EDUTAINMENT IN CARTOGRAPHY

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Abstract: *Edutainment is a mixture of education and entertainment. In the software industry edutainment was very popular in the 80's and the first part of the 90's when the graphic capabilities of PC-s were very limited. The early computer games were based on textual information. From the second part of the 80's low resolution pictures became a part of a computer game, but that was still quite far from the so called multimedia. As the CPUs and graphic cards became more powerful computer games started to develop rapidly. Nowadays the 3D, the virtual reality, the real time animation and the high quality sound are the essential parts of computer games. The computer games in edutainment are nearly totally disappeared. In the last some years the internet games turned to be more popular: the relatively low bandwidth and the lack of web multimedia standards gave new opportunities for the edutainment in this environment. Cartography can profit form this revival because maps are very popular content of the web.*

INTRODUCTION

How can we define the edutainment? It is not simply a mixture of education and entertainment, but a special kind of toys or computer games. It is difficult to define its characteristics, but nowadays if the creators want to be successful the entertainment part is to be more evident then the education part. We have to take into account that without proper guidance, most users (kids, pupils, students) will deal with only the most entertaining elements of the program and neglect the rest.

The interactivity is one of the most important characteristic of these games. The level of interactivity is different in different times and different environment. Interactivity is not too characteristic for traditional games and for very early computer games. Nevertheless the essence of the games is the interactivity which practically implemented as the rules of the game.

Good educational software (edutainment) has three basic elements:

- educational content,
- interactive components (real time response),
- attractive interface that can catch the attention of students or pupils.

As time goes by the importance of these three elements may change.

EARLY EDUTAINMENT

Gaming is independent from the age of the people: naturally, people in different ages prefer different games. If we focus on education these kinds of games may develop the users' skills, they may practice what they have learnt previously.

In cartographic edutainment the map is a key element, but it can be only a background image (the table of the game or the playground of the computer game).

The main types of traditional cartographic edutainment are the following:

- *Puzzle:* the elements can be equal in size, but can be geographic units of the map (administrative areas like countries or counties). One of the early samples of map puzzle was created in 1782 by Jacob Frierich Klemm in Nürting (Germany). The title was Neue Atlas für Jugend (New Atlas for the Youth).

- *Outline (unlettered) map game:* the players have to identify map features, or have to position them on a map. The common characteristic is that the map contains only some basic features (administrative units, water features, geographic coordinate lines) to test the users' knowledge.

This form of games became popular in the first part of the XXth century when school atlases were started to use in geography education in primary and secondary schools.

Figure 1: Globe puzzle (around 1860, the diameter is 17 cm)

• ***Cross-words:*** this is the combination of the normal cross-word and the outline (unlettered) map. Cross-words were invented in the 20's and became very popular. At that time cross-words were so liked that there was no reason to change the basic type. Only in the 70's when other types of cross-words were developed, the publisher wanted to make the variation of the traditional cross-words.
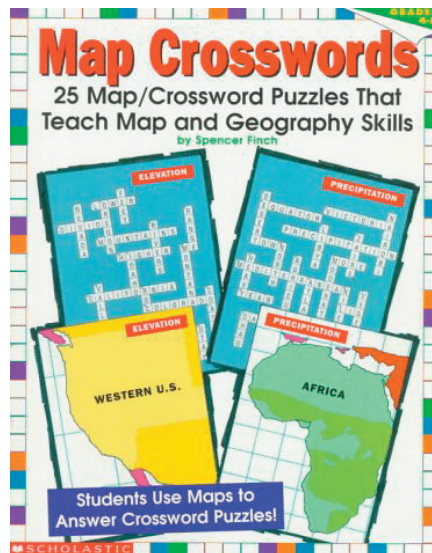

Figure 2: Map Crosswords, 1997 (http://images-eu.amazon.com/images/P/0590896466.01.LZZZZZZZ.jpg)

EARLY COMPUTER GAMES

The first personal computer, the IBM PC was released in 1981. Because of its high price in these years the players used home computers, like Commodore (C64-1982, Plus4-1984, C128-1985), Atari, Amiga. These home computers had primitive multimedia functions (sound, colour graphic), while PC-s were lack of these features in the first half of 80's or these functions were extremely expensive. Some of the successful computer games were based on the original Commodore games.

Radarsoft, a Dutch company produced several geographic-cartographic edutainment for C64 from 1984 (Topografie Europa, Maps 64 – USA, Topo 64 – Germany) in English.

Due to the limited graphic capabilities of the home computers simple, but well-developed entertainment software were created. In 1985 Bobco Ltd. published the World Geography software which was released only in German language (the English version was published too late, only in 1988). In this programme the users were able to test their geographic knowledge (the first PC version was published in 1989).

Figure 3: Word Geography, 1985

The Broderbund Carmen Sandiego series was the most successful edutainment of these years. The first product of these series was the *Where in the World is Carmen Sandiego?* This software was released in 1985. In the next years similar products were developed:

1986 - *Where in the USA is Carmen Sandiego?*

1988 - *Where in Europe is Carmen Sandiego?*

1989 - *Where in Time is Carmen Sandiego?*

1991 - *Where in America's Past is Carmen Sandiego?*

1993 - *Where in Space is Carmen Sandiego?*

Although the product is still on the market (transferred into Windows and Mac environment), additional versions were released by the new owner, the Learning Company (like *Carmen Sandiego's Great Chase Through Time*, 1999) but the name Carmen Sandiego is nearly unknown in the computer games industry.

The story of these games is quite simple, the player is the investigator who has to follow the route of Carmen Sandiego and her fellows. Practically the player has to answer questions, find the proper solution among the given alternatives. Nevertheless the graphic features let the questions to be illustrated and give an illusion of multimedia (whatever it was meant at that time).

Figure 4: Where in the USA is Carmen Sandiego? (C64 version)

One of the most important computer games which has changed the development of the future games and makes this market more profitable was the first person-shooter, titled Wolfenstein 3D, which was originally released for DOS in 1992 by ID Software. The well-known product of the firm was Doom (1994), which has influenced the development of computer games and give very little chance for edutainment software in PC environment in the game market.

CD-ROM, AS AN IMPORTANT STEP

The CD-ROM discs became real products at the end of the 70's, but for several years it was used only for storing music. From 1985 the CD-ROM has been used as a computer storage device, but the price was very high, which didn't allow fast distribution. The first CD-ROM products for PC-s were different dictionaries, handbooks, encyclopaedias.

Taking into account only the storage capacity, language teaching aids on CD-ROM had great potential. For instance, someone might produce a CD-ROM disc containing dictionary databases accommodating several languages, offering not only definitions, but also paths leading to examples and explanations of grammar, usage, word history and so on (Microsoft Bookshelf, a CD-ROM reference library in English for writers, was a first step in that direction).

In cartography the most logical applications are the atlases and maps. At that time only raster based maps were easy to produce, but the larger the file was, the most time the screen representation took. It was another disadvantage of raster files: the lack of index function, if we would like to search information on feature on a raster map we have to spend extra time to implement these functions. Vector based cartographic software (CAD, GIS) were also available at that time, but these software were business products and there were far from multimedia applications.

Users were very keen on multimedia functions: the first CD-ROM atlases (like National Geographic Picture Atlas of the World, first release 1992) contained lot of pictures, some sounds and few videos, these new elements attracted the users and could make these products profitable. Road maps were also top-selling products.

The first computer game which was published only on CD-ROM without a floppy disk version was released in 1993. In few years time the floppy disk totally disappeared as a storage device of software products and this process was fastened by the distribution of the web, too.

In 1995 Microsoft published the Encarta encyclopaedia first time. The new editions include more and more multimedia elements (video, panorama views, virtual flights) and it is already available as an on-line version too. The detailed World Atlas and different map quizzes are the parts of the Encarta product.

However, even at that time there were such cartographic edutainment products which worth to mention. One of these examples is the Klett-Perthes, a German publisher company, which released some CD-ROMs between 1997–2000):

- *Mit Alex auf Reise: Deutschland* (Alex journeys: Germany)
- *Mit Alex auf Reisen: In den Regenwald* (Alex journeys: in the rain forest)
- *Mit Alex auf Reisen: In die Wüste* (Alex journeys: in the desert)

These days the edutainment can be successful only if it uses the same techniques and features which are used in the most popular computer games.
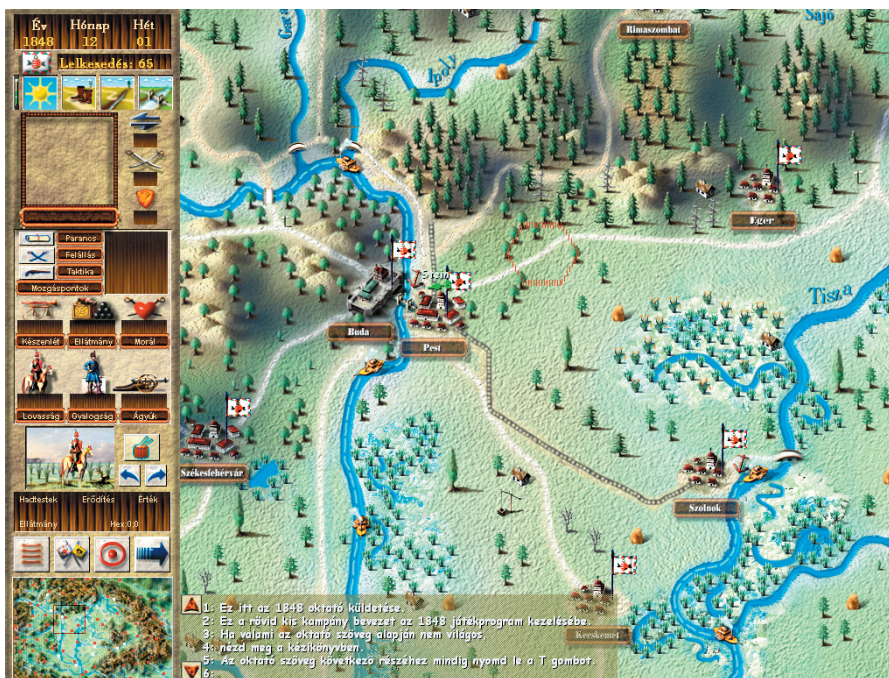

Figure 5: A strategic game-like edutainment about the 1848 Hungarian revolution, 2004 (sponsored by the Ministry of Education)

EDUTAINMENT ON THE WEB

From the beginning of the 90's the web became even more important factor of the computer industry. Since 1995 the web has totally determined the development of the industry: everybody wanted to be present on the web, all the software must be connected somehow to web based features.

The most important factor of the 90's was the limited bandwidth of internet connection. The majority of internet users could use only modem connection which doesn't let using rich multimedia elements. The developments of hardware industry were able to improve the connection speed of the internet users (including the wireless connection).

When Tim Berners-Lee invented the first browser and the whole web strategy in the beginning of the 90's the internet was a very static media. Only few standard file formats were supported (html, gif, jpg) and there were no users at that time who would be able to forecast the rapid development: the application of multimedia features into the web environment. The new techniques of the late 90's, like Flash, Java, JavaScript, VRML, SVG let us using multimedia elements to change the static web pages into dynamic websites. The standardization effect of the web is also very important: only the most popular, industry standards file formats are accepted (but plug-ins can give chance for less known formats), but these formats can transfer more rich content then ever before.

In the 80's the Internet was a common place of researchers, scientists, peoples in higher educations. Nowadays the web is a new media, a type of a business, a part of our life. Most of the internet users treat it only as an entertainment tool and the computer industry serve these demands. The internet can give a new challenge for the users, players: the chance of multi-user games, where the other players can be anywhere in the World. To play on-line with other people or just compare our results to other people is an appeal in internet games.
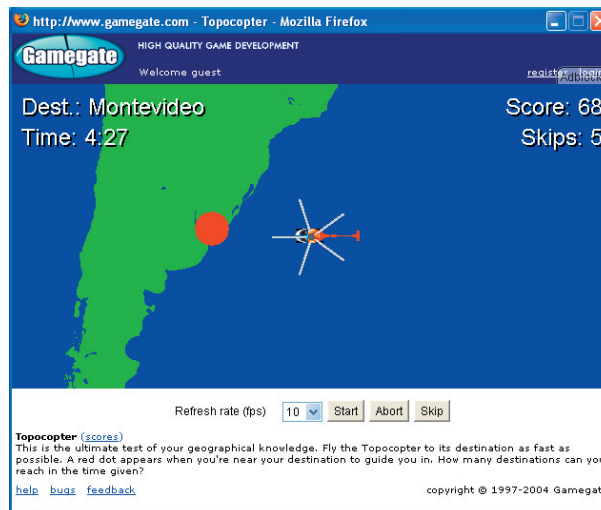

Figure 6: On-line edutainment: Topocopter, the game to locate thousands of cities around the World (www.gamegate.com)

These new trends can give more chance for edutainment in this new environment. Not every user is keen on playing complicated, 3D games which use virtual reality, but these users prefer simple, easy-to-use, non-violent, relatively short, intellectual type of entertainment.

Several websites offer these kinds of games: nearly all traditional board games are playable on the web. But it has already happened that a successful internet game was later published as a traditional board game. The majority of internet games are using new methods: the most amazing and recent element of internet games is the animation. Games like Topocopter would have never been playable without this function: the game is very simple; you have to navigate your helicopter into the given city as fast as possible because your time is continuously decreasing. After certain number (15) of successful navigation the player get extra time and can survive.

Animation is relatively new in cartography and even the researchers and scientists are working on how to implement these new elements in the cartography: does it help the users or is it just a short-term fashion?

In Hungary one of the most popular internet game is the Honfoglaló (Settler) which has a similar rules as the well-known Risk (Risiko), but instead of dice the players have to answer quiz questions to get points (or areas on the map): quiz and strategy together. The board is the actual area of Hungary (but a European version is also available).

Which are the most important elements of the success?
- multi-user game, the 3 players are randomly selected when they entered the game,
- on-line chat can be a part of the game (the players can talk to each other),
- one play is relatively short in time (5-30 minutes),

- the players' results are stored and accumulated (the effect of beat the high score is an important element in every game),
- the players' bonus points are allowed to convert into real things in an on-line shop (this is an important factor for advertisers),
- the system uses some ten thousands quiz questions to prevent the frequent users to easily remember the correct answers,
- the map is just a background, but it is well-known for the players (they have to know the relative geographic location of counties), about 10% percent of the quiz questions are related to geography and maps.

Figure 7: Honfoglaló (www.honfoglalo.hu), the most popular Hungarian internet game

THE FUTURE OF THE EDUTAINMENT

Can we forecast the future of edutainment? 15 years ago nobody would have thought that internet will be so popular, so it is not easy to predict the next some years.

Edutainment provide users, as learners, with deeply satisfying challenges that require the development of skills and strategies in order to achieve the objective. Further, contrasting with traditional views of education, edutainment provides a student-centered rather than teacher-centered approach of education: the computer itself may substitute the teacher, but in the edutainment the user, the learner is the most important performer.

An edutainment's setting can make the users learnt about everything and nothing. It depends on the user's background and desperation – anyway, the user will learn the actions during the edutainment process. This can be the minimal aim of the education in any environment: cartography has to take into consideration these opportunities. The appearance of the web has changed the map publishing because the map user is generally unknown to the map producer, publisher and their map reading skills are also unknown. The cartography have more "users" then anytime before, so the cartographic edutainment now has better chance then ever before if we recognise the special opportunities of the internet environment.

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