COMPUTER GAMES USED IN TEACHING OF GEOGRAPHY

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Abstract: *School, as a starting environment for young people for life, is obliged to show receptive to innovations in technology. Using the latest techniques for teaching is designed to facilitate learning, but also to familiarize them with the tools, which will be used widely in the near future.*
Computer games nowadays have become very popular among children. Many of them spend few hours per day playing. Depending on type, computer games could have positive or negative effects on children. Accepting the fact that children like to play video games, a good teacher can use these games for increasing motivation and learning results.
It is important that children, especially those living on a risk area, learn about natural hazards and how to prevent their negative effects. Playing computer games specialized on this topic could be an attractive way of learning about risk management.
In this article, we present some computer games, which are attractive to children, using concrete applications about natural hazards and urban planning. Risk management games are very helpful tot each pupils how to protect themselves against the destruction power of natural hazards. Playing these games pupils learn how to manage the risk in case of a natural hazards, and they will have some knowledge about how to plan a city, how to develop it. The focus is on the presentation of the OIKOS risk management game. This game is considered very important in teaching geography; this is also an important aspect: sometimes we take decisions without thinking of the future. In this way, it follows the formation of a factor of environment awareness and responsibilities.
Despite numerous advantages, the possibility of using modern technical means in education is very limited because most units do not have educational interactive board, and in places were this boards exist their number is reduced. This is explained by the relatively high costs of all equipment necessary for the operation, but also from news reluctance technology.

Keywords: *computer games, natural hazards, risk management game*

I. INTRODUCTION

Computer games nowadays have become very popular among children. Many of them spend few hours per day playing. Depending on type, computer games could have positive or negative effects on children. Accepting the fact that children like to play video games, a good teacher can use these games for increasing motivation and learning results.

It is important that children, especially those living on a risk area, learn about natural hazards and how to prevent their negative effects. Playing computer games specialized on this topic could be an attractive way of learning about risk management.

II. MATERIALS AND METHODS

2.1. Computer Games in Education

Cumulative contributions show that important progress has been achieved in Europe, particularly in the development of ICT in education, while one is notable heterogeneity of practices and policies presented in agreement with different political priorities, ideals and educational funding.

Establishing a set of parameters able to define a "good practice in using ICT for education" has proved to be particularly difficult, since a successful experience in a certain context may fail in another context. The diversity of education systems of EU Member States completes image difficulties and makes it impossible simply to transfer "best practices" from one medium to another.

Establishing criteria for "good practice" led to an analysis of twelve studies on "successful models of ICT in education". The only parameter was constantly innovative nature of the practices selected. In fact, the word "innovation" has become synonymous with "good practice". In educational context, this overlap could mislead.

Further research on models of good practice should establish other criteria.

Most policies are ongoing over a period of over two years, and some are continuing the previous policy. Consequently, time is essential for the policy to produce results. This has significant consequences on the assessment procedures. The shorter the observed event, change or innovative practice, the easier measured and assessed. The phenomenon observed, more than the number of factors to be considered for analysis would increase. Usually, the latter is the case of education – a profound and lasting one. Introduction of ICT does not affect this characteristic of change in education.

New technologies for processing and transmitting information in all shapes of influence of the manner of communication and interaction. The issue in education is essential to proper understanding of these educational resources. Through the variety of contents and of informational support may be an effective tool in teaching / learning when they are subordinated to a clear teaching concept. It does not eliminate the role of teachers, but enriched pedagogical tools consistent with the purpose of each cycle of education.

Smith, Curtin and Newman (1997) interviewed 54 primary school pupils, and their conclusions were that those children liked to learn and practice by themselves, by doing tasks alone. They also liked to use computers, mostly for computer games, and they considered that the time spent at school was an interruption to their computer time.

Prensky (2001) concluded that students nowadays thought differently, processed information differently, than few years ago. These students preferred multimedia and computer games. Thus the methods of teaching should be changed, too, to be more appropriate to students' way of learning.

Many sciences studied the benefits of computer games on children (Smith et al., 1997).

An experiment by Griffith, Voloschin, Gibbs, and Bailey (1983) on a group of primary school pupils showed that the visual and the motor coordination of computer game players were better than those of non-players. Greenfield (1985) also concluded that the sensor-motor ability of children, who regularly played computer games, was much better than the average.

Dorval and Pépin (1986) showed that children who played video games had better visual capacity and spatial abilities.

Keller's research (1992) showed that computer game players had better results in critical thinking, problem solving and strategy development tests than those children who did not play computer games. Computer games also facilitated the development of self-regulated learning (Zimmerman, 1990).

The commonly known hypothesis was that children spending considerable time playing video games were less sociable than children who did not play or spent too much time playing. Sakamoto (1994) showed that the frequency of video game use had no correlation with children's popularity among classmates. Shimai, Masuda and Kishimoto (1990) proved that children who played computer games developed higher sociability than non-player children did. Phillips, Rolls, Rouse and Griffiths (1995) demonstrated that frequent players had as many friendships as non-frequent players. These friendships were not only in the virtual world; they spent time together with their friends in the real world, too.

Many games were in English. These games helped children to learn words in English. Betz (1995) showed that computer games increased motivation and learning. Adam (1998) studied the benefits of strategic games in Urban Geography. He found out that these games increased motivation of the students to learn about urban planners, and also to deepen their knowledge and think about strategies (Adams, 1998).

In their study, Aguilera and Méndiz (2003) concluded that for learning, video games were important. Each type of game was associated with skills and abilities related to learning and education. These games could develop reading, logical thinking, problem solving, and decision making, spatial orientation abilities. Similarly, games could improve students' knowledge. Thus the integration of computer games in education was a natural process.

In table 1 we made a synthesis of these benefits. Of course, playing video games has negative effects too. Both the positive and negative effects depend very much on many factors. Among these factors the most important are the type of the game and the hours spent playing. For example, games where the player has to fight make him/her more aggressive. But on which level this effect occurs depends on the time spent playing that specific game.

Table 1. The benefits of playing computer games

Reference	Benefits
Griffith, Voloschin, Gibbs, bailey (1983), Greenfield (1985)	Better motor coordination
Dorval, Pépin (1986)	Better visual capacity and spatial abilities
Keller (1992)	Development of critical thinking, problem solving, and strategy making abilities
Zimmerman (1990)	Development of self-regulated learning
Shimai, Masuda, Kishimoto (1990)	Higher sociability
Betz (1995), Adam (1998)	Increased motivation and learning

2.2. Natural risk management games

Stop Disaster! After choosing a scenario, the player has to build, but be careful to protect as much as possible the lives of the people, who move to their houses, in case of a natural disaster. Hurricane, wild fire, floods, earthquake, tsunami are the given scenarios. After choosing the scenario and the difficulty level, they give a place, with a community living there, and some instructions on what players have to build (for example houses for 100 people, 2 schools, and 1 hospital). Players have to take into account natural hazards, which may occur on the given land, and build in such a way as to protect people's life (Phillips et al., 1995).

Figure 1. The floods scenario of the "Stop disaster" game

For example, choosing the floods scenario and the easy difficulty level we get the map shown in figure 1. We may see that the game has a very friendly design.

Simcity. This game began its life as a computer recreational game. However, it became more: a simulation of the process of urban growth and development. The game sets out to model the processes determining cities to grow and expand. The player is the mayor of the city. The first stage involves creating an appropriate physical terrain, then dividing the land into residential, industrial and commercial zones, followed by the provision of urban infrastructure, as roads, water, gas and

electricity transmission lines (Prensky, 2001). The simulation is rooted in the assumption that an "attractive" new urban location will attract residents and they will build houses, commercial centers, and factories. The game has an attractive design. Starting with SimCity3000 there is a 3D representation of the city, which allows true rotation, and there are five zoom levels. It is possible to zoom in to such a level as to see individual people and cars (figure 2). In some versions of the game the mayor has to deal with natural disasters, too.

Figure 2. A detailed view of the city in SimCity game

2.3. The OIKOS risk management game

The player is the mayor of a city, which has to be developed. But this territory is full of dangers, in the default way on the given land earthquake, floods, volcano eruption, landslide, cliff and beach erosion could happen. The player can set the number of active natural hazards. When developing the city, the mayor can choose not to build in dangerous places, or to weaken the consequences by special methods (Sakamoto, 1994). For example, on a place where earthquakes are a real danger, seismic proof buildings can be constructed. The goal of the mayor is that population in the area is satisfied with his/her work. For this, it is very important that the mayor protect the city against disasters. The main scope is to minimize the human and material loss in case of natural hazards.
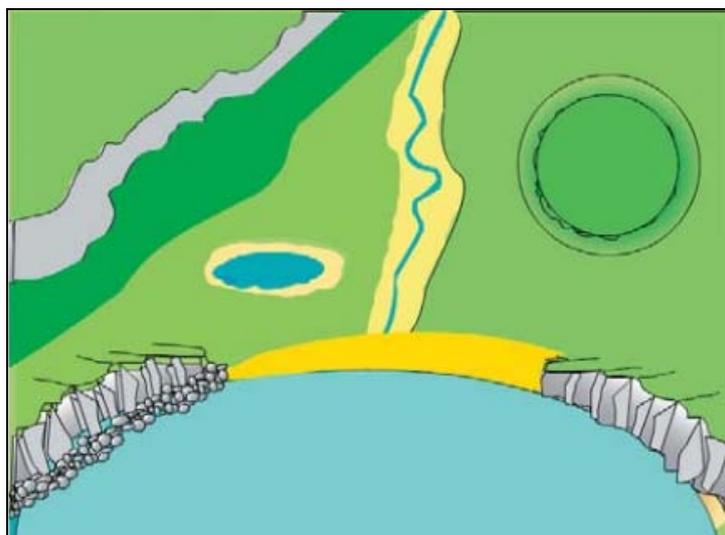

Figure 3. Visualization of possible natural hazards

To find out which are the dangerous zones, players can visualize the hazard map (figure 3). In this figure, we can see on the left hand side a zone where landslides could appear and on the right hand side a zone where the danger is a volcano eruption. Along the seaside, we can see the possibility of cliff erosion and beach erosion. In any moment of the game players can visualize the hazard map.

If players are not aware of the possibility of danger, they may build houses in places where the loss is very high in case of natural hazards.

In figure 4, we can see the game in progress. There are some houses built in dangerous places. On the left hand side, we can see even a collapsed house. This house was built on a place where landslides could appear.

Figure 4. Playing the game

III. CONCLUSIONS

Given the certainty that IT and in particular computer will become instruments of universal utility, it is necessary to develop in this sense a new way of thinking and behavior that make it possible to cope with any new requirements. Each student will receive the basic training in the IT field. This involves a series of objectives such as:

1. acquiring the common principles governing the application of information, knowledge of nature, properties and structures of information;

2. developing an overview of the importance of informatics applications and their effects on social and economic individual and community;

3. training the ability to identify where it is indicated the use of science and design appropriate solutions, with customizations in curricular development strategies;

4. developing understanding to apply new technologies in activities like searching for information storage and processing them for communication, supervision and controlling them;

5. current knowledge of communication equipment, the establishment of cooperative relations with the collective efforts from other countries to extract the latest information on global information networks, etc.

It aims thus, implicitly, at developing a basis of information not understood only as specialized expertise, but also as a new orientation and reference to reality. The study could include taking a course aiming at gaining knowledge in general, issues could be deal with depth, and they could find

applications in elective courses. Another choice would be the optional specialization courses, to cover their expected needs in the field of educational software and IT applications focused on various disciplines of education.

In the XXI century the computer was definitely a profound impact on education – considers a Dutch researcher in applied pedagogy. Changing structure of the rich countries and poor countries will have an effect on knowledge sharing worldwide.

Risk management games are very helpful tot each pupils how to protect themselves against the destruction power of natural hazards. Playing these games pupils learn how to protect a building against a specific natural hazard, they also learn that in some cases it is wiser not to build in a dangerous place, even if the decision to build there is advantageous from the financial point of view for a certain moment. This is also an important aspect: sometimes we make decisions without thinking of the future. These games develop pupils' competence to plan for the future, not for the moment.

The use of modern technology in teaching, including smart board, does not represent a scope itself but an effective way of teaching. Thus, we can say that:

- The quality of learning and teaching depends primarily on product quality and content of digital media or product, and then his way of realization. A person can learn but not all through using digital or high-quality educational software.

- The quality of teaching depends on specialized competence, pedagogical and methodical teacher, who can add value to a digital product or lower quality educational software, even when it has a lower level of competence in using computer.

- E-contents are at the start of their 'career', but it tends more towards the use of adaptive educational software that is self-regulated by psycho-intellectual profile of the user. The user can follow such a customized learning path, much more efficient than the traditional single solution addressed to all.

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*** OIKOS-Risk Management Game: Player Guide.

*** OIKOS-Pedagogical Guide.