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**THE *FULLDOME* DOCUMENTARY FILM IN THE
CONTEMPORARY MEDIA AND EDUCATION CONTEXT**

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Abstract

The Contemporary educational context cannot be defined and understood without to explain what is new media and, in this regard, Lev Manovich, first of all, list the categories of products and media often discussed and related to this topic in the popular press: ' Internet web sites, virtual worlds (interactive 3D environments, computer-generated), virtual reality (VR and Virtual Immersive Environments: IVE), multimedia, computer games , computer, video, digital cinema, digital interfaces and human-computer'. Visually, we communicate already in a language that only a century ago one can dream of: the language of the *fulldome* documentary film. Moreover, photograms seems no longer to be the molecule of the Visual communication, but just an extension, according to the benevolent aesthetics, grace to the new vectors of communication in the immersive fulldome world (capturing attention, volume projection, defining ocultation of a visual aspect, channeling the emotions and even the impression of ' live ' participation ' in real time ' up to ' how the movie ends' feeling). The Fulldome film is often used as a way to open educational and entertainment institutions in the digital world and to the real world is a recurring topic of discussion about updated information in museums and visitors experiences with the cultural media. After the Web 2.0 and social media boom, by overwhelming access to digital information via portable devices, it appears that we are approaching a new cycle: that of the popular immersive projection to get knowledge.

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1. Introduction

The *fulldome* projection & documentary is shaping up as a major cultural and educational act, as social and economically mature actor, it starts to become a multimedia industry and a correlation to the



benefit of global popularization of scientific and to the immersive edutainment (education through entertainment), multimedia and interdisciplinary.

After the Web 2.0 and social media boom, by overwhelming access to digital information via portable devices, it appears that we are approaching a new cycle: that of the popular immersive projection to get knowledge. Basically, we already communicate in a language that only a century ago one can dream of: the language of the *fulldome* documentary film. Through this paper, we want to consider the reasons the fulldome film is to be seen and used as a way to open educational and entertainment institutions in the digital world and to the real world. It is a recurring topic of discussion about updated information in museums and visitors experiences with the cultural new media, pointing out the *fulldome* documentary film role in the Contemporary Media And Educational Context.

2. The Fulldome Documentary Film in the Contemporary Media

The Planetarium is that type of optimum multimedia equipment, half screen and half projection system, that can be considered a dynamic simulation, interactive, immersive, a volumetric, visual engulf of the world and of the scale for knowledge of the world. The entire economy of knowledge, with all its efforts, is revealing the world in the form of a staircase on which we climb to the intelligible, from observation to the modelling, simulation, each foot would be a circumscribing, a reducibility, a didactic simulation controlled by means of a media product: fulldome film documentary.

The Fulldome film does not come *ex-nihilo*. The audience for such documentaries has various levels of cinema culture. Therefore, the fulldome documentary film must be an array of artistic, intellectual, communication. The objectives of such a film should not be subjugated to scientific ideologies of an abstract type, but of those who serve the popularization of science. The power of fulldome documentary film should be especially in the ability to generate Visual questions and to simulate the arguments for splinter, whatever the scientific theories discussion are mediated through this type of documentary film. For a field so esoteric, as is that of science, the effective participation of the public in setting strategic directions and priorities, however, would be dependent on the level of knowledge of science and scientific methods by the public.

Therefore, it is considered that it is necessary to investigate the general level of knowledge and understanding of science and the scientific method and, most importantly, the public attitudes towards science, because, on that basis, one can implement an entire complex of actions to raise awareness of the importance of public policies to accelerate the development of scientific knowledge. The fulldome documentary film is eminently a product of these public policies.

The New technologies have always been a great potential for artists who are looking for 'new formulas in art'. Today, the so-called 'new media' have great potential for filmmakers, especially for 'non-fiction storytellers', i.e. for documentary filmmakers. For almost a decade, one of the most recent additions to the range of immersive virtual environments (Virtual Immersive Environments: IVE) was digital fulldome projection.

Although, quite empirical researches have been conducted to explore the potential and benefits of other types of IVE, in this part of the paper we just try to provide a framework for examining the immersive fulldome environments properties.

The digital technology has become incorporated into planetariums and the use of these digital fulldome environments was diversified to include non-astronomical applications based on entertainment and other educational contents. The surface projection of the spherical digital fulldome screen type can be used as a canvas for your computer in real time or for live or pre-rendered multimedia content, or basically for every other digital visual projection accompanied by surround sound.

Under the dome of the Planetarium are many technologies and different artistic forms which, instead of being structurally or historically interconnected, they are rather directly and simultaneously disparate combined for an almost post-modern aesthetic observable in formulas-recipe, multimedia production. In a planetarium,- therefore, indeed a universal medium, the accumulation of various multimedia and media technologies can be seen today in the whole plenitude. Let us remember how, above all, that visitors are asking for more attractive visits in order to address the question, how can fulldome projections contribute to the achieve of this objective, even if the visitor is not demanding. The responsibility of museums should also be the cessation of the 'reproduction' of a passive visitor.

How evolution of the training models based on simulation called fulldome projection within the Planetarium's digital multimedia-simulator vault of heaven continue, it will make it possible for education and for researchers to introduce e- learning systems to enhance the concepts in the benefit of those who learn the tasks for which the subject assigned and for which traditional patterns are more inefficient (Yeh, 2004, p. 181-194; Guo, 2007, p. 227-256).

Visually, we communicate already in a language that only a century ago one can dream of. Moreover, photograms seems no longer to be the molecule of the Visual communication, but just an extension according to the benevolent aesthetics grace to the new vectors of communication/immersive fulldome (capturing attention, volume projection, defining ocultation of a visual aspect, channeling the emotions and even the impression of ' live ' participation ' in real time ' up to ' how the movie ends' feeling (Ben Shedd, (2010).

The Contemporary educational context cannot be defined and understood without having to explain what is new media and, in this regard, Lev Manovich, first of all, list the categories of products and media often discussed and related to this topic in the popular press: ' Internet web sites, virtual worlds (interactive 3D environments, computer-generated), virtual reality (VR), multimedia, computer games , computer, video, digital cinema, digital interfaces and human-computer' (Manovich, 2001, p. 8-9).

The Convergence media course so it is also bound by the rapid growth of the market in the area of video games and by the integration of the 'horizontal' media industry generated by the computerized imaging. The digital technology has become incorporated into planetariums and the use of these digital fulldome environments have been diversified to include non-astronomical applications based on interdisciplinary content, entertainment and other educational levels.

The *Fulldome* projection is a result of the application of new media information technology and communications (ICT) especially in the educational and entertainment institutions (see also the Omnimax and Imax). The *Fulldome* projection is often used as a way to open museums in the digital world and the real world is a recurring topic of discussion about updated information in museums and visitors ' experiences with the cultural media. After the Web 2.0 and social media boom, by overwhelming access to digital information via portable devices, it appears that we are approaching a new cycle: that of the popular immersive projection to get knowledge (***, Creative Research, (2002).

3. The Digital Planetariums: Future Science Museums

The Contemporary incredibly fast advances in computer technology has put at our disposal new planetariums, meaning virtual reality digital devices to cultivate and train the public on the modern cosmology (Hakim, 1992, p. 57). More than just a simple (r) from the word *revolution*, these devices used in education and culture have become virtual 3D environments, moving from representation of a closed world to an infinite universe one. As a virtual observatory, these planetariums have acquired the capacity to preserve and make available to the public their catalogs of observations that ranged, archived and updated, permanently under the analysis of multi-disciplinary researchers.

The Cultural issues that may face these institutions are: the first is becoming truly virtual museums, collecting data from astronomical observations in which the science invests research work; the second is to show science ' as it is ' and, finally, the third, is to facilitate construction of knowledge in the visitor mind, based on knowledge even in the phase of being under the research process.

From historical point of view, the term ' Planetarium ' comes from ' around the world ', a scale form originally representing the subscribed geocentric world, closed, in which visible planets ' wander ',, aside the two lights, the Sun and the moon. It was a first attempt to explain the world using a craft, a complete turnaround and with intuitive cosmographic primitive tools, a raw form to explain and simulate the universe organization (Lacombe, 2006, p. 32–37). The first one is attributed to Archimedes of Syracuse (287-212) and his concept has got to evolve independently, appeared as globes, armilare spheres type, reserved only for the stars and for sky mapping (Dumont, 1991, p. 4–5.). In 1682, Christian Huygens (1629-1695) made a scale model of the universe from a dedicated clock mechanism; *travel* speeds of celestial bodies were obtained through multistage mechanical complexity.

However, as pointed out by Michel Dumont, the Planetarium had to wait until the end of the 17th century, till the ability to reproduce mechanically the precise movement of the planets. In the 19th century, Professor Roger Long made a *stellarium* which represents a starry night sky, a facility that can accommodate about 30 persons (Girault, et al. 1993, 363–370). This was the first planetariums were designed also for large audience. In 1912, the globe of Wallace Walter Atwood would prefigure the ingenious idea proposed by the company Carl Zeiss Jena (Germany) by presenting projections of planetary management by pointed light, in fact, the first modern opto-mechanical planetarium. This innovation will be forever linked with the name of Oskar Von Miller (1855-1934), the founder of the German Museum in Munich and Walther Bauersfeld (1879-1959) from Zeiss.

Beyond the emotion and the admiration provided by the technological miracle engineered by Zeiss tema, the planetarium technological mutations will continue (Ruiz et al., 2006, p.14–19). The Multimedia emerged in 1990 to lead on the entire planet to the development of multimedia digital planetarium wear witness in the third millennium.

This metamorphosis was operated for the first time in 1983, with the first prototype of graphical projection, analog-to-digital, virtual planetarium, worldwide installed in Salt Lake City, in other words, an analog simulator for driving a commercial airliner was converted to simulate the environment of Virtual immersion among the stars.

Virtual reality is a way of representing that incorporates all rendering, interaction and immersion techniques (Bouvier, 2009, 6–16). It offers the possibility of generating virtual environments, which puts a human subject in situation of interaction, but also dive into a universe re-created from scratch. The human subject is given the opportunity to witness an experience of reality in a 3D virtual world. Jacques Tisseau characterizes virtual reality as a model in which the universe everything happens as if the models were real, as they offer mediation of the senses, triple action and spirit (Tisseau, 2001, p. 26–27). This author shows that man learns the reality through these three mediations. A virtual reality system, therefore, is distinguished from another computer application in that it gives the user the sensation of being in a virtual world and to act.

The user must feel that there is a genuine sense that he is in a different world than the physical, natural world of the body, meaning a sense of presence (Bouvier, 2009, 49). This notion of the presence of the user in a virtual environment comes in two parts: immersion can be multi-sensory, and interaction. But to be complete, a virtual environment also needs to be a place where objects behave independently, without any action by the user. Thus, Jacques Tisseau and Fabrice Harrouet envisages three axes to describe a system of virtual reality: autonomy, interaction and immersion (Tisseau, Jacques, Harrouet, Fabrice, 2003, 85–124).

The fourth axis would be a technological one, so, we would have a guide, a framework for positioning in any computer system can be made for the realization of virtual reality. Each vertex of the cube here shows a theoretical 'ideal' case. The innovative nature of the digital planetarium scientifically led to effective learning hypothesis using the show type learning process. These equipments are today based on the kind of positioning technologies of the spectators / players in their training for science 'as it is'.

4. Conclusions

A contemporary planetarium show, beyond a particular Visual meeting is thus a genuine act of media scripting that defines a cultural learning based on knowledge sharing, in which are mixed community acquisition, intellectual understanding, questioning, physical analysis and the affective dimension (feeling, emotion, curiosity, desire, pleasure, etc.). The visitor experiences completely a tour in a world faced with their own designs and models.

However, the situations of communication in these planetariums who are not just the result of transcribing the 21st century teaching, according to Yves Chevallard (1985, p. 25), or professional practice, according to Philippe Perrenoud (1998, p. 487–514), they are the result of a new form of transposition which takes into account all cognitive processes developed for the transmission of scientific knowledge and practices in a cultural context: this refers to the concept of media conversion described by Jack Guichard and Jean-Louis Martinand (2001, p. 186-188). Real time and virtual reality also justifies the use of constructivist pedagogy in planetariums, a pedagogy which regarded education/student as a actor of learning and of assimilated data.

On this basis, we propose to present the activity of the planetarium mediator in a tetrahedron media model, adapted by François-Xavier Bernard that reflects the characteristics of the interaction

between the four played parts of immersive media situation (Bernard, 2006, 201): 1) virtual environment, 2) mediator of planetarium 3) public/visitor, 4) knowledge and scientific practices targeted to be transmitted/assimilated. All that because our thesis is that fulldome documentary film for planetariums is the core of the future Museum of sciences.

International Planetarium Society Conference in the year 2016 went beyond the stage of technological and commercial competition arena, for the benefit of crystallization procedures altogether, and the techniques of making live Planetarium shows and rendered ones, ensuring intermodal optimal operation of planetariums in fact, aesthetic and technical challenges of fulldome documentary film and of the present scientific research.

One of the conclusions of the survey undertaken in 2014 by Maciej Ligowski (physicist, fulldome show producer, former deputy manager of Copernic Planetarium (2009- 2013), in anticipation and preparation of biennial programme of the International Conference of the International Society of Planetariums/International Planetarium Society (IPS) which was hosted during the period 19-25 June 2016 in Warsaw (http://www.ips2016.org/IPS2016_program_survey_summary.pdf, accessed in 2016, April, 17th), is confirming our hypothesis and that the projection of the fulldome is technically and aesthetically, in an era of hybrid and that it is quality oriented towards interdisciplinary and attractive content to several audiences.

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