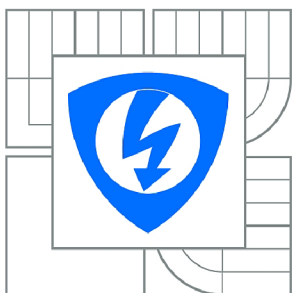# VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ

BRNO UNIVERSITY OF TECHNOLOGY

FAKULTA ELEKTROTECHNIKY A KOMUNIKAČNÍCH TECHNOLOGIÍ
ÚSTAV JAZYKŮ

FACULTY OF ELECTRICAL ENGINEERING AND COMMUNICATION
DEPARTEMENT OF FOREIGN LANGUAGES

SCIENCE AND TECHNOLOGY IN MEDIA

VĚDA A TECHNIKA V MÉDIÍCH
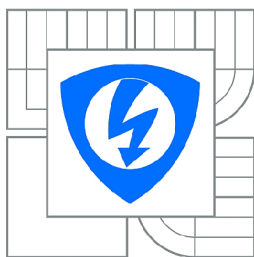
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BACHELOR'S THESIS

AUTOR PRÁCE   Bc. ZUZANA GELLNEROVÁ
AUTHOR

VEDOUCÍ PRÁCE   PhDr. MILAN SMUTNÝ, Ph.D.
SUPERVISOR

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Studentka:	Bc. Zuzana Gellnerová	*ID:*	143976
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Mc Luhan, M. (2001) Understanding Media: the Extensions of Man. London: Routledge.

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Annotation

This thesis deals with the influence of Media, especially New Media, on the field of Science and Technology. It defines basic media terms and warns that Media may represent an excellent mean of Science and Technology promotion. On the other hand, they are very powerful and can distort reality and manipulate with humans. There are explored several examples in the thesis, too. The conclusion outlines a possible view on the interconnection of Science, Technology and Media in the future.

Anotace

Tato práce se zabývá vlivem médií, především nových médií, na oblast vědy a techniky. Definuje základní mediální pojmy a upozorňuje na to, že média mohou být výborným prostředkem k propagaci vědy a techniky, ale mají také obrovskou moc a mohou zkreslovat realitu a manipulovat s lidmi. V práci je také rozebráno několik konkrétních příkladů. V závěru práce je nastíněn možný pohled do budoucna propojení vědy, techniky a médií.

Keywords

science, technology, media, art, New Media, scientific articles

Klíčová slova

věda, technika, média, umění, nová média, vědecké články

Prohlášení

Prohlašuji, že jsem svou bakalářskou práci na téma Science and Technology in Media vypracovala samostatně pod vedením vedoucího bakalářské práce a s použitím odborné literatury a dalších informačních zdrojů, které jsou citovány v práci a uvedeny v seznamu literatury na konci práce.

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V Brně dne ....

Poděkování

Chtěla bych velmi poděkovat panu PhDr. Milanu Smutnému, Ph.D. za vedení mé bakalářské práce a také bych chtěla poděkovat své rodině za podporu nejen během studií.

V Brně dne ....

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2 Introduction

This bachelor thesis deals with the influence of Science and Technology on Media. It focuses on new ways, opportunities and possibilities of presenting Technology via Media. The methods, which are used for the analyses, are for instance: making comparison of books, articles and essays, focusing on new ways of using technology for expressing something new and innovative or personal experience with New Media Art such as Light Show creations and computer and software Art. The main aims of this thesis are analyses and approach that Science, Technology and Media may be interconnected and what can arise when the idea of connecting and influence of those branches is put in practice. There are a lot of accomplished scientists, there are many acknowledged technicians, there are creative artists but there are not many people who are able to focus on the production of something using the potential of Art, Science and Technology. The thesis could bear an inspiration, a view of various opportunities during an influence between the branches in question. When discussing the importance of Media, the thesis analyses a threat of negative aspects occurence such as distortions, manipulation or misuse as a propaganda tool as the thesis focuses on those aspects, too.

The thesis is divided into three major parts: *Definitions of basic terms, Examples of scientific articles and their presentation via media and Examples of multimedia works and methods of influencing media*. The first part of the thesis focuses on definitions of basic terms. It is not easy to define the terms as there are many media theoreticians who may represent different opinions on the terms. In spite of this fact the thesis focuses on the following terms: Media, Interactive Media, Intermedia, Multimedia, Hypertext and Hypermedia, Supermedia.

Examples of scientific articles and their presentation via media part deals with various articles and their analyses. The texts analysed are based on a structure of the text and on reported speeches, which keep the article attractive. Colourful pictures, videos and the usage of social networks, hyperlinks and the idea of suggested articles make the articles

very valuable. Many social networks and channels such as twitter, facebook, pinterest, google+ or linkedin are used and this helps the articles to be better and quickly known. An interactivity via many social networks (thanks to them the people may share articles, comment on them et cetera) ensure a promotion to the article, too.

The final part of the thesis, bearing a name *Examples of multimedia works and methods of influencing media* aims at multimedia art pieces. Most of the art pieces are huge three–dimensional and interactive installations based on New Media production. Interactivity is the main aim of those art pieces. This part of the thesis focuses even on light shows, which emanate from New Media principles.

3 Definitions of basic terms

3.1 Media

Medium is a general term which is not easily defined. Marshall McLuhan (2001: 7) is well known for his statement 'the medium is the message.' He thinks that media bear the messages of an event, not the event itself. The event is a kind of story which happened in the past or a story which is just going on right now or which is going to happen in the future. However, the message reports about an event using letters grouped into a text *"Automation creates roles for people, which is to say depth of involvement in their work and human association that our preceding mechanical technology had destroyed. Many people would be disposed to say that it was not the machine, but what one did with the machine, that was its meaning or message. In terms of the ways in which the machine altered our relations to one another and to ourselves, it mattered not in the least whether it turned out cornflakes or Cadillacs.' ... 'The personal and social consequences of any medium– – that is, of any extension of ourselves – – result from the new scale that is introduced into our affairs by each extension of ourselves, or by any new technology"*(McLuhan 2001: 7). *"Media represent all the ways which may be used as a huge lying to a large group of people'*(Lokaj 2008: 8)-[1] A medium is a kind of communication channel among various groups of people or even among different companies. Since the origin of media, the aim of medium was not only to provide communication but also to influence human's behavior, beliefs, values or attitudes towards society and the influence of media is reflected by almost every human activity.

Media influence society directly, very often by the usage of propaganda tools. There are generally two ways of understanding propaganda. One group of people say that propaganda is a kind of ethically neutral tool, whereas another group of people have an opinion that propaganda seems to be an unethical tool of manipulation. František Koukolík (2010: 198)

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[1] translated by Zuzana Gellnerová, original text: „Média jsou všechny prostředky, které mohou být použity ke lhaní velkému množství lidí najednou."

claims that propaganda is one of the most powerful social manipulation tools. *"A definition states that propaganda is an attempt of an authority, for instance a state, a church or a political party, which tries to convince as many humans as possible and it calls them "a target." Propaganda often exaggerates, it may or may not lie. The pressure of propaganda varies in intensity." Propaganda is based on procedures which may cause human groups complian'* (Koukolík 2010: 198). [2]

Propaganda tools are very often overlapped or combined with various logical illusions. A few examples of commonly used propaganda tools are the following: 'argumentum ad nauseam,' where a continuously repeated lie becomes true, 'argumentum ad hominem,' where the bearer of an opinion is being assaulted instead of assaulting just the opinion (For more details see Koukolík (2010:199-211)). Even refering to an authority or a celebrity is considered to be a kind of propaganda tool. Misinformation by which false and not precise statements are consciously spread or for instance a euphoria to which artistic happenings or funny comedies in televisions are trying to evoke positive feelings in the audience.

3.1.1   Herman–Chomsky Propaganda Model

Herman–Chomsky Propaganda Model from 1988 describes a situation of mass media in the United States, where money and power influenced news in the way that the news is filtered.

"News production processes are shaped by a range of factors, encapsulated by the 'filter elements' associated with the Propaganda Model.' The Propaganda Model predicts that these filter elements impact upon what becomes news. The five filter elements are (1) the ownership, size and profit orientation of mainstream Media; (2) advertising as the principle

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[2] Translated by Zuzana Gellnerová. Original text: 'Definice říká, že propaganda je pokus nějaké autority, například státní, církevní nebo stranické, o něčem přesvědčit co největší lidské skupiny, jimž říká "cíl". Propaganda často nadsazuje, může, ale nemusí lhát. Nátlak propagandy bývá různě velký. Propaganda užívá postupy, které dokáží přimět lidské skupiny k povolnosti a souhlasu.'

source of revenue for mainstream media and the corresponding influence of advertising values on news production processes; (3) mainstream media's routine reliance on agents of power as the primary definers of social reality; (4) organized flak that represents a mechanism of social control; and (5) various ideological forces, which may be deployed and adapted to correspond to elite interests when required" (Herman and Chomsky 1998, cited by Mullen and Klaehn 2010: 4).

It had been strongly manipulated with the society that time. Even these days, the population is being manipulated via media but hopefully with less power, using different filtres. They are realised not only by old means of media but also via New Media, new technologies and via new communication channels.

3.1.2   Old and New Media

Media develop quite quickly during the latest time period. There are old media (alias traditional media) such as newspapers, magazines, a television or a radio and New Media (alias Electronic Media or Interactive Media) such as web pages, blogs, email, CD/DVD-ROM, virtual reality, interactive television, mobile technologies etc. Marshall McLuhan (2001: 24-25) divided media into two categories: hot and cool media. Hot media are known for extending just one sense by a high definition which leads to complete data filling without intensive audience participation. For instance, a photograph is a kind of hot medium, whereas a comics, which is just a rough drawing containing little information, requires involving the viewer's activity and imagination so it uses low definition and is a cool medium. Similarly, a phonetic alphabet contains more aspects of communication and is a hot medium. A picture alphabet such as pictograms in China is a cool medium because we have to participate by finding words in it. Cool media lead to the human need to interact with other media and to involve more senses. But there is a problematic example. A radio can transmit a high quality sound, but is unable to provide listeners with sufficient pictures so even McLuhan was not sure whether to put radio in hot or cool media. It is obvious that a radio represents a boundary between hot and cold media.

Marshall McLuhan (2001: 86) suggested that the character of society depends on technology that the society uses and that a medium is an extension of a human body and senses. *"If the human ear can be compared to a radio receiver that is able to decode electromagnetic waves and recode them as sound, the human voice may be compared to the radio transmitter in being able to translate sound into electromagnetic waves. The power of the voice to shape air and space into verbal patterns may well have been preceded by a less specialized expression of cries, grunts, gestures, and commands, of song and dance"*(McLuhan 2001: 86). Since the time new technologies and New Media appeared, they have modified the environment and caused a pressure on relatively adapted individuals in society. McLuhan says that every new technology became an extension of a human's body such as, for example, a wheel became an extension of human feet. On the other hand, if a perception of new technology was unable to determine the cause of individual's irritation, the physical body would avoid using those functions of the body, which took the most stressing and changing conditions. *"With our central nervous system strategically numbed, the tasks of conscious awareness and order are transferred to the physical life of man, so that for the first time he has become aware of technology as an extension of his physical body. Apparently this could not have happened before the electric age gave us the means of instant, total field-awareness'*(McLuhan 2001: 52). Having that total field-awareness we can move ourselves onto higher limits and mainly electronic Media may give us a huge help.

3.2   Interactive Media

Generally, Interactive Media are used as a synonym for New Media or Electronic Media. *"Interactive media is the integration of digital media including combinations of electronic text, graphics, moving images, and sound, into a structured digital computerised environment that allows people to interact with the data for appropriate purposes. The digital environment can include the Internet, telecoms and interactive digital television"*(England, Finney 2002: 2). Interactivity may be understood as a process of two or more issues influencing each other. Interactivity is the ability of users to directly manipulate and participate in the transformation of the final content of the work.

In the field of New Media the relationship or discontinuity of interactivity with the full participation of a viewer is discussed very often. For instance, Australian professor Lelia Green (2002: 162) argues that interactivity implies both the ability of communication media that can be adjusted by the user, thus requiring technology to allow the effective use of input from the user. On the contrary, Nicolas Bourriaud (2004: 89) maintains an opinion that the interactive work provides the recipient with some kind of freedom, but that it allows them to react only to the original impulse which was sent by the author of the work. Bourriaud (2004: 46-47) said that the recipient's participation should become a part of the author's copyright. Bourriaud tried to draw the attention to the tendency of New Media to proclaim interactivity and audience participation as the core of the author's work and as a property of the work. But this could mean that the recipient may be limited by the author's framework.

Lev Manovich (2001:59) focuses on the meaning of interactivity for a user. He divides interactivity into two types: opened interactivity, which creates more complex interaction between a human and a computer and which automatically generates the content in a real time regarding to the user's responses, and closed interactivity, where Manovich refers only to previously defined posibilities.

Martin Lister (2003) says that interactivity is a part of New Media characteristics. Digital Media enable us to intervene and manipulate media and he thinks that interactivity is based on the user's ability of media manipulation in terms of feedback communication. Receiver's interpretation of a scientific or a technological text plays a significant role and very often the direct participation of a viewer is considered to be a necessary condition for the final work. Whereas old media offer the recipient only passive perception of scientific and technological information, New Media offer us interactivity and interactivity changes the role from a 'viewer' to a 'user.'

3.3 Intermedia

Intermedium crosses the boundary between more types of media and becomes an origin of New Media art pieces. In Synesthesia and Intersenses: Intermedia (1965) Dick Higgins claims that many works are included in Intermedia. Intermedia do not divide different parts of media but they connect them, which is very important these days. For a better illustration, Dick Higgins explains Intermedia on an example of two artists: Pablo Picasso and Marcel Duchamp. Pablo Picasso was a well known artist who drew amazing paintings but those paintings may seem to be a bit old fashioned today. On contrary, Marcel Duchamp, well known for his ready mades (he used common objects, gave them an unexpected title and made an exhibiton) created Intermedia works. Ready mades are a part of Intermedia because they represent Intermedia just by the way we percieve the work. A thing, used for a common usage, turns now into a piece of art which has a high artistic value and this fact gives us something new, a new angle of view, a new level of understanding something between 3D art and media. Interactive art performances, happenings and events are Intermedia art pieces whereas a static photograph, a paingting or a common theatre performance are not. Intermedia are flexible, they do not use many rules. Since today, not so much information about Intermedia is known and there is a huge possibility to discover something new about Intermedia in the future. *"Intermedia has many pasts, several definitions and at least two futures"* (Friedman 2007: 4).

3.4 Multimedia

Multimedium respects the autonomy of embedded and mutually confronted elements such as sound, images, texts or gestures and is based on the usage of more than one medium for a creation and presentation of scientific, technological and artistic work. *"One of the most striking features about early multimedia experiments was the rich variety of hardware and software put to use. The central issue was the engagement of a variety of media that could address any number of senses. Multimedia ventures included sound technology using phonograph, telephone, tape recorder, radio, public announcement systems, specially created sound devices, experimental instruments for contemporary music and standard musical instrument's"* (Friedman 2007: 11). For instance, a documentary movie about the birth of electrocity may represent a type of multimedia work because many illustrating moving pictures and animations and various sound effects could be seen there. A Harry Potter movie saga, where the visitors can experience great performances and gestures of actors, dramatic images, supported by suitable background music and sound effects, may represent another example.

3.5 Hypertext and Hypermedia

The term hypermedium was invented in 1965 by American philosopher and sociologist Ted Nelson. Hypermedium is considered to be a logical extension of a term hypertext which connects audio, video, graphics and text into a non linear information medium via hyperlinks. *"Since in new media the individual media elements (images, pages of text, etc.) always retain their individual identity, they can be "wired" together into more than one object. Hyperlinking is a particular way to achieve this wiring"* (Manowich 2001:59). A world wide web is an example of a hypermedium because of using electronic hyperlinks which are mutually interconnected in internet environment of global computer networks. *"A hyperlink creates a connection between two elements, for example between two words in two different pages or a sentence on one page and an image in another, or two different places within the same page. The elements connected through hyperlinks can exist on the*

same computer or on different computers connected on a network, as in the case of World Wide Web" (Manowich 2001: 59). The Czech net artist Markéta Baňková works in the field of internet projects such as a virtual map of New York where anyone can click on the main page and then visit various hyperlinks and move along the city by clicking. Every hyperlink hides authentic photos, symbols, texts or realistic videos about the particular part of New York. This project was created between the years 1999 and 2002 and it is based on a connection of hypermedia and hypertext. It is also known for being a preversion of Google Street View but the project called 'New York City Map' has a bit different aim: to catch the atmosphere of the city.

3.6 Supermedia

The term 'supermedia' was firstly used by two artists Federico Díaz and David Kořínek, who established a Supermedia atelier at the Academy of Arts, Architecture and Design in Prague. By using this name for the atelier they wanted to express the supremacy of their atelier over common media such as a television, a radio, the Internet or printed newspapers or magazines. This supremacy is expressed by a Latin prefix super– which has a meaning 'to be over something.' The main aim of Supermedia atelier was to work with different types of media and to combine traditional media, Digital Media and Multimedia. We can conclude that the term 'supermedium' is a medium which lies on a border among more types of media. Therefore supermedium contains something more than just a medium, something beyond traditional media. Even New Media are slowly becoming traditional media if compared to supermedia. New Media are getting old and recent Supermedia, which tend to combine more types of media and try to get over boundaries across media, are finding their place in today's society. Supermedia are based on new information technologies and we may very often influence the ideas and feelings of people. Nowadays, people tend to move more and more in the virtual world and they are being more and more influenced by this virtual background.

4 Examples of scientific articles and their presentation via media

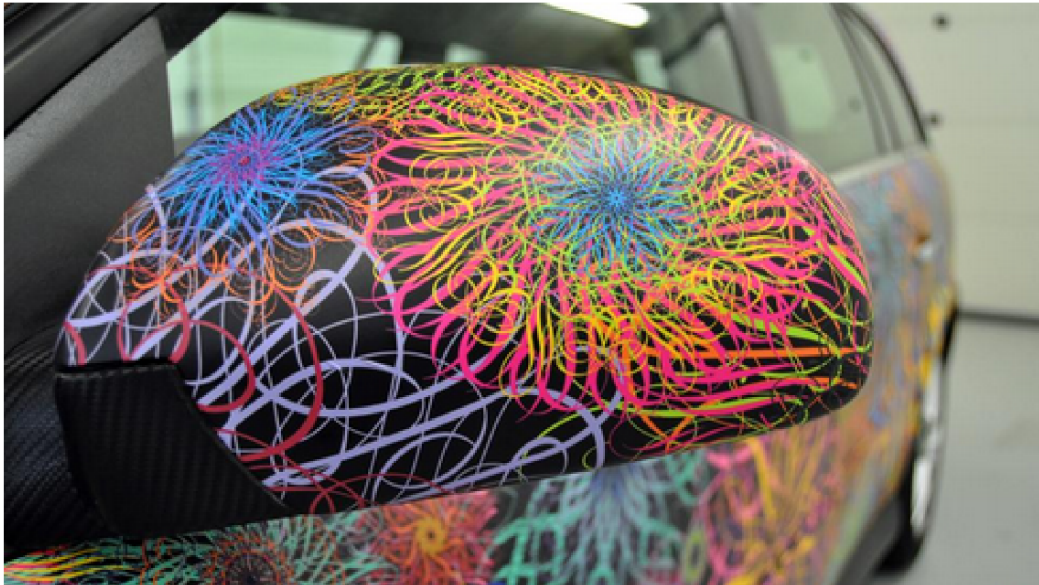## 4.1 The art and science of colour on demand article at bbc.com

This article is written by Jack Stewart. It has a subtitle called 'How do you make a supercar more super?' and it deals with a customisation of cars based on colour wrapping. Even though this article brings quite general information, it contains many direct speeches. The art and science of colour on demand article includes a few hyperlinks which are related not only to another bbc.com articles but also to external websites referring to personal or company webpages which enrich the whole article.

There is a huge colourful picture in the upper part of this website (Fig. 1) so it catches a reader's eye and there are many illustrating pictures and a professionally made video among the whole text. The multimedia video lasts 2 minutes and 7 seconds and shows a multiple quickened process of a car wrapping origin, which makes the whole information more complex. On the left there are 5 different miniatures of articles which are related to the chosen article. The miniatures provide us with additional information. This may be an effective means of capturing the reader's attention and for increasing the number of website visitors. On the right we may see 3 useful hypertext icons which give readers a possibility to subscribe to BBC newsletters or to follow Facebook and Twitter accounts of BBC. These options give us an opportunity to gain up to date information in the future. They also offer the people to express their opinions and ideas. There is an extensive possibility of interaction and the readers have a chance to communicate with authors of the texts. Below these icons there are picked top 4 articles and below them even a few links to other impressive articles in the category. In this case, the category is called 'Autos.' Below the suggested articles there are 10 headlines having a title 'Latest from around the BBC' category which attracts the attention. Moreover, these headlines make all the information connected. The readers may find articles about many branches such as two latest news

from all around the world and two by two articles about travel, culture, future and capital. Because of the fact that 'The art and science of colour on demand' article belongs to 'Life in colour special series' there are advertisments for 4 latest articles connected to 'Life in colour' in the lower part of the website. For instance, an article about seeing songs in colours or about the women who are able to use a super-human vision is presented here. This feature gives the readers an opportunity to influence the whole information and allows the readers to select a kind of information which will be presented on the web page in the future. The new opportunities in the field of interactivity are introduced thanks to the mentioned feature.

Figure 1: The art and science of colour on demand article at www.bbc.com

4.2 Jaguar XE Superhero print by Stella McCartney at the Paris Motor Show article at designboom.com

Stella McCartney prepared a series of Jaguar XEs dressed superhero prints and her goal was to make the visitors pay attention to these cars' arrival to Paris Motor Show. This event will be held in France during spring 2015 and the car customisation should represent a modern British design supplied with performance, style and innovation.

Designboom company uses a wide potential of media. Similarly to BBC, designboom communicates with viewers and readers via many channels of social media. As it may be seen in the right part of figure 2, designboom uses for instance twitter, facebook, pinterest, google+ or linkedin channels. These social media networks are powerful means of communication. A shortened version of the article about Jaguar XE Superhero print by Stella McCartney may be found thanks to a facebook page of designboom which a visitor can become subscribed to by clicking on a 'like' button. If a user starts to be interested in the article, he can obtain further information about a Motor Show In Paris. The user gets more information by clicking and redirecting from a facebook designboom page with the article to the webpage of designboom where compact information about Jaguar XE Superhero print by Stella McCartney at the Paris Motor Show were given. It would be worth to point out that most of the articles are spread not only via an official webpage but even via various social networks mentioned above. On top of that, the social networks allow viewers to comment, spread, interact and discuss the article with other viewers. It may be considered a remarkable way how to present articles and how to impress the viewers and entice them to visit the events – in this case a Motor Show in Paris.
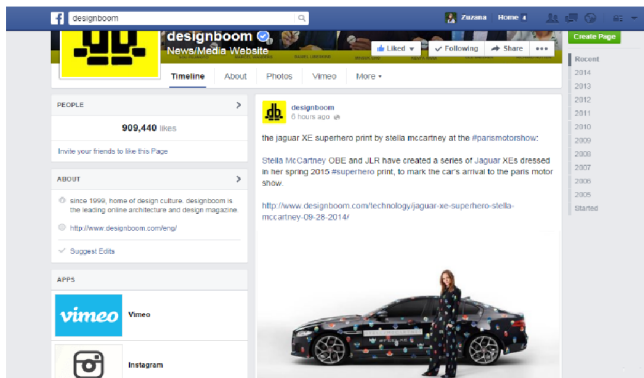
Figure 2: Jaguar XE Superhero at www.facebook.com and at www.designboom.com

Figure 3: Ars Electronica website (www.aec.at) and Ars Electronica blog (http://www.aec.at/aeblog/)

4.3 Linz Has Been Named UNESCO City of Media Arts article at Ars Electronica website and Ars Electronica blog

Ars Electronica is a festival which bears a title 'Festival For Art, Technology and Society.' This festival takes place in Linz and it is held every year, at the beginning of September.

Ars Electronica uses the Media in a very effective way. The general idea of Ars Electronica is based on using both, Old and New Media. Every year, various posters are distributed all over Linz and surrounding towns. The advertisements are spread in local magazines and newspapers. Even billboards are a part of Ars Electronica promotion eventhough their preparation and the space rentals are quite expensive. Those are the examples of Old Media which are applied by Ars Electronica. Focusing on New Media, Ars Electronica uses them with a really high potential, benefiting from the most functions and features which are offered by their usage. The headlines, photos and posts are kept both in German and English via a website, a blog, Facebook, Twitter, Google+, Flickr, Youtube and Pinterest. The mentioned social media enable an interactive interconnection between readers, visitors and Ars Electronica (Fig. 3).

5 Examples of multimedia works and methods of influencing media

5.1 Geometric death frequency 141 and Outside itself

Geometric death frequency 141 and Outside itself installations represent a new way of thinking and communication among Science, Technology and Art. The interconnection between those mentioned branches give the visitors a different view of a perception. Both Art pieces were created without a touch of a human hand and they were realised only by robots. The robots were preprogrammed and based on a given algorithm, their task was to create an interactive installation, composed of black balls. The black balls were representing photons of light. Both projects responded to changes of light, shadows and to other impacts and stimulations nearby the installation. Both installations were growing up and changing their shape, they had a behaviour/behaved like a living organism.

5.1.1 Geometric death frequency 141

Geometric death frequency 141, which is a huge three-dimentional and interactive installation, bears a new evolutionary level of artistic work and it includes new and unshaken ways of communication and production. This New Media installation was created by Federico Díaz and he created Geometric death frequency 141 for Massachusetts Museum of Contemporary Art. The installation was presented at an exhibition at a courtyard of the Massachusetts Museum since October 2010 to spring 2012.

Geometric death frequency 141 was made of 420 000 black balls which were built-up in a virtual container and composed by robots into a shape of wave (Fig. 4). The virtual container had the following proportions: 15 x 6 meters. During a process of Geometric death frequency 141 creation Federico Díaz was using the latest opportunities of current computer programming and software development. The installation was created only by the use of robots, no touch of a human hand was used. The robots placed the balls into a

pre-programmed position with a millimeter precision. Federico Díaz used two robots which are usually applied for car manufacturing.But these robots were modified. He programmed the robots for being able to stick the balls together. Locating and sticking every ball took the robots around 26 seconds. In case of a human doing this work, locating and sticking one ball would take between 2 and 5 minutes and the whole art installation would be created in 14 000 hours. In this case human bears an idea but a machine realizes the whole installation.

Federico Díaz and his team transformed two-dimensional pixels of photos and videos of the courtyard and facade of Massachusetts Museum of Contemporary Art into three-dimensional voxels. *"I thought it would be great if the installation could be created such as a tree grew up and was deformed according to the wind blowing. Single pixels, photographies of the museum and photographies of entrance area become the code for creating this effect. In a software, these photographic pixels were replaced by balls, so-called voxels, which were consequently made to be moved in a programme"* (Hospodářské noviny – Víkend section, 2011-2-11, p.10, [3] Those voxels were made to be moved and they created a dynamic wave which was hitting a facade of Massachusetts Museum. In this way an interesting effect was created where the wave was slowly starting at a courtyard and ending inside the first floor of the Gallery. Those three-dimensional points were put into a motion and created a dynamic wave which was facing a facade of the museum. Original idea of this installation was creating just one abstract wave but finally Federico Díaz decided to deepen that idea and to create not just a simulation of random movement.*"Light is something that enables us to see. Light is made of particles. In the sculpture, light particles were replaced by black spheres. So they represent the fluid movement of light"*(DÍAZ, Federico. Federico Díaz: Geometric death frequency-141. p. 11-12) In this case light behaves like a wave

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[3]Translated by Zuzana Gellnerová. Original text: „Říkal jsem si, že by bylo skvělé, kdyby socha mohla vzniknout, jako když vyroste strom a deformuje se podle toho, jak fouká vítr. Kódem k jejímu vytvoření byly jednotlivé zobrazovací body, fotografie muzea a vstupního prostoru. Tyto fotografické pixely jsou v softwaru nahrazeny kuličkami, takzvanými voxely, které se následně pomocí programu rozpohybují."

because the light is presented as a kind of changeable movement. Light and time may be stopped. This stopping represents death. Federico Díaz says that our society tends towards recording various situations of everyday life because we are afraid of death. In this installation Díaz tried to create a parallel among a visual picture and thinking. If we see something new, we try to compare it with something that we already know. We are trying to explore the structures and shapes, so we are able to make connections. *"So we create the past, just as we create the future"*(DÍAZ, Federico. Federico Díaz: Geometric death frequency-141. p. 14)

Every particle of light is represented by a ball. During a computer simulation, which consisted of composing frames gradually disappearing and converting into a wave, Federico Díaz stopped the simulation at frame number 141 and he did it accidentally. This art work represents a close connection between art and modern technologies, using the potential of programming and software development. Unusual ways of visualisation and expressing ideas that made the final project special were used. This art work was created thanks to an involvement of a machine into a process of Geometric death freequency-141 creation.

Figure 4: Geometric death frequency 141

5.1.2 Outside itself

Federico Díaz created a three-dimensional installation named Outside itself. *"Díaz's outside itself project is an interactive, mathematically-programmed, robotically-produced, light-responsive installation that grows and morphs as a life form unto itself"* http://www.e-flux.com/announcements/federico-diazs-outside-itself-at-the-54th-venice-biennale/ [Qn. 2014-10-11] This project was presented at the 54th Venice Biennale (la Biennale di Venezia) in 2011.

Thanks to robots, which were preprogrammed by a computer programme, the object was able to change its shape and it was developing in a similar way as a living organism during a reaction to the light. Outside itself installation consists of thousands black balls (Fig. 5) which were created and built up only by robots. The main goal of this interactive installation was the idea that every single ball represented a photon of light. Optical sensors monitored the impact of light on a specific place and they helped the flow of information to be created. The surrounding intensity of light varied not only according to whether it

is a day or a night but also according to how many visitors were nearby the installation and it was also dependent on the fact in which colours the visitors were dressed and which directions they were going (Fig. 6). Outside itself reacted to various circumstances. If no visitor came near this installation, no object would be created. The optical sensors would stay at the same position and the robots would build just a static area with no dynamic shapes. But this never happened during the Venice Biennale. Generally, around 500 visitors per day participated in the creation of Outside itself. Visitor's shadows were analysed by a computer software and as a result their movements were recorded into the software. They were then evaluated by a special algorithm. Outside itself is a creative piece of art. This installation is very changeble and interactive. It represents a kind of extended human hand which helps us to overcome boundaries of a human being such as the society uses modern technologies for different simulations and for creating information networks.

The features of this installation gave us an original and creative touch of this piece of art and this kind of a touch was probably transfered onto the visitors. Because this three-dimensional installation was presented at Venice Biennale, many photos and a few videos of the event were taken. Not only videos from the final version of the installation but even a few videos about the origin of this project were available. The process of a usage of robots for creating the balls, supported by the author's comments made the videos attractive. In a clear way, basic ideas of the installation were explained. This attracted the attention and it helped the people who did not have a chance to visit the installation, to keep them feeling a similar atmosphere thanks to new technologies and media which allowed that to be made.

The professionally made videos help the people who are interested in the connection of new, modern technologies with art, to feel the atmospere and spirit thanks to this medium and thanks to the fusion of more media such as pictures from the event, web pages, web articles and articles in the newspapers, everything due to the media background of

the Venice Biennale. The whole Biennale was well prepared and organised. Worldwide, there were many advertisements on the internet which were focused on attracting potential visitors, there were various posters on the streets, but the posters could be seen only in the Northern part of Italy. On the one hand, we can see one of the disadvantages of old media. The posters cannot be seen everywhere and they could be manually destroyed. The same stands for printed newspapers and magazines. Although these kinds of advertisements are usually presented in specific newspapers and magazines focused on for instance art or modern technologies, the people may skip or destroy them by accident quite easily. On the other hand the presentation of those kinds of events on the internet gives more people an opportunity to get more information about the event. The whole Biennale becomes more international. It is known worldwide and there are visitors not only from Europe, but from all over the world thanks to the media.

To sum up, Outside itself is a three-dimensional interactive installation which represents a new way of communication among different branches such as Science, Technology and Art. It was created only by preprogrammed robots. This technique represents something very unusual and some of the experts argue whether the installation is still a piece of Art if no human realised it. Moreover, the majority of experts bear an opinion that this kind of installation is surely a creative and incredible art piece, which was built up during an innovative process.
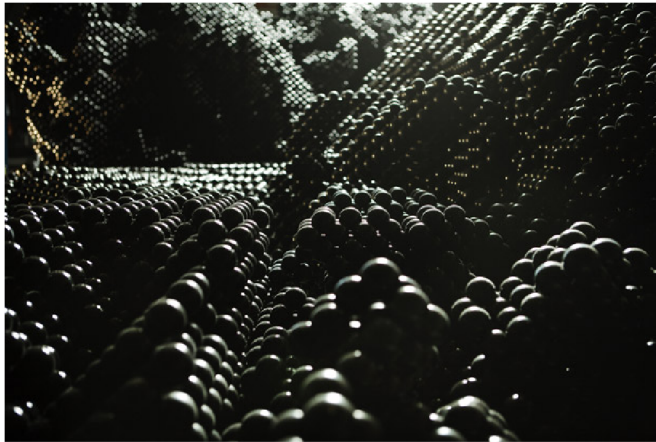
Figure 5: Outside itself, a photo from www.e-flux.com

Figure 6: Outside itself, a photo from author's personal web page (www.fediaz.com)

5.2 Light Shows

Light Show are formed to create different and creative background effects if they are run in darkness and on proper buildings with suitable number of windows. Besides prearranged lights in a special software and beyond the need of darkness, many light shows are accompanied by background music to attract more visitors and to evoke better atmosphere. So not only a particular sequence of images but even the sound are important media for a complex multimedium of a light show.

It is important to size up the main purposes of a light show. It may be prepared to be seen by a few people during a family or birthday party but it could also be designed for thousands of people. During a light show preparation, a proper place for presenting a light show is needed, then special diodes are placed and it is appropriate to wait until a darkness so the effects of a light show could be seen as well as possible. Finally, a preprogrammed animation containing many sequences and frames, designed exactly for particular amount of visitors and their requirements and expectations, is run. Creative images can present interesting stories and they are very often supported by background music which is mixed by an experienced DJ.

Light shows are very often transferred by New Media. For instance, a light show which is presented every May in Prague, Brno and České Budějovice is called 'Kolej roku – Light Show Live Edition' and is being recorded on a videocamera, cut in a computer programme and presented via internet and via television. Both of these media distort the appereence and perception of original light show which can be seen live during specific days. A light show presented via television has a bit different colours and even the sound and background music are different even though video cutters and editors remove various scratches and visitor's voices. A light show presented via the Internet may seem to look unprofessional if taken, for example, by a visitor who was using his own video camera or a device containing a video camera, his hands are usually shaking during recording a light show and there are a lot of noises caused by people around. The colour scheme is getting

faded and blurred. If this kind of a video taken by a viewer's device is uploaded on the internet then the final atmosphere seems to be very different from the original live version of a light show.

6 Conclusion

This bachelor thesis deals with the influence of Science and Technology on Media. The thesis was divided into three major parts: Definitions of basic terms, Examples of scientific articles and their presentation via media and Examples of multimedia works and methods of influencing media.

The aim of the first part of this thesis was an attempt to clarify basic terms of Media. It is not easy to define most of the terms as there are many media theoreticians who may represent different angles of a view on the terms. In spite of this fact the thesis was focused even on the main media theoreticians and included thoughts which for instance Lev Manovich, Marshall McLuhan, Dick Higgins or Nicolas Bourriaud support. Marshall McLuhan invented a phrase: 'the medium is the message' and he thinks that media bear the messages of an event, not the event itself. Media influence a society directly and very often by the usage of propaganda tools. Some people have an opinion that propaganda is a kind of ethically neutral tool but on the other hand other people say that propaganda seems to be an unethical tool of manipulation.

Lev Manovich focuses on the meaning of interactivity for a user, dividing interactivity into two types: opened interactivity and closed interactivity. Nicolas Bourriaud claims that the interactive work provides the recipient with some kind of freedom, but that it allows them to react only to the original impulse which was sent by the author of the work. Bourriaud considers that the recipient's participation should become a part of author's copyright. Dick Higgins named pieces of art, which where created in the boundaries between more types of media, Intermedia. Intermedia are flexible as they do not use many rules and very often, ready mades are part of intermedia works. Supermedia work with different types of media and they are based on a combination of traditional media, Digital Media and Multimedia. Supermedium contains something more than just a medium, something beyond traditional media. Supermedia are based on new information technologies and because more and more people tend to move in the virtual world, they are being more

influenced by this virtual background. These days, people are very influenced by various types of media.

The second part of the bachelor thesis brings examples of scientific articles and their presentation via media. Analyses of three articles were made. The articles are supported by the usage of many social networks and channels and there are very often illustrating pictures and professionally made multimedia videos among the texts so it catches the reader's eye.

Examples of multimedia works and methods of influencing media is the final part of this thesis and its aim is to present multimedia art pieces. The installations analysed are based on programming and software development, using of robots and they are created without a touch of a human hand. Interactivity is the main aim of those art pieces. Every single ball imagines a photon of light but if no visitor comes near this installations, no objects are created. This part of the thesis focuses even on light shows, which emanate from New Media principles. Light Shows interconnect programming, sound effects or background music with moving pictures and the narrative aspects are being created as a final product. Light Shows can be recorded on a videocamera, cut in a computer programme and presented via internet or a television. A light show presented via a television may vary in colours, compared to original colour intention. The sound and background music may be defaced with various outer scratches and visitor's voices. A light show presented via the Internet can look unprofessional if taken by a visitor's recording device, whose hands may be shaking during the recording. If this kind of a video taken by a viewer's device is uploaded on the Internet, then the final atmosphere usually differs from the original live version of a light show.

Science and technology develop very rapidly. They will offer us a huge potential in the future. Twenty five years ago, there existed no mobile phones. However, a few years ago, smartphones very developed. These days, mobile phones with curved displays are being

tested, so we would be able to roll them and wear them in our pockets. New questions, for instance, whether this invention will be worth for a future civilisation or if we are able to go on a holiday to the Moon, soon, appear. In case of Media, the situation and potential are similar. Media are everywhere around us. Even the humans, who do not use the Internet and never watch television, are influenced by Media.

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