the way that Saint Nicholas is in Europe. He is a symbol of positive things. Fundamental to this American approach is a simple separation between objects and the historical/cultural symbolism that has accrued to them over the centuries. As a result, politically correct persons have no problems in making Santa Claus a black person. Patriotic Americans are free to dress Santa in an American flag, and after the events of September 11, they had no qualms in making Santa into a fireman¹⁵⁸ because firemen were neglected and needed more respect. This poetic license with respect to the past is what makes America simultaneously fascinating and immensely puzzling for Europeans for whom history remains paramount, and for whom an event many centuries ago can be as vivid as if it happened today.

This a-historical approach of the first model has led Americans in Las Vegas to copy the Doge’s Palace and other landmarks of Venice for one of their hotels for which they even provide a virtual visit.TV.¹⁵⁹ In another hotel, the Luxor, there are game ride attractions that reconstruct the *Secret of the Luxor Pyramid* (1996).¹⁶⁰ The producer of this ride, Douglas Turnbull, has since become a Vice President at IMAX which now describes their wide-screen cinema as “the ultimate field trip” in their education section,¹⁶¹ as if such compelling films, which are effectively virtual visits, could replace the need for actual field trips and real visits If films and theme parks could replace tourism that aims at visiting the original, persons will theoretically spend their money as tourists at themes parks and special cinemas.

To a certain extent this is true. In 1999, international travel to the United States represented \$14 billion as part of \$80 billion for services and as compared to \$347 billion for merchandise trade balance.¹⁶² In simple terms, this means that international travel to the US accounted for approximately 3.2% of monies gained. Since then there have been events such as September 11 (2001) and the Iraq war (2003) and revenues from tourism have dropped to an estimated 2.5%.

While the details¹⁶³ of these statistics need not concern us here, they become striking when we recall that tourism in general represents 12% of the world economy and generates \$3.5 trillion annually.¹⁶⁴ This means that the US earns about 20% of the world average on tourism. In this light, a model for edutainment that undermines a tourism inspired by fascination for historical originals is ultimately uneconomical. Europe's trend towards open source and open culture is actually more profitable than many suspect.

7. Conclusions

Notwithstanding much contemporary rhetoric concerning globalization, a survey of developments in edutainment and technotainment reveals a complex picture. To be sure there are trends, which are truly international. For instance, the idea of theme parks, which originated in the United States now have their equivalents in Euro Disney and Tokyo Disney. Nintendo's Play stations and Sony's Aibo dogs are found all over the world, as are multimedia products from European museums. At the same time, Japan, the United States, and Europe are developing quite different approaches.

In Japan, as in Europe, edutainment is closely linked with "serious" learning. Robotic edutainment plays a significant role especially with respect to virtual guides for groups. In the United States, by contrast, edutainment is frequently perceived, even by Americans themselves, as opposed to serious learning, as a commercially successful 'necessary' evil, which undermines the 'hard fun' and challenges of true learning. Meanwhile, in the extreme view of some members of AOL, the entire internet is potentially one big edutainment package.

At the same time, edutainment in the United States is increasingly becoming linked with theme parks offering generic, atmospheric impressions of the past, which undermine and ultimately compete with the authenticity of historical objects that date from a specific place and time. By contrast, in Europe, the emphasis is on reconstructions of the past whereby the complexities of historical and cultural dimensions of knowledge are brought to light. As such the European approach provides a new stimulus for tourism.

It was noted that the European context is generating thousands of petabytes (cf. exabytes) of new materials, which call for high-speed networks and grids for culture if they are to be shared. In addition to connectivity challenges, it was acknowledged that copyright plays a role. Two models were examined in order to suggest that trends towards open source and open culture deserve more attention. If this model is followed, then a new era of edutainment awaits us, with enormously greater amounts of content than would have been thought possible in the past.

Acknowledgments

I am grateful to my assistant Alexander Bielowski for reading the manuscript and offering suggestions.

Appendix 1. Survey of Some Major Edutainment Robotics Companies

Playing, Handicraft, Hobby ¹⁶⁵	
US	15
Germany	4
Australia	1
Canada	1
Japan	1
UK	1
Education, Knowledge Transfer ¹⁶⁶	
US	20
Germany	5
Australia	1
Canada	1
Switzerland	1
UK	1
Information, Entertainment ¹⁶⁷	
US	27
Germany	7
Australia	1
Canada	1
France	1
Japan	4
Netherlands	2
Switzerland	1
UK	1
Adventure Parks ¹⁶⁸	
US	5

Notes

¹ Cf. *De optimo genere oratore: Docere debitum est, delectare honorarium, permovere necessarium.*

See: <http://www.thelatinlibrary.com/cicero/optgen.shtml>

² Johan Huizinga, *Homo ludens. A Study of the Play Element in Culture*, Boston: Beacon Press, 1950.

³ See: http://whatis.techtarget.com/definition/0,,sid9_gci538402.00.html

⁴ See: <http://edu.kde.org/>

⁵ [Competir](http://www.competir.com/) - Portal de Edutainment de Latinoamérica. Recursos de capacitación: cursos, seminarios, tutoriales, consultorías, cd-roms, mentoring y cursos ad-hoc. See: <http://www.competir.com/>. Cf. Edutainment Journal in Chile. See: <http://www.edutainment-ve.com/>. Cf. also the Instituto Sports Adventure International ISAI Edutainment Model. See: <http://www.satglobal.com/edutain.htm>.

⁶ See: <http://www.edutainment.com.au/>

⁷ This is described by Cristobal Garcia, MIT. See: <http://kurier.at/multimedia/216200.php>. Cf.

<http://cms.mit.edu/mit3/subs/works.html#garcia>

⁸ See: <http://www.kyoto-one.ad.jp/edutainment/ef2001/english.html>

⁹ See: <http://pr.fujitsu.com/jp/news/1995/Oct/30-e.html>

¹⁰ See: http://www.sega.com/games/esrb_ratings.jhtml

¹¹ See: <http://www.kidsdomain.com/review/kdr/spicosys.html>

¹² See: <http://www.us.playstation.com/games/SLUS-00622.asp>

¹³ See: <http://www.angelfire.com/in/kylenein/readers/topgames.html>. Cf. *Pac-Man, Fever, Monopoly.*

¹⁴ See: <http://www.edutainment-robotics.com/edutainment.html>

¹⁵ The Learning Edge Corporation. See: <http://www.theledge.com/servmuseums.htm>

¹⁶ See: <http://www.warrenrobinett.com/learningcompany/index.html>

¹⁷ See: <http://www.warrenrobinett.com/rockysboots/index.html>

¹⁸ See: <http://www.technomanifestos.net/index.pl?Logo>. Cf:

“Why then should computers in schools be confined to computing the sum of the squares of the first twenty-odd numbers and similar so-called problem solving uses? Why not use them to produce some action? There is no better reason than the intellectual timidity of the computers-in-education community, which seems remarkably reluctant to use the computers for any purpose that fails to look very much like something that has been taught in schools for the past centuries.” (Papert and Solomon, 1972).

¹⁹ See: <http://www.papert.org/>. Cf. <http://mindstorms.lego.com/eng/default.asp>

²⁰ Seymour Papert, “Does Easy Do It? Children, Games, and Learning,” *Game Developer* magazine, “Soapbox” section, June 1998, p. 88.

See: <http://www.papert.org/articles/Doeseasydoit.html>. Cf. Ken Kahn <kenkahn@toontalk.com>, moderator Does Easy Do It? Children, Games, and Learning. Summary of [GDC99](#) Roundtable discussions held on March 16, 17, and 18, 1999.

See: <http://www.toontalk.com/English/easydoit.htm>. There are many publications by Papert. Cf Papert, S., and Solomon, C., “NIM: A Game-Playing Program”, MIT/AI Memo No. 254, LOGO Memo No. 5, January 1970; Papert, Seymour, Artikel: The Children's Machine; in: *Technology Review*, July 1993, Volume 96, Nr. 5, 28ff.; Corrina Perrone, David Clark, and Alexander Repenning, “WebQuest: Substantiating Education in Edutainment through Interactive Learning Games,” Fifth International World Wide Web Conference May 6-10, 1996, Paris, France.

See: http://www5conf.inria.fr/fich_html/papers/P36/Overview.html. For another sceptical note re: edutainment see: <http://archives.seul.org/seul/edu/Jul-1999/msg00429.html>

²¹ Seymour Papert, Does Easy Do It? Children, Games, and Learning, *Game Developer* magazine, “Soapbox” section, June 1998., page 88. See: <http://www.papert.org/articles/Doeseasydoit.html>. Cf. Ken Kahn <kenkahn@toontalk.com>, moderator Does Easy Do It? Children, Games, and Learning. Summary of [GDC99](#) Roundtable discussions held on March 16, 17, and 18, 1999.

See: <http://www.toontalk.com/English/easydoit.htm>. There are many publications by Papert. Cf Papert, S., and Solomon, C., “NIM: A Game-Playing Program”, MIT/AI Memo No. 254, LOGO Memo No. 5, January 1970; Papert, Seymour, Artikel: The Children's Machine; in: *Technology Review*, July 1993, Volume 96, Nr. 5, 28ff.; Corrina Perrone, David Clark, and Alexander Repenning, “WebQuest: Substantiating Education in Edutainment through Interactive Learning Games,” Fifth International World

Wide Web Conference May 6-10, 1996, Paris, France. See: http://www5conf.inria.fr/fich_html/papers/P36/Overview.html

²² See: <http://www.ted.com/about/tedstory.html>. Cf. Jamie McKenzie, "Beyond Edutainment and Technotainment," *Educational Technology Journal*, Vol 10, No 1, September 2000.

See: <http://www.fno.org/sept00/eliterate.html>.

²³ "TED Brings 'Technotainment' Gathering to NYC," *Wired News*, 12:10 PM Sep. 25, 1997.

²⁴ See: <http://www.wired.com/news/culture/0,1284,7192,00.html>

²⁵ This is now a serious category in television. See: <http://www.realitytvlinks.com/index2.html>.

²⁶ See: <http://www.fox.com/temptation/>

²⁷ See: <http://www.fansofrealitytv.com/forums/forumdisplay.php?f=85>

²⁸ See: <http://www.thecomputershow.com/computershow/news/southpeakhistorychannel.htm>

²⁹ See: <http://www.education-world.com/students/edutainment/index.shtml>

³⁰ For a list of books on edutainment games see: <http://www.geocities.com/allhou/booksteachgames.htm>

³¹ See: <http://www.the-underdogs.org/collect.php?name=Edutainment+for+Adults>. Some of these entail books for teaching languages. E.g. Cf. I. E. Hewitt, Edutainment "How to teach English with fun and games!" See: <http://www.eslgames.com/edutainment/#redirect>.

³² See: <http://www.ias.ac.in/currsci/apr252003/976.pdf>

³³ See: <http://www.prashantpandya.com/philately.htm>

³⁴ Dee Dickinson, CEO, New Horizons for Learning, A Closer Look at the People at New Horizons for Learning. See: <http://watch.pair.com/charter5.html>. Some sense of the enormous changes in education is provided by Cameron S. Moseley, US school publishing: From Webster and McGuffey to the Internet. See: <http://www.consultmoseley.com/maischoolpub.htm>: points out:

Of the \$5bn estimated to have been spent by schools in 1995 on instructional materials, about \$1bn probably was spent on products designed for other markets and on testing instruments....

The school publishers of 1942 would be amazed by the range and variety of products, print and non-print, offered in 1996 by the members of AAP's School Division, and by their increasing involvement in electronically-focused publishing. They would be particularly bemused to learn that a portion of industry revenues is derived from the computer-software segments of "integrated learning systems" (ILS), and that many products of members of the Software Publishers Association (SPA) must be considered in compiling industry statistics. Words like "content provider" and "**edutainment**" [my emphasis] would puzzle them, and they would be appalled by the predictions of some electronic apostles that connections to the Internet will, early in the 21st century, replace school textbooks altogether.

³⁵ E.g. Preschool-2nd grade. See: <http://www.smartkidssoftware.com/edutain2.htm>

cf. Jewel case values. See: <http://www.smartkidssoftware.com/je-edut.htm>

³⁶ See: http://investor.mcgraw-hill.com/ireye/ir_site.zhtml?ticker=MHP&script=410&layout=-6&item_id=100955

³⁷ See: www.funbrain.com.

³⁸ See: http://www.pearson.com/media/press_release.cfm?itemid=99

³⁹ Eric Klöpfert, MIT TEP (Teacher Education Programme).

See: http://education.mit.edu/11127/intro_files/frame.htm#slide0003.htm

See: <http://education.mit.edu/11127/>

⁴⁰ See: <http://www-itg.lbl.gov/ITG.hm.pg.docs/dissect/info.html>

⁴¹ See: <http://k-2.stanford.edu/>

⁴² See: http://www.nlm.nih.gov/research/visible/visible_human.html

⁴³ See: <http://vhgallery.gsm.com/>

⁴⁴ See: <http://www.vh.org/adult/provider/anatomy/BrainAnatomy/BrainAnatomy.html>

⁴⁵ See: <http://www.edge.org/documents/archive/edge59.html>

⁴⁶ Cf. Stanford's P³BL which "is a methodology of teaching and learning focuses on problem-based, project-organized activities that produce a product for a client. It is based on re-engineered processes that bring people from multiple disciplines together. See: <http://ldt.stanford.edu/~chaoyc/ed229b/about.html>

⁴⁷ See: <http://www.hipernet.ufsc.br/foruns/aprender/docs/papert.htm>

- ⁴⁸ Cf. Marvin Minsky: *The Society of Mind*. See: <http://www.english.uiuc.edu/multimedia/CDs.html>; Marvin Minsky, *Jokes and the Logic of the Cognitive Unconscious*. AI memo 603. MIT Artificial Intelligence Laboratory, 1980. which has inspired Oliviero Stock Password Swordfish: Verbal Humour in the Interface. See: tcc.itc.it/people/stock/humour.RTF.
- ⁴⁹ "[Minsky 1986]" See: <http://www.dil.aber.ac.uk/dils/research/rfocus8/8sub2/resources/chap5.htm>
- ⁵⁰ See: <http://www.edge.org/documents/archive/edge59.html>
- ⁵¹ See: <http://www.fawny.org/f200011.html>
- ⁵² <http://www.justdisney.com/disneyland/history.html>
- ⁵³ History of Children's Entertainment & Edutainment Centers. See: <http://www.whitehutchinson.com/leisure/historychildren.shtml>
- ⁵⁴ See: <http://www.usoinfo.com/Parkinfo/guides/usf/USF-Attractions.html>
- ⁵⁵ See: <http://www.usoinfo.com/Parkinfo/guides/ia/port.htm>
- ⁵⁶ See: <http://www.usoinfo.com/Parkinfo/guides/ia/toon.htm>
- ⁵⁷ See: www.theholylandexperience.com,
- ⁵⁸ See: www.floridasplendidchina.com,
- ⁵⁹ See: <http://www.orlandoinfo.com/springbreak/index.cfm?siteAreaID=100&displaycontent=edutainment>
- ⁶⁰ See: www.floridasplendidchina.com
- ⁶¹ Not surprising tourism to the historical Israel has dropped as a result of the unrest. See: <http://www.bridgesforpeace.com/publications/dispatch/signsoftimes/Article-42.html>
- ⁶² See: http://realitytimes.com/rtnews/rtapages/19990715_aolmail.htm
- ⁶³ See: <http://www.redherring.com/mag/issue26/kids.html>
- ⁶⁴ See: http://www.metmuseum.org/education/index.asp?HomePageLink=education_1
- ⁶⁵ See: <http://www.naea-reston.org/ata glance.html>
- ⁶⁶ See: <http://www.aaae.org/>
- ⁶⁷ See: <http://www.princetonol.com/groups/iad/links/artedu.html>
- ⁶⁸ See: <http://users.erols.com/merorg/>
- ⁶⁹ See: <http://www.pta.org/programs/artslibr.htm>
- ⁷⁰ See: <http://azarted.org/pages/VASA%202003%20AI%20Prospectus%20Forms.PDF>
- ⁷¹ See: <http://www.geocities.com/EnchantedForest/Dell/9575/>
- ⁷² See: <http://www.alhfam.org/alhfam.pie.html>
- ⁷³ Andrea Bonarini, Matteo Matteucci, edutainment Robotics." See: <http://www.google.nl/search?q=cache:cW4sXghnILOJ:www.cs.cmu.edu/~matteo/Download/Edutainment.ppt+s+lego+mindstorm+edutainment&hl=nl&ie=UTF-8>
- ⁷⁴ By their own reckoning they held \$2.3 of a \$25 billion global education market. See: <http://finance.vivendiuniversal.com/finance/download/pdf/slideshm.pdf>. By contrast Hachette has only 12 titles under edutainment ⁷⁴ See: http://www.hachette-multimedia.fr/web/index.phtml?inc=catalogue_gamme.inc.phtml&part=inter&CID=4&RID=20
- ⁷⁵ Ibid.
- ⁷⁶ Vivendi Universal Media and communication reports string first quarter results. See: <http://finance.vivendiuniversal.com/finance/financials/pdf/Q1Results.pdf>
- ⁷⁷ "di avvicinare i giovani all'arte giocando insieme ai mitici personaggi Disney." See: [http://www.clubsocialis.org/itcorporate/story\\$num=102&data=corporate&struct=story](http://www.clubsocialis.org/itcorporate/story$num=102&data=corporate&struct=story)
- ⁷⁸ Euphon 3o Road Show Nuovo Mercato, Milan, November 20, 2002, p. 4. See: <http://www.borsaitalia.it/opsmedia/pdf/8562.pdf>
- ⁷⁹ "a collaborare alle più significative manifestazioni, a carattere sociale, umanitario, culturale, artistico o sportivo mirate a valorizzare la città." See: [http://www.clubsocialis.org/itcorporate/story\\$num=138&data=corporate&struct=story](http://www.clubsocialis.org/itcorporate/story$num=138&data=corporate&struct=story)
- ⁸⁰ See: http://it.gsmbox.com/news/mobile_news/all/93981.gsmbox
- ⁸¹ See: <http://www.borse.it/Stampa.php?T=L&F=euphon.htm>
- ⁸² See: P. 5 of <http://www.borsaitalia.it/opsmedia/pdf/8562.pdf>
- ⁸³ For instance, a recent Strategic Business Report identified no less than seven kinds of Edutainment Software, namely: Entertainment, Home Video, Interactive, Leisure, Educational for Children, Multimedia, and Videogame. See: <http://www.globind.com/pdf/itsbr/eng/ENG-SBR036T.pdf>
- ⁸⁴ Ibid., p. 199. See: ftp://ftp.cordis.lu/pub/econtent/docs/mobilestudy_en.pdf

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- ⁸⁵ Andersen, Digital Content for Global Mobile Services, Final Report for European Commission, February 2002, p. 192. See: ftp://ftp.cordis.lu/pub/econtent/docs/mobilestudy_en.pdf
- ⁸⁶ Ibid., p. 192. See: ftp://ftp.cordis.lu/pub/econtent/docs/mobilestudy_en.pdf
- ⁸⁷ Andersen, Digital Content for Global Mobile Services, Final Report for European Commission, February 2002, p. 191. See: ftp://ftp.cordis.lu/pub/econtent/docs/mobilestudy_en.pdf
- ⁸⁸ Ibid p. 192.
- ⁸⁹ Ibid., p. 267.
- ⁹⁰ See: <http://www.hh.se/staff/tosv/classes/bit4/BIT4-01.pdf>
- ⁹¹ See: <http://www.storiaeinformatica.it/newdef/italiano/ndefault.html>
- ⁹² See: <http://www.hh.se/staff/tosv/classes/bit4/BIT4-01.pdf>
- ⁹³ See: <http://www.cogapp.com/home/microgallery.html>
- ⁹⁴ Indeed it has been called the first cultural CD ROM but this overlooks the Virtual Museum work done at the Banff Gallery.
- ⁹⁵ p. 198 of Andersen report. See: ftp://ftp.cordis.lu/pub/econtent/docs/mobilestudy_en.pdf
- ⁹⁶ See: http://www.infobyte.it/home_text_en.htm
- ⁹⁷ See: <http://www.mobygames.com/game/sheet/gameId,2624/>
- ⁹⁸ See: <http://www.game-over.net/review/march2000/aztec/>
- ⁹⁹ Review by Tom Houston of March 25, 2002 of Versailles II.
See: <http://www.justadventure.com/reviews/Versailles2/Versailles2.shtm>
- ¹⁰⁰ <http://www.mobygames.com/game/sheet/gameId,2624/>. Cf Review
See: <http://www.quandaryland.com/1998/egypt.htm>
- ¹⁰¹ See: <http://www.dreamcatchergames.com/tac/egypt/index.html>
- ¹⁰² See: <http://www.gslis.utexas.edu/~kidnet/reviews/DIANAH.html>
- ¹⁰³ See: <http://www.mobygames.com/game/sheet/gameId,4659/>
- ¹⁰⁴ See: <http://www.game-over.net/review/march2000/aztec/>
- ¹⁰⁵ France 2, France 3, Les Armateurs Reunis, Cymax, Tooncan, Toutenkartoon production, twenty-six 26 min. episodes, 2001.
See: <http://www.coolfrenchcomics.com/belphegor.htm>
- ¹⁰⁶ See: <http://www.learningco.co.uk/about/CorporateInfo.asp>
- ¹⁰⁷ See: <http://www.microsoft.com/presspass/press/2001/sep01/09-10TVDeveloperPR.asp>
- ¹⁰⁸ See: <http://doc.sell.fr/ftp/Noms112002.PDF>
- ¹⁰⁹ See: <http://www.vrndproject.com/>
- ¹¹⁰ See: <http://www.vrndproject.com/vrndfr.htm>
- ¹¹¹ See: <http://www.unrealty.net/>. Part of the problem lies in finding a proper successor for VRML. Here the Web 3-D Consortium offers promising potential.
- ¹¹² See: <http://www.directron.com/disney.html>
- ¹¹³ Tom Houston, That's edutainment 1999.
See: http://www.justadventure.com/articles/Edutainment/Thats_Edutainment.shtm
- ¹¹⁴ See: http://www.spiele-idealo.de/107R13P1454_Tomb-Raider.html. Cf. its successor *Tomb Raider II: Angel of Darkness*. See: <http://ps2.gamezone.com/gamesell/screens/s20036.htm?Num=0>.
- ¹¹⁵ One of the problems with this trend is that the technological wizardry often undermines appreciation of the original integrity of the story. For instance in the case of the Matrix cf. Joe Morgenstern, "Digital Magic Excites , But Where's the Soul in the Film Sequence?," Wall Street Journal Europe, May 16-18, 2003, notes that Enter the Matrix as a game cost \$42 million and appeared before the film. For further games see: PC 4War, Nr. 4, April 2003 and magazines such as Jeux videos and Playguide.
- ¹¹⁶ See: http://www.spieletips.de/magazin/artikel/?type=edutain-pc&session_id=
- ¹¹⁷ Brad King, "Machinima: Games Act Like Films", *Wired News*, 23 July 2002.
See: <http://www.wired.com/news/games/0,2101,53929,00.html>
- ¹¹⁸ See: <http://www.imm-studios.com/>
- ¹¹⁹ See: <http://www.depinxi.be/>
- ¹²⁰ See: <http://www.depinxi.be/media/news/rousseauLVL/compowebLaval.txt.html>
- ¹²¹ See: <http://www.depinxi.be/media/news/RTLcaalors/webRTL.html>
- ¹²² See: <http://www.cybernarium.de/>
- ¹²³ Cf. Maurizio Forte, *Archeologia, percorsi virtuali nelle civiltà scomparse*, Milan: Mondadori, 1996.
- ¹²⁴ Cf. <http://137.120.135.183/FP5/index.html>.

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- See: <http://137.120.135.183/FP5/publicPDF/deliverable10c.pdf>
- ¹²⁵ See: http://www.inigraphics.net/publications/topics/2002/issue4/4_02a11.pdf
- ¹²⁶ See: [http://www.bilbaoit4all.com/ingles/documentacion/pdf_ponencias/JULIAN%20FLOREZ%20\(ENG\).pdf](http://www.bilbaoit4all.com/ingles/documentacion/pdf_ponencias/JULIAN%20FLOREZ%20(ENG).pdf)
- ¹²⁷ See: <http://www.vicomtech.es/ENGLISH/Projects/INTEK1.shtml>
- ¹²⁸ See: <http://www.vicomtech.es/ENGLISH/Projects/INDUSTRIAL2.shtml>
- ¹²⁹ Benjamin R. Barber, *Jihad vs. McWorld*, New York: Times Books, 1995.
- ¹³⁰ George Ritzer, *The McDonaldization of Society, New Century Edition: An Investigation into the Changing Character of Contemporary Social Life*, Thousand Oaks, Ca.: Pine Forge Press, 2000.
- ¹³¹ Wissenorganisation und Edutainment, Humboldt-Universität Berlin, 21-23.3.2001.
See: <http://www.bonn.iz-soz.de/wiss-org/2001info.htm>.
- ¹³² See: <http://www.hh.se/staff/tosv/>
- ¹³³ Torben Svane, Jo Hamilton Jones, Establishing International Co-operation in Edutainment Software Design, Some Experiences, *Presented at IEEE Frontiers in Education, Boston, MA, Nov 2002*.
See: <http://fie.engrng.pitt.edu/fie2002/papers/1580.pdf>
- ¹³⁴ See: <http://www.hh.se/staff/tosv/programs/esd/pmu00.htm>
- ¹³⁵ See: <http://www.eduline.be/spirit/spirit.htm>
- ¹³⁶ See: http://www.i3net.org/ser_pub/services/leaflets/
- ¹³⁷ See: <http://www.cogs.susx.ac.uk/projects/equator/equator.htm#ambient>. These are further discussed in: J. Burnard, J. Pitt, A Gursay, "Digital storytelling. Theme Mixed Reality." See: http://www.art-e-fact.org/DISTEL_PROSEMINAR_WS_02_03/Mixed-Reality/AW3_Mixed_Reality_vortrag.pdf
- ¹³⁸ For other examples of educational practice different from the US, cf. Willi van Lück, "Computerspiele und Edutainment in der Schule." See: <http://www.medienpaedagogik-online.de/cs/8/00536/>;
Cf. Vincente Matellan Olivera, "Libre Software role in edutainment robotics market." Universidad Rey Juan Carlos, Madrid, See: <http://gsyc.escet.urjc.es/robotica/edutainment2000.pdf>
- ¹³⁹ See: http://www.investindk.com/big/idk_frame.asp?artikelID=8926
- ¹⁴⁰ See: <http://www.edutainment-robotics.com/>
- ¹⁴¹ See: <http://ais.gmd.de/de/pm/001109.html>
- ¹⁴² See: <http://www.edutainment-robotics.com/news/index.html>
- ¹⁴³ For basic readings on Lego and robotics
See: <http://www1.cs.columbia.edu/~sklar/teaching/spring2001/mc375/references.html>
- ¹⁴⁴ See: <http://satchmo.cs.columbia.edu/rcj/rcj2k/>
- ¹⁴⁵ See: <http://www.thebritishmuseum.ac.uk/education/>. Cf. Dr Roland Jackson, "Museum Education through the Internet," Paper presented at the conference: Collections and Connections: Museums and Galleries Education - Looking Forward, Institute of Education, London 7 March 1997.
See: <http://atschool.eduweb.co.uk/jackson/ioepaper.htm>
- ¹⁴⁶ See: www.eculturenet.org
- ¹⁴⁷ Cf., for instance, the site on Native opinions of Pocohontas.
See: <http://www.pkp.ubc.ca/educ441/read.php?f=49&i=1&t=1>
- ¹⁴⁸ See: http://cyberlaw.stanford.edu/lessig/blog/archives/2003_03.shtml
- ¹⁴⁹ See: <http://staffweb.library.northwestern.edu/thelantern/jan2000/thespians.html>;
<http://www.labart.univ-paris8.fr/chantier/nouv/anne-gaelle/VR-stage.html>
- ¹⁵⁰ Pioneers in this context are Diana Walczak and Jeff Kleiser whose "Nestor Sextone for President" premiered at SIGGRAPH in 1988. A year later, Kleiser and Walczak presented their first female Synthespian, Dozo, in the music video "Don't Touch Me." See: <http://www.kwcc.com/works/sp/lead.html>. This led to the special-effects company Kleiser-Walczak. See: <http://www.kwcc.com/>. Cf. <http://www.kurzweilai.net/meme/frame.html?main=/articles/art0526.html?m%3D6>.
- ¹⁵¹ See: http://www.iofilm.co.uk/fm/s/simone_2002_r2.shtml
- ¹⁵² See: <http://www.imax.com/>
- ¹⁵³ Alex Gove, "Virtual Celebrity Productions puts the dead to work," *The Red Herring Magazine*, January 1999.
See: <http://www.rhventure.com/mag/issue62/animation.html>
- ¹⁵⁴ For another discussion of this topic see the author's "Historical Heritage and Future Creativity," *First International Workshop on ICTs, Arts and Cultural Heritage with Special Emphasis on Applications, Local Development and Local Learning*, 5 May 2003, San Sebastian, 2003 (in press).
- ¹⁵⁵ See also the author's "Goals of Culture and Art," Lecture to the IIC, Kuala Lumpur, September 1999.

(<http://www.mmi.unimaas.nl> also on the site of the International Institute of Communications, <http://www.iicom.org>). Published electronically in TRANS. Internet-Zeitschrift für Kulturwissenschaften, vol. 1, Vienna, (<http://www.adis.at/arlt/institut/trans/0Nr/veltman1.htm>).

¹⁵⁶ Simple postcard and poster copies are another matter of course.

¹⁵⁷ See: http://www.kwcc.com/works/sv/index_3frames_santa_ny.html

¹⁵⁸ See: <http://www.google.com> under Google images under Santa Claus.

¹⁵⁹ See: <http://www.virtualvisit.tv/html/lv5.html>

¹⁶⁰ See: http://www.kwcc.com/works/sv/index_3frames_santa_ny.html

Cf. <http://www.amusement-point.de/rides/virtual/simulator2.htm>

¹⁶¹ See: <http://www.imax.com/>

¹⁶² See: http://www.tinet.ita.doc.gov/view/f-1999-561-001/index.html?ti_cart_cookie=20030707.033322.25707

¹⁶³ One government source claims that tourism to the US dropped 18 % in 2001 and 9% in 2002. See: <http://tinnet.ita.doc.gov/view/f-2000-99-001/estintl.html>.

A second source claims a 16% and 12% drop of visitors to the US and a drop of 5% and 2% respectively for US tourists abroad. See: <http://tinnet.ita.doc.gov/view/f-2000-99-001/estintl2.html>

Meanwhile, other statistics concerning tourism deficits speak of a 38% and a 13% drop for 2001 and 2002. See: http://tinnet.ita.doc.gov/view/f-2000-99-001/rec_pay.html.

¹⁶⁴ See: <http://www.tours.com/travelstats.php>

¹⁶⁵ See: <http://www.edutainment-robotics.com/companies/playing.html>

¹⁶⁶ See: <http://www.edutainment-robotics.com/companies/education.html>

¹⁶⁷ See: <http://www.edutainment-robotics.com/companies/information.html>

¹⁶⁸ See: <http://www.edutainment-robotics.com/companies/parks.html>