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EDUTAINMENT GAMES FOR PRESENTING CULTURAL HERITAGE*

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Cultural heritage has to be preserved, disseminated and popularized. Computer Modeling, AI, and Multimedia help to cultural heritage holders by offering different forms of digital presentation of their holdings. The main topic of the paper presented is one of these forms – Edutainment Games (EG). The paper is a part of an ongoing research of this new game type put in the scientific frame of digital preservation of cultural heritage. The definition of "computer game" used is: "Form of computer art (model) with built-in and quantitative definitions of success and failure, in which players, put up with predefined set of rules for the progression of a game session, make decisions in the pursuit of a clear and meaningful goal. "The practice shows that important condition for creating ***EGs*** is the active dialogue between the game industry and the game research. There are attempts for establishing ludology (from Latin "ludus" – game) the science of games as a combination of existing mathematical, historical, psychological and anthropological theories of games. The paper is not focused on game theory, but on research and application of specific game-type in specific area – culture and education. It also presents SWOT analysis aimed at scientific grounding and motivation of specialists, which will take the advantage of make up for a deficiency of EG, presenting Bulgarian cultural heritage.

Introduction. *Playing* different games (social and electronic ones) and *meditating* (schematisation, philosophizing) are main culture creating factors through the ages [**1**]. They complement each other, being intended to build communication bridges (in non–digital and digital form) and to bring *delight* by default. This is the main goal of preserving cultural heritage in its various forms – the dialogue.

Edutainment games (EG) appeared in the virtual and market space a decade ago, as a computerized form for *entertaining education*. The *scientific frame* in which edutainment in its game form is discussed here is *digital preservation of cultural heritage*. Benefits of EG development could be enhancing learning, producing useful learning software in all educational institutions and increasing literacy level in different subjects. This is a good goal taking into account the recent illiteracy invasion of the mass culture, including the digital one.

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The term *computer game* is in sharp competition with *video games*[1], *console games*, and *arcade games*. Computer games are not restricted to the entertainment sector only. Business, military, health/medical sectors and aircraft are increasingly using similar technologies [2]. Unfortunately, cultural heritage sector as a whole is most poorly presented amongst the game application areas, especially in the sense of investing in it. The definition for computer game used here is matching best the frame defined above: *Form of computer art (model) with built–in and quantitative definitions of success and failure, in which players, put up with predefined set of rules for the progression of a game session, make decisions in the pursuit of a clear and meaningful goal.*

EGs are developing in a strong competition with fun-only games and could play stopping role to the brain–washing tendency. They are considered as attractive learning tool as LOGO programming language for example.

In most of the cases electronic preservation of cultural heritage is a centralized process governed by the state (although some preservation institutions such as museums, libraries have their own policy). Lack of working policy and vision is the core problem that explains low action level in that area in Bulgaria in comparison with Serbia for example, where a National Center for Digitization [`http://www.ncd.matf.bg.ac.yu`] had been established a couple of years ago, aimed at promoting a national strategy for cultural and scientific heritage digitization. In Bulgaria, a country with very rich cultural heritage such a center is still in a vision stage.

The Book *and* the Game. The most widespread traditional (non–digital) tool for transmitting culture is still the *Book* (hand–written, illustrated and after XV c. – printed). After the appearance of the personal computer and Internet we have a digital tool for *permanent* preservation of cultural artifacts, without location and access restrictions. Thanks to fast growing Information Technologies (IT) sector, now technically "everything" could be digitised. Thus the transmission of knowledge (information, culture) in 21st c. is the living area for all wide scaled applications of Artificial Intelligence (AI), computer modelling and information technologies.

The benefit for cultural heritage holders worldwide could be great if they use the tools, created by the scientific disciplines mentioned above for preserving of their holdings, widening the access to them, advertising their own institution and especially for e-learning purposes. *Virtual reality* as computer created interactive environment, recently is experimentally used for *cultural heritage presentation, education, art* and *surgical training* purposes. The greatest advances in the AI area in the last 20 years have occurred in the field of expert systems (which are very expensive to produce) and game development.

Computer game is around 40 years old. Google found 4 500 results on 9th February 2004 for "edutainment games". For "edutainment" results are 304 000, for "computer games" – 3 630 000. These numbers are indicative for the share of computer game phenomena in contemporary mass culture. The most general thing to say of the computer game evolution is that it has become gradually based on genres: 3D Action/Adventure

[1] *Electronic games played on a video screen, with the game program emanating from a computer's floppy disk, hard drive, special game cartridge or hand–held units. After its phenomenal growth in the early 1980s in the United States, Europe, and Australia with the advent of Pong, the video games industry was further developed by Nintendo Corporation and Sega Genesis, which nowadays continue to dominate the market worldwide.*

and shooter games; Strategy games; Simulation; God Games; Fighting, Puzzle, Fantasy Games; Racing; Role–Playing Games; Sports. Games may be classified also according to the number of players and the use of networking technologies [2].

Educational Potential of EG. As a form of computer art, EG is distinguished from other game types by making learning interesting and amusing at once. Thus it helps to "cultivate" human mind and imagination, so that creativity potential of players to pour out. Theory and applications of Computer Science and IT vest with "power" this goal. The attractiveness of the presentation of a specific manuscript for example could be improved by including elements from "learning by doing (making)" and "learning by discovery" methods, suggested by cognitive psychology. This means that in the time of the game–play the user could learn additional knowledge by defining "objects", which can be created and modified.

Requirements for the use of EG. EG require contextual knowledge to be played, an interdisciplinary team and working policy of cultural heritage holders to be made on high quality. These requirements are not always taken into account and as a result the smaller part of the market presented EG are on the professional level required. By contrast with the fun–aimed game types, EG needs also professional scientific assistance. This makes the development of EG more expensive, which explains why the game industry still resists on investing. On the other hand constant theme in discussions about the future of games is that the innovativeness of game play has lost to graphical appeal and technological advancements. Really creative offerings are ignored by the press and as a result by the gamers also. The lack of *vocabulary* of creative aspect of game development is another negative factor that results in creative stagnation. The current state could be changed only by active dialogue between game researchers and game makers. Such a dialogue is in its starting level nowadays. **Di**gital **G**ames **R**esearch **A**ssociation (DiGRA), **I**nternational **G**ame **D**evelopers **A**ssociation (IGDA) and the *Game Studies Journal* are game industry attempts to educate outsiders, including those within the business who argue that there is nothing in games beyond hollow entertainment [3]. Their goal is encouraging games research and promoting dissemination of work through research, development, commercial, practitioner and policy communities, and networks.

The role of the academic community in this process is more interdisciplinary collaboration in order "the tools to analyze, recognize, and create research labs" to be given [3]. Non-profit research is one of the best ways to enhance technology and increase appreciation and the main obstacle here is the fact that game industry resists open source. The wedge needed to break the status-quo seems to be ludology challenge. Ludology (from "ludus", the Latin word for "game") tends to become "unified theory of game play", but it still stays an emerging field searching for its institutions [4]. It is developing in three main axes: theory (curriculum), research and application.

SWOT analysis of EG (on the Bulgarian background.) The author offers a brief *SWOT analysis* (an useful marketing research tool), which shows the Strengths, Weaknesses, Opportunities and Threats of EGs. The whole picture is positive and could motivate active contribution of policy makers and specialists in this new way of presenting holdings of cultural institutions. There are already two commercial historical games with educational content and wide audience in Bulgarian game market – "Tzar" and "Trans". They are created by Bulgarian specialists from *Haemimont* and became

very popular recently among pupils. This is a good indicator for the future development of this kind of computer games on the national background. Thus the current state of lacking EG, presenting Bulgarian cultural heritage could be changed in favour of many interested groups.

Strengths of EG.

- Presents qualitatively the cultural heritage
- Acquires specialised knowledge in various domains
- Improves language skills
- Game industry gains without addicting danger
- Develops critical thinking and logics
- Increases the interest to learning and literacy level
- Facilitates teachers in educational process
- Familiarizes the people with computers

Weaknesses of EG.

- Lacking working policy in Bulgaria
- Lacking legislation and copyright issues
- Demanding at least average general knowledge of the player
- Time consuming
- Loosing the balance between education and entertainment

Opportunities of EG.

- Global computer and video game industry is generating revenues of over 20 billion US dollars per year thus forming a major part of the entertainment industry. Cultural heritage sector and educational institutions could use the opportunities offered taking the challenge of investing in EG.

- Recently edutainment area, which was ignored a decade ago, gains much attention. User community is familiar to the multimedia digital environment [5]. Specialists in e–learning area also are attracted by the potential of what the business calls "game–based education".

- Teaching–learning tools, such as EG, Net LOGO etc. could become a backbone of educational e–publishing. This is promising opportunity in favour of game industry and educational institutions

- The stable tendency for integrating computer games with other media or platforms (PC, television, radio, console, handheld) increases the market and application area.

- EG offers and requires exchanging experience amongst different specialists, which is feeding research area of ludology

- Cultural tourism could be influenced by disseminating EG online and as a CD.

Threats list of EG is the smallest one in comparison with other game types. This is the best possible advertisement. On physical level – pathological computer use disorder, wrist, neck and elbow pain and on psychological level – many children "dedicate" their lives solely to their created profile.

Conclusion. The "share" of EG, presented virtually still is comparatively small. But "the innovative games are often those that find interest in what has hitherto been considered unimportant. And that's part of what pushes computer games forward, making them different, making them appealing in new ways" [6]. Edutainment games future

depends not only on funding, which is the most obvious in Central and East Europe region, but on active dialogue on business level (Game industry) and scientific level (Game research). Starting point should be education, development of mind, again in all levels.

Instead of a classical conclusion, the author offers an excerpt from the analysis of the future of computer games, made by the Director of the New York University Media Research Laboratory, Prof. Ken Perlin:

We are in danger of becoming passive citizens, being spoon–fed culture. Television culture is not a cause, but a symptom... if we institute programming languages as part of the general education of all; we will be helping to guide a revolution in the way people think and act. Imagine if programming, Symbolic Logic (also useful for any sort of critical thinking) became like writing ... a fundamental language of self–expression. Way beyond open source for democratizing access to cultural participation at the most basic level. That's exactly the sort of spirit, which will transform gaming culture from the ground up. I do believe that a large portion of the lack of creativity stems from the current educational system. Somewhere along the lines the educational system shifted from teaching people how to think to teach them what to think... It's depressing to see [7].

Game culture of 21st c. and illiteracy invasion from everywhere are not a threat for the educated mind only. Edutainment game as a product of the same culture offers interactive playing environment for delightful learning. Such game play has good message, message of the history and the culture of human beings. Investing in it requires and provokes creativity. And exploring creativity potential of Homo Sapiens – Ludens is the goal that is worth much, because to play is to contemplate.

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ОБРАЗОВАТЕЛНО-РАЗВЛЕКАТЕЛНИ ИГРИ ЗА ПРЕДСТАВЯНЕ НА КУЛТУРНО НАСЛЕДСТВО

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Важен въпрос пред образователните институции, музеите, библиотеките е как съхраняваното в тях културно наследство да бъде представено в електронен вид, т.е. популяризирано сред възможно най-голяма аудитория. Компютърното моделиране, изкуственият интелект, мултимедиите изпълняват успешно тази задача. Статията представя част от по-обширно изследване на образователно-развлекателните игри (ОРИ или Edutainment games), което е в процес на разработка. Използваната работна дефиниция за компютърна игра е: „Форма на компютърно изкуство (компютърен модел), построена върху количествени дефиниции за успех и загуба, формални правила за времето на играенето, съобразявайки се с които играчите взимат решения, за да постигнат предварително ясна и значима цел“. Изследва се потенциалът на ОРИ в областта на образованието. Трайното установяване на науката за игрите „лудология“ (от лат. “ludus” – игра) като самостоятелна дисциплина е труден процес, но тя вече функционира като част от учебните планове по информатика, мултимедии, изкуствен интелект (Computer Science), както и история и теория на културата, психология, библиотекознание. Тя се развива в две основни оси – теория и приложения. Тъй като първата се покрива на университетско ниво, авторът акцентира върху втората – изследване и приложение на компютърните игри и специално ОРИ в една тясна област – представяне на културни паметници. Авторът включва анализ на силните, слабите страни, възможностите и потенци алните заплахи от използването на ОРИ (SWOT анализ). Целта на текста като цяло е научна обосновка на ОРИ и мотивиране на специалисти от различни области, които биха поели предизвикателството да създадат не просто поредната игра, но игра-алтернатива, която, представяйки българската култура, да обучава и да провокира творческо мислене.