T.C.
YEDİTEPE UNIVERSITY
GRADUATE INSTITUTE OF SOCIAL SCIENCES

INTERACTIVITY IN NEW MEDIA

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Submitted to the Graduate Institute of Social Sciences
In partial fulfillment of the requirements for the degree of
Master of Arts

ISTANBUL, 2004

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.../.../2004

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ACKNOWLEDGEMENTS

I would like to thank my Supervisor and Chairman Prof. Dr. Emin Doğan Aydın for helping me to bring this study to reality and providing me all the conditions and equipment I was in need of. I would like to thank my undergraduate major program Chairman Prof. Dr. Ahmet Orkan for encouraging me to complete my study and for co – advising it. I would like to thank Asst. Prof. Dr. Cüneyt Budak for debating my study and for helping me editing it.

I also would like to thank all the following lovely people that helped, encouraged and supported me every time I was in need of: My family, friends and my love, Rsh. Ass. Mert M. Uçkan, Inst. Ruhcan Akil, Dr. Berrin Yanıkkaya, Assoc. Prof. Dr. Bülent Erçetin and the Visual Communication Design Department Academics of Yeditepe University.

I hope this work will be helpful for further studies in this area.

ABSTRACT

Nowadays the term New Media is used very frequently. It is true that the media has entered a period of becoming new. But the properties of this process are left unknown. Interactivity is another subject that rises with the concept of New Media. Although interactivity has a great importance in New Media, this importance and existence is not known properly.

This study tries to define New Media by formulizing it and showing its properties. The history of media is given in order to support and illuminate the path of the study as well. The importance of interactivity in New Media is stressed and the subject is examined with its history.

The study also includes the new introduced concept of "the user". The union of the known source and receiver forms the user, who becomes the key element of New Media.

Keywords: New Media, Interactivity, User, Digitization, Media History, Interactive Media

ÖZET

Günümüzde "Yeni Ortamlar" kavramı sıklıkla duyulmakta ve kullanılmaktadır. Medyanın yeni bir sürece girdiği ve yenileştiği bir gerçektir. Ancak bu yenileşmenin ne yönde olduğu, neler getirdiği, ne gibi özelliklere sahip olduğu bilinmemektedir. Yeni Ortamlar ile birlikte öne çıkan kavramlardan birisi de etkileşimdir. Oldukça önemli bir konu olan etkileşimin, yeni ortamlar kavramı içerisindeki yeri de yeterince iyi bilinmemektedir.

Bu çalışmada Yeni Ortamlar'ın tanımı verilmeye çalışılmıştır. Tanımın yanısıra bu kavram çözümlenmeye çalışılmış ve özellikleri verilmiştir. Çalışmaya ışık tutması ve dayanak olması açısından ortam tarihçesi de incelenmiştir.

Etkileşimin, Yeni Ortamlar açısından önemi vurgulanmış ve etkileşim konusu tarihçesiyle birlikte ele alınmıştır. Günümüz anlayışında etkileşimin ne olduğu ortaya konulmuş ve özellikleri incelenmiştir.

Çalışmada Yeni Ortamlar'da etkileşimin yaratmış olduğu yeni bir kavram olan "kullanıcı" ele alınmıştır. Değişen, gelişen ve yenilenen ortamlarda kaynak ve alıcısının birleşiminden oluşan bu yeni kavram irdelenmiştir.

Anahtar Kelimeler: Yeni Ortam, Yeni Medya, Etkileşim, Kullanıcı, Sayısallaştırma, Ortam Tarihi, Etkileşimli Ortam

1 INTRODUCTION

It has been more than thirty thousand years that human started to move their hands in order to shape their ideas on something that can make them immortal. It is no wonder that human being has the instinct to communicate. If a question would be asked; why human need to communicate the answer would be very simple: Because human have the privilege to think that leads to the clear act of socialization. From the first decades of the first speech to the most recent days of the electronic revolution, the answer is very clear: We need to communicate.

In this perspective, humanity has reached many levels of communication. First speech formed and verbal communication started. The first acts of socialization took its path. Simple groups gathered to form bigger ones. These bigger groups gathered to form larger and more complex communities. In the meanwhile not only individual needs were on demand. Also social needs formed. As they lived together, the problems occurred one by one.

Kingdoms came, Empires passed by. Revolutions exploded, democracy conquered our planet. But all these did not happen at a glimpse but step by step. What ever the reason for a social act was, there had been always a need for spreading ideas, telling stories and reaching information.

At this point of idea the need for media occurred. People were always in need for telling their stories. Narration started from mouth to ear. But it formed a more efficient way than this. Early human used cave walls to paint their stories. Thus the next generations were able to reach the experienced information.

As for many centuries this carried on until the founding of writing. With this revolutionary invention the significant history of media started as well. Blocks of stones were used. Then clay was found and used for a long time. The cumbersome structure of this big medium was advanced into parchment, vellum and finally to paper.

Slowly papers were put together and books were formed. Copied sentence to sentence by hand, step-by-step the bridge to mass communication was on its way. In the

meanwhile the desire for information was reaching a certain level for humanity. People were getting more curious to learn more and more. Communities asked for information, which made the mass production of information carrying media a must. Social needs shaped the technology and the printing machine was born. Via printing, ideas spread more quickly, people became more literate and minds started to shape the society. In order to feed the hunger of the mass newspapers were born.

For decades newspapers served the society as a tool of information. In the meanwhile the concept of media professionals was formed. The professionals were in charge of providing information. The will to serve in better and faster ways were pioneer actions for the media. Besides text, photography was found in order to visualize information. Also via still images, moments were caught and immortalized. Not only literate people were able to catch the information anymore.

With the founding of photography the media took its step to motion pictures. A group of motion images was containing more information than a single one for sure. By the way a new understanding of entertainment was found as well.

Obviously newspapers and books with photographs were interesting media. But once the trigger of invention was pulled the advances were not possible to stop. Electricity on its own was a revolution in all parts of life as well as the media. Telephone and telegraph were inventions that provided a new channel to the story. The information flow on the wire was very accurate and very fast.

The wheels of life are turning very fast and without an end. Trying to synchronize this circulation, information was set free from wires to waves. First radio after television was found and humanity entered the scene of broadcasting. The idea of broadcasting was carried on an upper level, on to space via satellites.

Information was able to travel all around the world freely but it was not open to common use yet. This problem emerged the need for a global serving system. With the invention of the computer a new era for humanity was ready to take a start. And it really happened.

From this point on the steps were taken quicker than ever. Computers took on charge in many areas and communication was one of them. The Internet was found and

the global server of information was applied in order to serve the community. This is where the age of information and the new media begins.

Today the term New Media is very popular on every platform. Everyone is using the term but no one is really aware what the subject is really about. If you ask somebody what new media is the answer will be very short and brief: It is the computers, the Internet. If we enquire the question a bit more we will get an extended answer including CD-ROMs, video games, web sites, mp3s and barely mobile phones. Thus the layman's idea about new media is the property of the computer as a distribution and exhibition tool of information. Although this cannot be claimed as wrong, it is not enough to describe the new media.

This study tries to explain what new media is. A survey of the history of media in general, provides the background for the study of new media and how it developed to the condition of "new". We will be referring to the old media to compare the impact of new media. In explaining new media, its properties are examined and the formulization emerges from them.

When explaining the new media, a very important property of it comes to the front: Interactivity. A brief history of interactivity is used to support our thesis on the most powerful property of the new media. Developed are new ideas about the "user" which form the new state of the common known receiver / source.

The first chapter is the rephrased history in a brief art of media; from speech to computers. The second chapter is about new media; its definition, formulization and properties. The third chapter is about interactivity; the most powerful tool of new media. The last chapter is the conclusion of the study as a consequence.

2 THE COMMUNICATION AND MEDIA REVOLUTIONS

It is the age of information and its technology we are living in. Information was always important in human life. But it has never been used such this effectively. Today most of the businesses are built on data / information production and management. We pay lots of money in order to learn something as quickly as possible. As information flows all around us it gets pretty difficult to manage it.

It did not reach this point coincidently. We are aware of the electronic media revolution. The computers and the dependent communication technology take humanity on to another dimension in means of communication. It is fast and uses many channels. The new media is liquid wise; changing continuously and this change can be traced very easily.

Though we got used on the computers, cell phones, the internet, the TV and their environment; we need to go back to the roots of human communication and media revolutions in order to understand what today's media makes new.

2.1 INVENTING THE MEDIUM

2.1.1 Speech and Language

"A medium is any object or device used for communicating a message by moving patterned physical information over distance or preserving it through time."(DeFleur and Dennis, 1998: 18)

2.1.1.1 The Need of Communication

Before discussing and exposing the media revolutions it is essential to define the need of communication. In order to understand the evolution of human – media history we need to understand why communication is necessary.

Obviously communication is a human action. The reasons for communication in human world can be defined by three properties (Aydın, 1996: 1-3):

- Human being is a thinking animal
- Human being is a communicative animal
- Human being is a social animal

As for a rational definition, a part of the natural system on this planet, human can be defined as animals as well. But last not at least, human are thinking. The ability of thinking makes a significant difference that leads to the point of speaking. Human speak because they think. The reasons of human speaking are as same as the facts of human thinking (Aydın, 1996: 1-3).

Besides the both facts, human are social animals. This is obvious as the history of humanity is studied closely. There has been always the will of living together. Thus communication is essential for human.

2.1.1.2 Human Start to Speak

The formerly communication between human beings was in an age of media absence. This refers to face – to – face communication. As thought the first human were not able to speak. Anthropologists discovered that early human beings such as Australopithecus, Homo Habilis and Homo Erectus were not able to speak at all. This is a consequence of physical limitation, because their voice boxes were similar in structure as modern apes. They had the ability of to form vocal noises but the control over it was not sufficient. The more recognized era of the Neanderthal (Homo Sapiens, Neanderthalensis) had a reasonable difference. We know that they were able to

communicate pretty well but not through speaking; body movements; gestures and limited numbers of sound were their channels (DeFleur and Dennis, 1998: 6).

The history of human leads us to a point of around forty thousand years back from today in order to find the first paths of a complex language structure. The Cro – Magnon (Homo Sapiens, Sapiens), known as our direct ancestors, has the same structure of lips, tongues and voice boxes as ours (DeFleur and Dennis, 1998: 6). The replacement for the Neanderthal, the Cro – Magnon was a revolution on its own. We can call this as the first revolution of communication. If we consider the physical parts of the human body as a medium it is also a revolution in media. But it is hard to suggest that this media is human formed. We rather call it an evolution and leave this subject to the nature itself.

2.1.1.3 Language and the Basic Human Communication

Of course it took thousands of years to form languages. As thought language is a concept formed by symbols in certain rules. We know that today languages are studied in grammatical forms. Those are the rules that form the language as well as the syntax, the logical order of symbols to form complex word groups, so called sentences. Also pronunciation is an important factor in order to communicate accurately. We can define symbols as a word, action or object that stands for internal meanings in people in a given language. (DeFleur and Dennis, 1998: 7) As a matter of fact the most important point is to communicate accurately and all the rules that form the communication channel are products of necessity.

At this point it would be wise to take a look at human communication. As a basic linear model human communication forms the following steps:

- The sender decides on a message.
- The sender encodes the intended message by selected symbols.
- The data / information is sent.
- The receiver gets the message in the encoded form.
- The receiver decodes the message and interprets.

- As a consequence of interpreting the receiver is influenced.

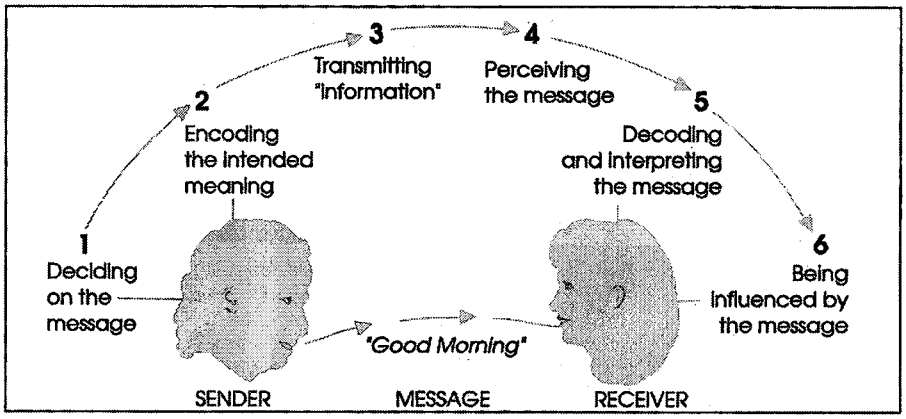

Figure 2.1 A Basic Linear Model of Human Communication (DeFleur and Dennis, 1998: 9)

This is a very simple definition of the human communication process. Of course it is not "that" simple after all. There are parameters that should be considered. For instance there is always an option for the receiver not to understand what the sender is saying. On the other hand communication is an interactive process. Which points simply that both the sender and the receiver are open to interpretation and influence.

In time the languages formed and human beings reached a certain level in face – to - face communication. Thus culture developed and humanity began to civilize. But the civilization was limited with the absence of media. Notched sticks, flags, smoke, drums etc. were devices of communication. But still there was no constant way of carrying information through time or space. The capacity of human memory was the only storage device and human voice was the only passer.

In this case it is pretty obvious that it is almost impossible to form a rich cultured and spread society. Accumulated ideas could not be stored and passed. Storytellers used to train young generations in myths and legends in order to preserve a group's history. In this case it became insistently necessary to develop something to preserve all kinds of needs.

2.1.2 Writing

Considering writing as the graphic representation of the ideas, unlike speaking, it requires a medium. This can be considered as the starting point communication and technology partnership. Because from here on we will clearly see that human needs form new concepts but many times these ideas are limited with the existing media. So technological developments are inevitable. Also sometimes it is obvious that technological improvement form the needs of human. After a time it gets impossible to separate technology and communication – especially as a means of sociology – from each other.

As meant above the needs of human beings in social wise lead to a revolution both in communication and media. The founding of writing and its needed media is not too far away from today. But if we just think of phonetic symbols.

2.1.2.1 A Brief History

Defining writing, as the graphic representation of ideas does not directly point the recent alphabet we are using today. The hole is just much deeper.

The earliest known attempts to represent ideas with pictures were cave paintings. Researches lead the known history to Southern Europe. Well known examples are in Lascaux / France and Altamira / Spain. These caves have paintings that show various animals and men hunters. The tools used to paint were bones, stick and primitive brushes with animal fat, charcoal and powdered earth of several bright colors as ink (DeFleur and Dennis, 1998: 33). While these paintings are considered fifteen – twenty thousand years old, the oldest known example, The Chauvet paintings are considered to be thirty thousand years old (Fang, 1997: 1).

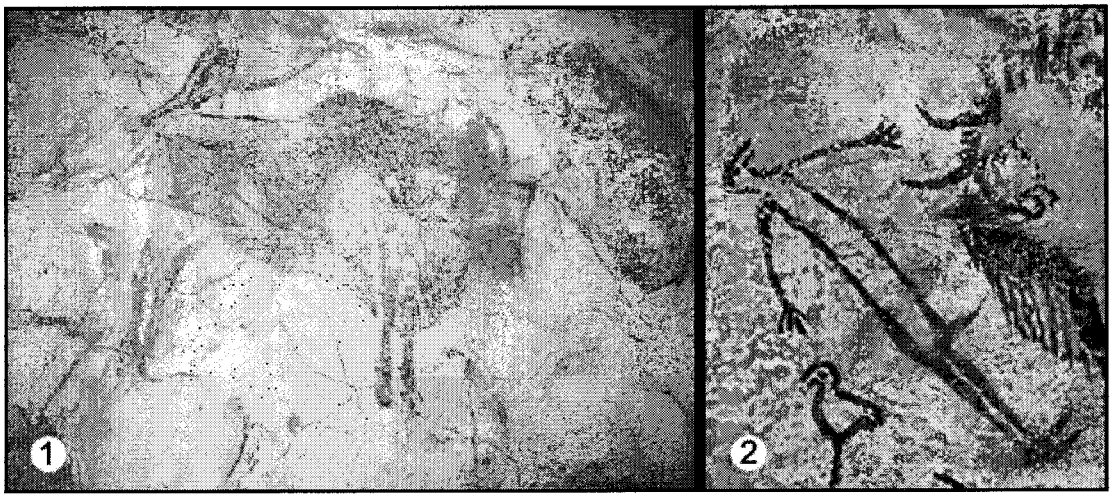

Figure 2.2 Early cave paintings in Altamira / Spain and Lascaux / France (1 - usuarios.maptel.es/ eirik/marandilla.htm; 2 - www.hypnose-kikh.de/ museum/saal1.htm)

The paintings were surprisingly contemporary in appearance as artistic products. But as a way of communication they were very limited. Nevertheless, representing ideas via paintings is a remarkable way of storing information. Despite the limitation, the paintings could easily help a storyteller to provide more accurate information than being unaided. Though these representation style seeks for its artist in order to form the whole sentence. In other words only the original artist could be able to recall the indented message accurately. On the other hand, even the information is being stored; we cannot tell that it is a direct open source for exchange. As a result it needed to be standardized.

Seeking for a more uniform way of writing takes us to the Fertile Crescent, The Near East. At some point between 5000 B.C. and 4000 B.C. we are able to trace ideographic writing samples. Writing in a technical sense began to emerge with some graphic symbols such as known forms like birds, the sun, a boat, the parts of body etc. to represent standardized meanings that were agreed upon by conventions among given people (DeFleur and Dennis, 1998: 34). This thought writing style was representing ideas directly with drawings as a whole. That's why it is also called pictographic writing. The early Egyptians, the Chinese and the Maya are the well-known examples of this style.

However ideograms work pretty fine with specific thoughts it has disadvantages. As the society moves to a more complex platform the thoughts get shaped in a more complex way as well. So new ideograms need to be standardized and after a while the number of ideograms reach a certain level that just makes the use of them more and more cumbersome. For instance the well – known pictographic writing called Hieroglyph of the Egyptians contained about seven hundred ideograms while a truly literate Chinese scholar was able to recall fifty thousand characters (DeFleur and Dennis, 1998: 35). Thus, it was really a very hard job to become literate. Most of the population remained illiterate. Even some powerful rulers were not able to read and write. The only choice was to rely on professional scribes. Often a scribe became very powerful because of the skill. They were at high status and impressively financial rewarded.

A much simpler writing was found in order to prevent such difficulties detailed above. Instead of linking thoughts, representing sound became more reasonable. These characters called phonograms were representing a specified sound by a convention or rule that prevailed among those who speak a particular language.

Around 3100 B.C. the Sumerians invented numerals as well as pictograms. So, some researchers believe both writing and mathematics evolved together. After the pictograms and numerals, the Sumerians advanced to phonograms. This combined written and spoken language. But yet an alphabet was unknown (Fang, 1997: 1).

The Sumerians formed the cuneiform writing in order to make records. They used wet clay as medium. Compared to stone it was excellent. With a help of a sharpened stick ideograms were drawn on clay and then baked. Later on the ideograms got simplified and formed mentioning symbols which were unrecognizable as representation of actual objects. It is believed that the sharpened sticks were uncomfortable pen-likes to draw actual drawings. So we can claim that technology shaped the medium.

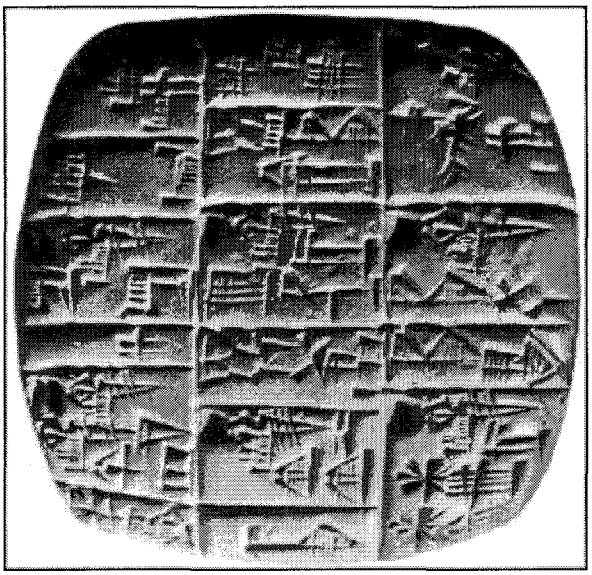

Figure 2.3 Sumerian Cuniform Writing Examples (http://www.usu.edu/anthro/origins_of_writing/writing_medium/)

The innovative invention of the phonogram writing passed through the timeline and gave other societies a good starting point to form a complex civilization. The Babylonians used the cuneiform phonetic writing as well. The most famous document, Hammurabi's Legal Code was carved on stellae, blocks of basalt eight feet square (7432 cm^2), and carried out to all the big cities and temples of Babylonia (Fang, 1997: 3). In the same region the Assyrians used the same writing as well. We know that the Phoenicians took the writing from Mesopotamia, too. As a seagoing trader society the Phoenicians were passer-byes of the Mediterranean and the Aegean Seas (Fang, 1997: 8). They had colonies in Greece and the North Africa. Frequent visits to Greece passed the phonetic writing to this region. As soon as the writing reached Greece, the history of communication and media reached another turning point.

2.1.2.2 The Alphabet: Standardization in Writing

Beginning about 500 B.C., the Greeks developed a remarkable efficient alphabet out of many versions that were developed earlier. Standardizing their alphabet greatly enriched Greek culture. Derived from the Phoenician alphabet were the Hebrew

alphabet, beginning aleph, bet and the Greek alphabet, beginning alpha, beta. To a Phoenician, aleph and bet meant, respectively, ox and house. If the capital A is inverted, a face of an ox can be seen. The original bet was in the shape of a square that clearly represents a house (DeFleur and Dennis, 1998: 37).

2.1.2.3 The First Media of Writing

At this point it would be wise to discuss the development in media. As we discuss about the writing passing from society to regions, we may ask ourselves "on what media?" Apparently, writing needs a medium to be carried on. The remarkable argument is hidden in this sentence: Ability of carrying, travel in space.

Though the Sumerians developed a remarkable writing, the written media were still clay tablets. Considerably they "were" portable but cumbersome indeed. Humanity needed a new medium that was truly portable. The reply for this call came from the Egyptians around 3000 B.C. The papyrus.

Papyrus, which is apparently the root for the modern word of paper, originally a plant in the area of the Nile, was developed to form a paper like medium on which can be written via brush or reed pen (DeFleur and Dennis, 1998: 37). The sheets were able to join together to form longer / larger medium called scroll.

It did not take a very long time papyrus to reach Greece. Egypt was the sole papyrus producer and the Greek had great influence on Egypt. The innovative solution took on a very important role in the Greek and Hellenic civilization (Fang, 1997: 5).

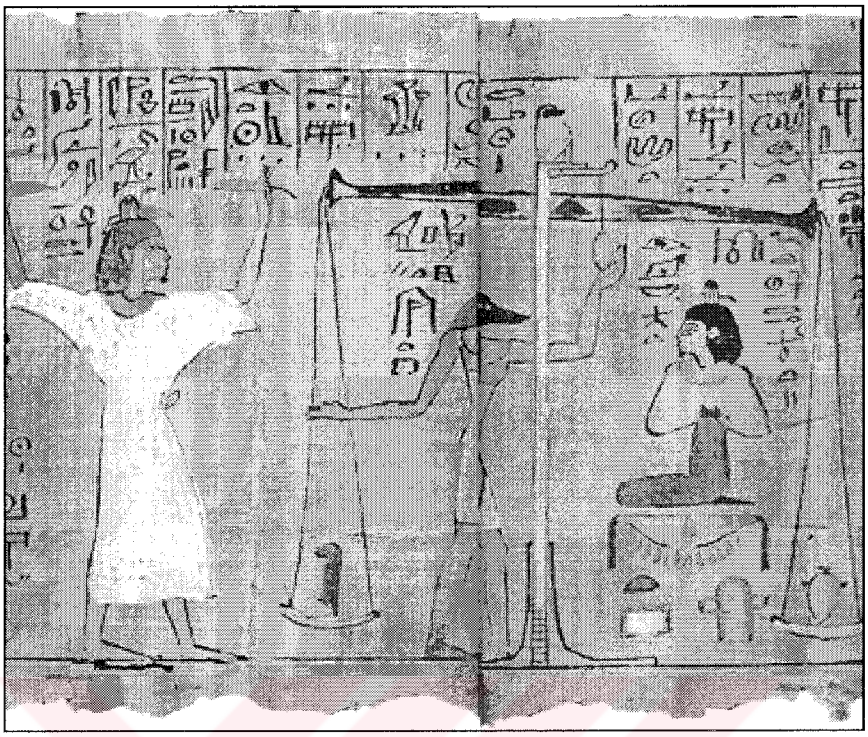

Figure 2.4 Sheet of Papyrus with Hieroglyphs
(http://www.callisto.si.usherb.ca:8080/hst103/societes/egypte/ecriture.html)

This sole solution for portable media was great but not beneficial for every community. The Egyptian controlled papyrus and it was also in perpetually short supply. As the use of writing spread, alternatives had to be devised. Parchment was found as an alternative.

Parchment was made from the skin of a sheep, a calf or a goat. It was more durable than papyrus. Even recyclable, the ink could be removed. Both sides were suitable for writing. Just like papyrus it was pretty portable. It could be produced anywhere sheep is availably unlike the papyrus that was only available in the Nile area. The only disadvantage was the physical effort to write on the parchment. Other wise we know that many parchments made it through time but not much papyrus is available nowadays (Fang, 1997: 6).

Figure 2.5 The Making of Parchment
(http://www.usu.edu/anthro/origins_of_writing/writing_medium/)

Besides, vellum was used as another medium that was developed for a young calf's skin. But they were very expensive because only a few pages could be produced from a young calf.

The days of the Greeks came to an end with Roman dominion. Though the Roman inherited the rich culture of the Greeks and formed their civilization on the basis of their culture. Rome replaced the Greeks in power and eminence, building a large standing army and large bureaucracy. The conquest of Egypt put the Roman in charge of control of the papyrus. This assured the supply of needed papyrus for administration all over the empire (Fang, 1997: 12). The Roman kept everything in records and formed the alphabet one last time that became later on the basis of the contemporary western civilizations' alphabet

As the phonetic alphabet formed clearly and portable media was founded, civilizations acted faster growing just like the Roman Empire. Scrolls and rolls were filled with information. Soon new needs were on demand.

2.1.3 Printing

People forming large scales of living units, many problems occurred. Spreading on a wide region administration became very difficult. Also human curiosity and intelligence led the search for answers and knowledge about physical, social and religious world accumulated. These factors created the need to record far more than just short messages. For instance to provide guidelines for daily life, codes of law were necessary. As mentioned above, Hammurabi's legal codes consisting of 282 laws are a good example.

Besides the rise of great religious systems were in the same search. These long texts were not possible to be carried trough space and time via oral ways accurately. The Old Testament of Judaism is a good example. Later on the sacred book of Christians, the Bible was recorded on long scripts. The sacred book of Koran had the interesting structure that was letting the Muslims to memorize it completely. But after all via oral channel it could not be kept for a very long time.

2.1.3.1 Manuscripts and Books

With a well-formed alphabetical writing and the portable media such as papyrus, parchment and vellum, it was not a difficult step for the Romans to move to the bound book with cut pages of uniform size. They gave us pages with writing on both sides and bound at the edge between boards and covers. In other words it was the Romans who developed the book into the form that we use today (DeFleur and Dennis, 1998: 38).

Not only the form of book but the formats of today's scripts in the western civilizations were shaped innovatively by the Romans. The idea of the paragraphs and majuscule / minuscule (uppercase / lowercase) letters belonged to them.

After illiterate tribes ruined The Roman Empire around 476, the Western world entered the Dark Ages. The Roman alphabet and the art of book production came to an edge to get lost. But somehow then the Christian monasteries kept it. Using the Roman

alphabet and letterforms and the Latin language, they hand – copied thousands of manuscripts.

Figure 2.6 Manuscripts (Jean, 2002: 84)

As Europe slowly emerged from the Dark Ages, interest in books and writing began to grow. Universities were established in major cities and more people became literate. Apparently monks did not stay as the only book producers. In many urban centers commercial establishments called scriptoria began manufacturing and selling books. Books became media for teaching and learning. Not only written in Latin, in the thirteenth century books were copied in common languages such as English, French, German and Italian as well (DeFleur and Dennis, 1998: 40).

Besides, another technological improvement had revealed for the Western society during the twelfth century: paper. Paper was developed first by the Chinese and used during the second century (Fang, 1997: 22). In the middle of the eight-century the Persians revealed the process from the Chinese and the world of Islam began to use paper. After, the Moors brought it to Spain in the twelfth century. The use of paper had advantages and disadvantages. It was not as durable as parchment or vellum. But it was

quite cheap and available. However it took a long time for paper to replace parchment and vellum indeed.

2.1.3.2 From the Chinese to Gutenberg: The Printing Machine

With all the prerequisites, paper and parchment, literacy, the need for lengthy documents and a sophisticated format system for books, the Western society was ready to move to another revolution: Printing.

We know that the Chinese had begun making ink impressions from elaborately carved wooden blocks shortly after the year 175 when they first developed paper (DeFleur and Dennis, 1998: 40). The earliest known example of woodblock printing in this manner is in 764 in Japan. The Chinese printed their first known book in 868 while they invented the movable type in c.1040. Even the Koreans cast the types individually in bronze in 1403 (Briggs and Burke, 2002: 334). However the system was not perfect. The woodblocks were very bulky and required a very hard work. A single page was to be carved in reverse on a wooden block and this block could barely make over a hundred copies before it got deformed. Also the quality of the printing in means of readability was very poor because it did not have sharp edges.

At this point a German blacksmith called Johannes Gutenberg came up with his system for printing. He manufactured individual letters in molten metal in such way that they would be very clear and sharp. And they also could be used over and over without wearing out quickly. It took him a very long time of experimentation to produce the right pressure with the right ink combination on paper and parchment. Finally he printed two hundred copies of his famous forty – two - line Bible in 1455 which is regarded one of the most beautiful example of a printer's art (DeFleur and Dennis, 1998: 42).

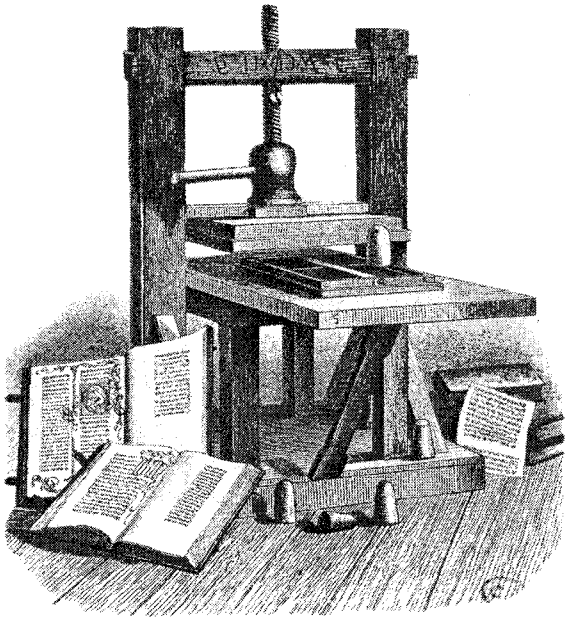

Figure 2.7 The Printing Machine (Jean, 2002: 92)

Shortly before the marketing of his printing he was taken to court because of financial problems and his print house was taken away while he became a very poor man and died suffering in 1468. His system for printing was so sharp that it became very spread all over Europe in a very short time. Between 1462 and 1490 major cities in Italy, France, England, Germany, Switzerland, Denmark and Turkey established printing houses (Fang, 1997: 39).

The revolution in printing gave a new perspective to societies. Though they were expensive they were cheaper than the manuscripts. Universities lived a break through. Books were printed in local languages and subjects such as science, philosophy and religion became very known for all kinds of people who were literal.

In later ages, in other words more recent years, books development and formed a market. Many entrepreneurs lay in money in this business, as it became a sector of finance. Also books started to communicate in mass ways and this was the further step for the communication revolution.

2.2 THE MASS COMMUNICATION MEDIA

2.2.1 Newspapers and The Telegraph

2.2.1.1 Newspapers

Newspapers, as a nature, are mass communication media. Since the earliest use of language, people have been interested in gossip and tidings about people in their midst, others outside their group and events in distant places. The first published news was in the age of the Roman Empire called "Acta Diurna Populi Romani" which means daily transaction of the Roman people (Fang, 1997: 30).

The Roman "newspaper" does not hit the pot from the right spot in means of the contemporary newspaper we know. Considering Gutenberg's printing machine the obscure forerunner of what we would know call a newspaper was printed in Germany in 1609. Not much is know about it though. Edwin Emery, a distinguished historian of journalism, has defined a newspaper in the following terms (DeFleur and Dennis, 1998: 62):

A true newspaper;

- Is published at least weekly
- Is produced by a mechanical printing process
- Is available for a price to people of all walks of life
- Prints news of general interests rather than items on specialized topics such as religion or business
- Is readable by people of ordinary literacy
- Is timely
- Is stable over time

By this definition the first true newspaper was the "Oxford Gazette" published first in 1665 and will be called London Gazette later on (DeFleur and Dennis, 1998: 62).

Of course the newspaper opened the door for new industries. It forced the technology as well as social limits.

In the dawn of the industrial revolution in 1775 Watt and Boulton perfected the steam engine (Briggs and Burke, 2002: 336). Thus lead to the revolution and every single parameter of human life was affected from it. Few years later in 1798, Nicholas Robert invented the papermaking machine (Fang, 1997: 49). And in the following years in 1811 the steam press began operation (Briggs and Burke, 2002: 337).

The timeline can be clearly traced in order to see how newspapers became a part of the technological history, both affecting it and getting affected. As a medium of the new age of industry newspapers were almost ready. Only the content was in search of a revolution.

2.2.1.2 The Telegraph

In 1843, two Englishmen Wheatstone and Cooke, built a working telegraph that was installed on the Great Western Railway in England, but the greatest fame and credit has gone to Samuel F.B. Morse. Morse worked together with Alfred Vail to transmit intelligence via electricity. In 1838, Morse sent a message down two miles of wire in New Jersey, then repeated his feat in Philadelphia and again in Washington D.C. He asked the government for financial support but could not get it first. After many trials the government supported Morse and financed the experimental line between Baltimore and Washington in 1843. One year later the first message was delivered successfully (Fang, 1997: 78 – 79).

The telegraph was a significant medium for information transmitting. Although it did not attract governmental attention at the first sight, later on it became very important. The limited content and distribution of the newspaper, moved to a much larger scale in definition. This was news agencies were established more efficiently as well.

2.2.2 Photography and Film

Capturing images is a question of science indeed. Unlike writing and printing, image capture needed more research and experiment. Probably that's why the technology for it developed lately in comparison of writing and printing.

2.2.2.1 Projecting

In order to capture an image the first problem is to focus and project one. We know that the convex quartz lenses for magnifying and focusing the sun's rays were used as early as 600 B.C. (DeFleur and Dennis, 1998: 129). Most of us as children experimented with magnifying glasses that could set a piece of paper on fire by concentrating the rays of the sun for sure. Just as we did the ancient people did it as well.

There were several experiments on projecting images through history. One of them is a priest called Athanasius Kirscher, who did the "magic lantern show" in 1645. He used some sort of primitive slides that he painted and then reflected on a wall via using a light source. The images could barely recognized but the show it self was pretty sensational. We are also aware that in the 19th century projected images were a sort of entertainment for people. Magicians and showmen wandered across their reach and did ghost – like shows. While projecting became common to ears as a word and eyes as a reality, still there was no one who could keep them recorded on a medium.

2.2.2.2 Film

The development of photography had to wait till the 1830's. Chemistry worked well for photography and a progression was on its way. For years people were aware that colors could change outdoors. Mostly it was thought that the reason for that is the air or the heat of sun. But a German scientist called Johann Schulze proved them wrong. It was light that changed the colors. He published his ideas in 1727. After exactly a century in 1827, a French chemist called Joseph Nicéphore Niépce produced the world's

first true photograph. He took a shot of his courtyard, etched on a coated pewter plate. His exposure time was eight hours. So in the photograph the sun seemed to be shining on both side of a rooftop (Fang, 1997: 70).

Figure 2.8 Reproduction of Joseph Nicéphore Niépce's "View from the Window at Le Gras" Helmut Gernsheim & Kodak Research Laboratory, March 21, 1952 Gelatin silver print & watercolor, 20.3 x 25.4 cm (http://auden.hrc.utexas.edu/PhotoFiles/dbimages/d2k0030.html)

2.2.2.3 The First Photograph and Daguerreotype

Niépce met another image – capture – obsessive, Louis Daguerre, a painter and theatrical producer. Two of them joined forces and became partners. Soon before the end of their researches Niépce died but Daguerre carried on working. In 1839, Daguerre announced his new apparatus: Daguerreotype. It was the complete success of a capture. The photographs were very sharp and clean. Each picture was made on a polished copper plate that had been coated with gleaming silver. In total darkness, the silver coated plate was exposed to iodine fumes, which formed a thin coating of light sensitive silver iodide on its surface. When the well-protected plate was placed in a camera and

then exposed briefly to a strongly lighted scene, the pattern of light and dark entering the lens of the camera altered the silver iodide. Chemical baths then fixed the image on the plate. This process was adopted all over the because of the complete success in the clearness and sharpness in the photographs (DeFleur and Dennis, 1998: 130).

Daguerreotype was able to make only a master of the image. In the meanwhile an English scientist William Fox Talbot was working on the same process with similar material and mentality. Only his results differed; he got reverse photographs so called negatives. His photographs were not as sharp as the Daguerreotype but he was able to make two positive copies.

Spreading, Daguerreotypes reached many cities. Everyone wanted a picture of themselves and their loved. It became common to take photographs of the recently deceased in their coffin as a final image for the family.

Not only in daily life photographs were important. Newspaper professionals discovered the power of the photographs pretty soon. Though the print community had to wait for a while to use photographs in their papers.

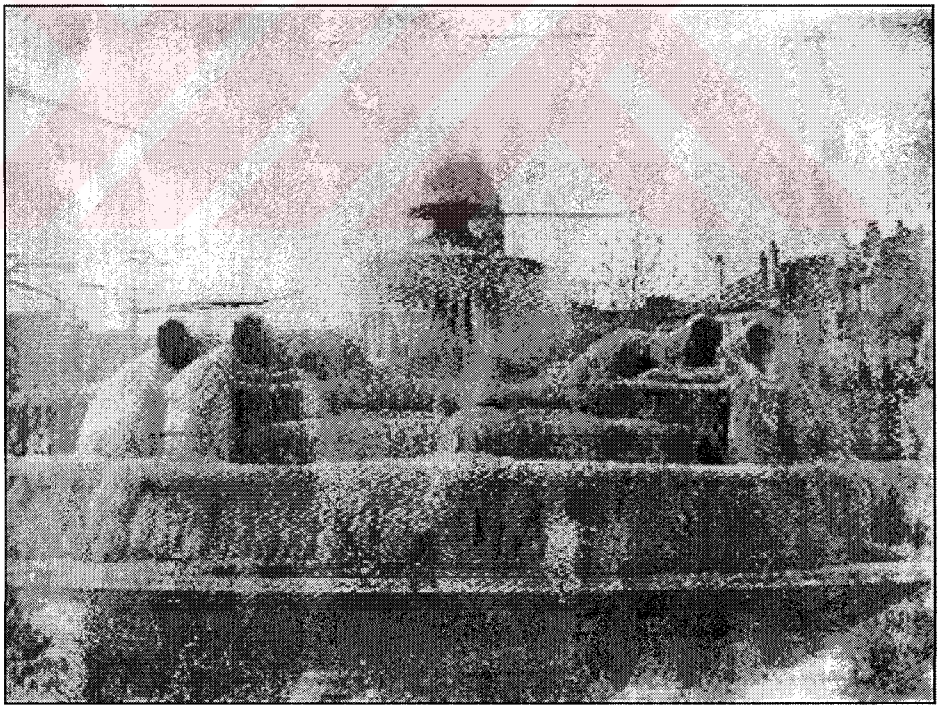

Figure 2.9 Daguerreotype photograph example (Joseph-Philibert Giralus de Pragney,"Frozen Water in the Fountain", daguerreotype, 1842,Bibliotheque Nationale, Paris)

Using sketches in newspapers became common during the 1800's. The sketches were carved on wooden blocks and then printed. But this could not be used to print photographs. Because photographs were realistic and that meant realistic color diffusion was needed.

2.2.2.4 Half – Tone, Photoengraving and Celluloid Film Rolls

In 1878 Frederick Ives created a halftone process that broke a photograph into tiny dots that could pick up ink, giving the appearance of continuous tones from light to dark. The awaited revolution happened, called photoengraving, and the words came together with the pictures, photojournalism (Fang, 1997: 74).

In 1888, as chemistry and technology had improved, George Eastman developed the celluloid roll film and the small box cameras (Briggs and Burke, 2002: 339). So photography became also a hobby. The invention of roll film would affect the motion picture technology from a very close distance and make it feasible.

As the capture of a still image became possible, inventors tried to capture motion. In 1878, photographer Eadweard Muybridge was hired to place a bet in order. The bet was about if a horse lifted all his legs up from the ground when it was running. Muybridge set twenty-four cameras on a racetrack and shot the running horse's images in order. The result was a series of stills that flipped in rapid succession, displayed the horse in motion (Fang, 1997: 96).

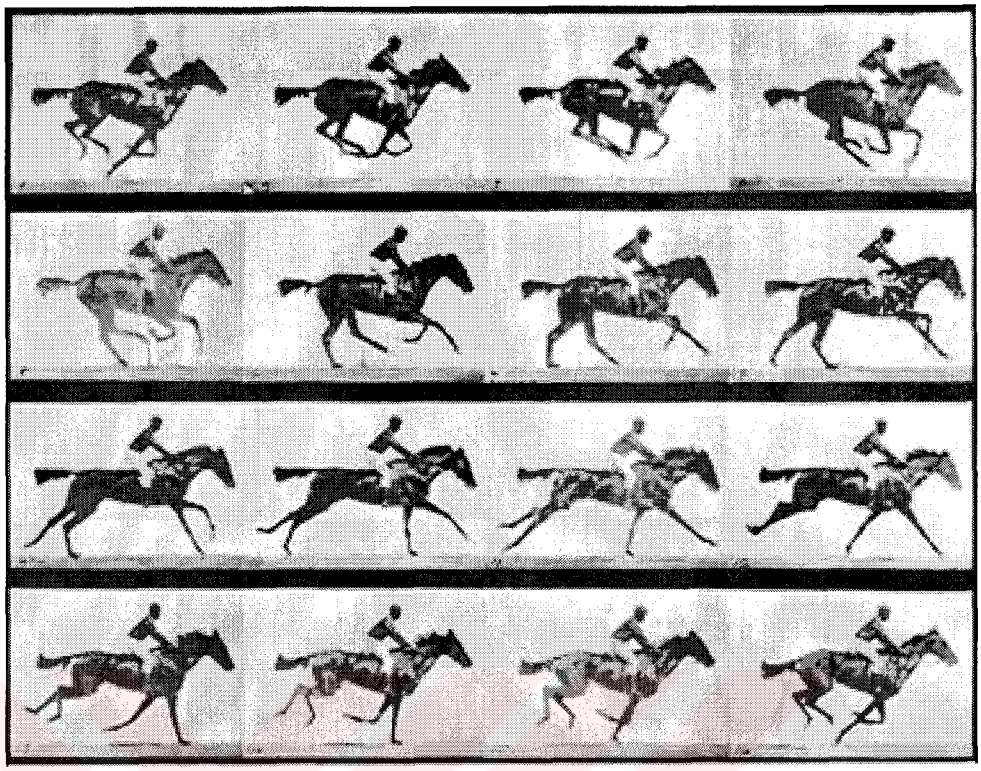

Figure 2.10 Eadweard Muybridge's "Horse in Motion" (http://www.digitaljournalist.org/issue0309/lm20.html)

Later on Muybridge joined forces with physician Etienne Jules Marey and they developed a camera doing the same job that many cameras were doing together: Rapid shots of a series of photographs.

2.2.2.5 The Motion Picture Camera and Cinematograph: The First Movies

On the other hand Thomas Edison was working on a motion picture camera as well. He invented the Kinetograph for still shots in 1891. Using Eastman's celluloid film rolls, one year later he developed the motor driven Kinetoscope. It ran 50 feet of film in about 30 seconds. Sprockets guided the film's perforated edges past the lens with a controlled intermittent movement like the ticking second hand of a watch. It had a peephole and could serve one watcher at one time (Fang, 1997: 97). The kinetoscope was truly a significant show. It spread all over the world. Audiences paying money could watch few minutes of film by looking through a hole.

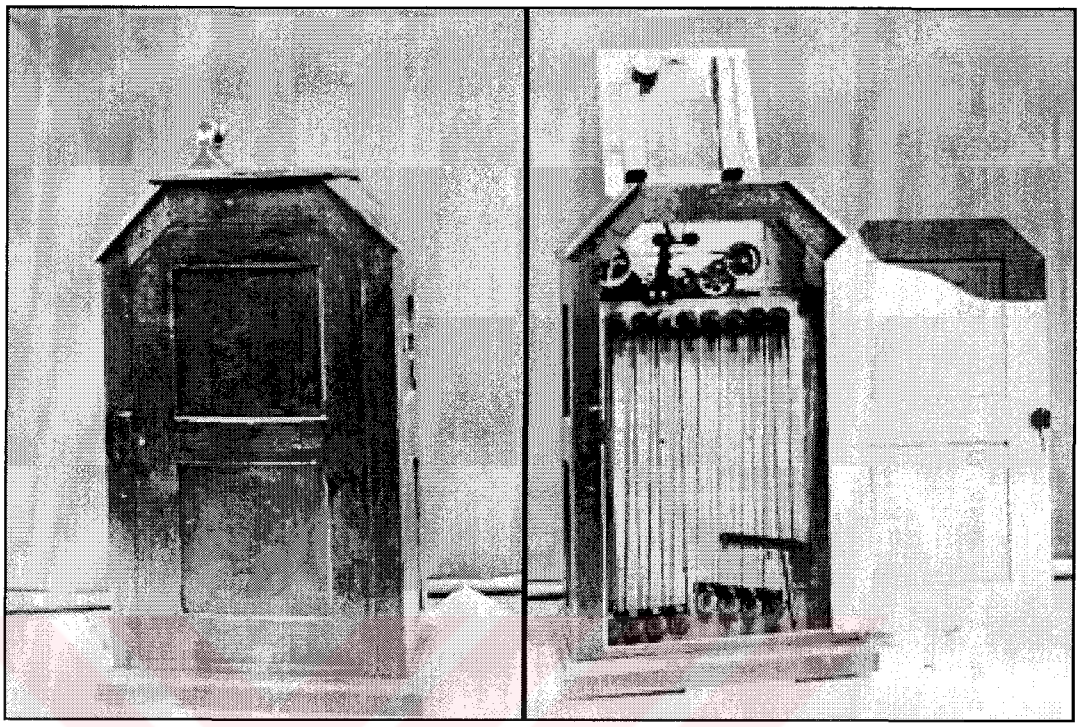

Figure 2.11 The Kinetoscope (vakuumtv.c3.hu/archive/ vacuumscope/img.html)

Once the motion picture camera was invented the search for projecting it accelerated. The French brothers, Auguste and Louis Lumiére, saw a kinetoscope running in Paris. They took one of them and experimented improvements on it. The result was the Cinematographe, a combined camera, film printer and projector. Substituting Edison's motor with a hand crank, the cinomatographe became portable as well. So the Lumiére brothers had the chance to film anywhere they wanted. Besides, their invention was able to project on a screen.

In 1895, they did their first public appearance in a café in Paris. A twenty minutes program of the film in accompany of a piano and Lumiéres' fathers' commentaries. This is considered the birth of the movies (Fang, 1997: 97).

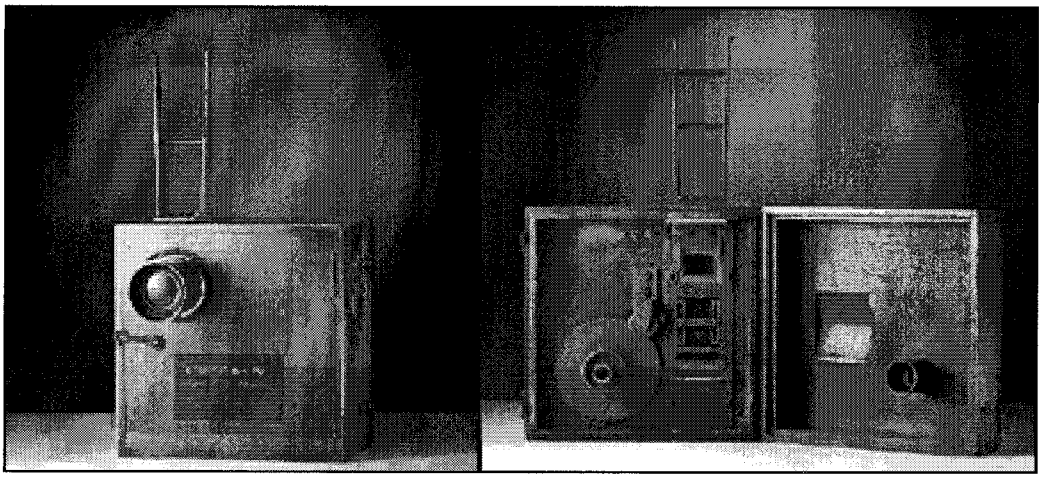

Figure 2.12 The Cinematographe (http://americanhistory.si.edu/cinema/projecting.html)

2.3 BROADCASTING; RADIO, TV, COMPUTER and THE INTERNET

2.3.1 Radio and Television

When we take a look over today's technology, radios and televisions seem to be very simple devices. But we have to consider that just like the other media above, radios and TVs were once serving as new media devices. What seems so simple now was very complicated once.

Not much, back to the 1800s, the fastest message was the one riding on a horse. Best conditions may call it, the message on a pigeon's foot. People were still traveling on foot or by animal power. Trips to distance places often took months. Communication between human was carried out by these conditions. Briefly the pace of society was pretty slow indeed. Days were lived simply rural. Small – town existence was common.

Ironically, the century was not half over before time travel had been drastically reduced. Awesome machines, belching smoke and steam and pulling long strings of wagons, rolled across the countryside on iron rails at what were then considered incredible speeds. The Industrial Revolution had generated a parallel revolution in the

production, distribution and consumption of goods and services of many kinds (DeFleur and Dennis, 1998: 165).

The development of wireless mass communication media is a part of this great change indeed. As the community was going large, the need of speedy and accurate mass communication was becoming a need.

2.3.1.1 Electricity and the Telephone

The accurate use of electricity is one of the most important developments in broadcasting. We know that the ancient Greeks did marvel at static electricity but could not understand it. In the 1700s, Europeans were able to generate static charges in gigantic volumes but still they were not capable to understand its nature. After accumulative researches, scientists such as Volta, Ampere, Faraday and Maxwell were able to fix the problem and develop devices such as the telegraph, and later on radio and TV (DeFleur and Dennis, 1998: 165).

The telegraph as mentioned above was a revolution in information transmitting. It was an efficient way of controlling electricity on the wire. After the telegraph, in 1876, Graham Bell and his assistant Thomas Watson, got the fruit of their long term experiment, of transferring human voice in to wire transmission data; the telephone. (Straubhaar and LaRose, 1997: 260)

Their first model was both a transmitter and a receiver. After several improvements, Bell and Watson replaced the original box telephone with a hand telephone with a separate transmitter and receiver (Fang, 1997: 85).

2.3.1.2 The Radio Waves and The Wireless Telegraph

Though the telephone was a significant invention, it was an expensive toy. Not before the early 1900s it would became a common device. Besides, the telephone was not very separate from the telegraph as a communication tool. Still both of them were depending on wires. That means human voice could not go further than the wire itself.

In the meanwhile a German scientist called Heinrich Hertz was experimenting on electromagnets. In 1880 he explained the radio waves via a simple transmitter and receiver he had constructed (Briggs and Burke, 2002: 339). This would become the starting point of wireless communication.

Few years later an Italian well – off family youngster, Guglielmo Marconi, began to work on Hertz's founding. Despite being a scientist with help of a well-known physicist Auguste Righi, Marconi made his way through and became able to send and receive Morse codes without wires in a short distance (Fang, 1997: 90). In 1895, Marconi made a successful transmission in a longer distance. Being a good businessman Marconi offered the Italian government to support his work. But the Italian were not interested in it. So he took his experiments to London and showed them to the English governors, who later became interested in it. Marconi got the patents for his machine and the English supported the work. In 1901 he had built a much more powerful transmitter and succeeded in sending a message across the Atlantic (DeFleur and Dennis, 1998: 168).

This wireless telegraph was another revolution. It became very useful in sea transport communication from ship – to – ship, ship – to land and land – to ship. Marconi, built his future investments in this wireless technology by forming the American Marconi Company in 1899, which would became a monopoly in wireless communication in the US later in 1913 (DeFleur and Dennis, 1998: 169).

In 1904 Marconi also invented a device for generating and detecting a particular wavelength for the more precise transmission of signals. This device was very important because it allowed the transmitter to broadcast on a specific frequency. Simply, as we tune our radios today, with the receiving instrument tuned to a similar wavelength, signals on the frequencies could not interfere (DeFleur and Dennis, 1998: 169).

2.3.1.3 The Radio

Not much later, in 1906, Reginald Fessenden brought the idea of radio alive. He radically changed the wireless system of Marconi and used the telephone as a microphone in order to perform the first broadcast in 1906 (Becker and Roberts, 1992: 269). Same year Lee De Forest brought the radio on foot. He invented the audion, a three – element vacuum tube that allowed much more sophisticated circuits and applications. The tube made amplification of radio signals possible (Fang, 1997: 93).

Radio took on an active role in World War I. Pilots were able to communicate with land and operations were carried on more effectively. Also radio became a dependent medium for rescuing. Sea accidents of all kinds were asking for assistance via radio. Mostly the efforts were successful. But a tragic situation such as the sinking of Titanic was on the list as well.

It took a while for radio to become a mass communication and entertainment medium. The radio needed to be produced in large numbers, the price should be affordable and scheduled programs were in need. The first person that became aware with the situation was David Sarnoff who was working for the Marconi Company. He offered to use the radio both as an entertainment and news medium but was rejected by his superiors. Later on in 1919 he became the manager of the new company called Radio Corporation of America (RCA) and played a major role in bringing radio into public (Becker and Roberts, 1992: 273).

2.3.1.4 The Recording of Sound

News, sports scores, lectures, weather reports and music were the first ideas as contents for the broadcast. Actually news was not a problem. Read by a speaker the news could easily put on broadcast. What about music? Live music was not an argument. So there was the only option: The phonograph.

The phonograph is the invention of Thomas Alva Edison. Sound recording was not directly his invention. There were theoretical papers on this subject. But Edison was the first one that put a machine working on the desk, thus in 1877. The records for the

phonograph were made of tinfoil wrapped around a cylinder. The recording needle cut a groove in the foil, the depth varying the sound (Becker and Roberts, 1992: 240). Although Edison did not perceive his invention as a medium of entertainment primarily, it would turn into one. Though the phonograph had a major problem.

Making copies of the new medium was not feasible. Graham Bell working on this subject invented a wax – covered cylinder recording from which copies could be made. But still one or two copies were possible under the best circumstances.

The awaited reply for this call came from Emile Berliner in 1887. He invented the flat disk recording that he called Gramophone. Unlike the cylinder recording, the disc could be duplicated reliably in large numbers. This was a great development, which gave a swing into this area that would become an industry in the following years.

In 1925, the Bell laboratory developed an electrical system for the mechanical working phonograph. A microphone replaced the input while speakers replaced the output. So the sound both recording and playback improved a lot.

Back in business phonographs were in use for music broadcasts in the early stages of the radio as becoming a mass communication and entertainment medium. As mentioned above, after the idea was developed, it was not a hard job to set a home radio and begin to broadcasting. And so did many people. Of course after a while the air was full with signals. This was an unexpected condition and some regulations were on demand. Starting with the act in 1912, radio regulations formed strictly broadcasting.

As a matter of fact the radio became very popular and reached its golden age in 1930. Lots of stations were on air and people were listening to radios all around the world. The dynasty of radio was on the peak till the beginnings of 1950. The new king of mass communication and entertainment was found, the Television.

2.3.1.5 The Television

The idea of broadcasting motion pictures was not a very young idea actually. The recording and projection was already found. Movies were playing at theaters. But moving image transmission was not available.

Tracking down the timeline, a remarkable invention flashes in the page of the year 1884. A German scientist called Paul Nipkow developed a rotation disk with small holes arranged in spiral pattern that had unusual properties. With this 45 hole contained disk, he was the first to scan a scene optically point by point fast enough to reach the human eye's persistence of vision, which is the basis of television. The disk broke the image into segments of varying light intensity that struck a selenium plate and a result could be transmitted with varying electrical current (Fang, 1997: 154). Another rotating disk with spiral holes reconstructed the image. As this can be considered the first experiments of true television it would not be right to claim that the system was perfect. The major problem was that it was a mechanical system that was causing consistency problems.

The early experiments of TV were separate from radio itself but the technical development of TV and radio is closely intertwined indeed. All the inventions and technologies that made radio broadcasting possible are also a part of the history of television.

Efforts to perfect a mechanical system based upon the Nipkow disk continued still. In England, John Logie Baird carried on this subject but his picture was very poor in quality. The truly results came from the US.

A Russian immigrant called Vladimir Zworykin had worked with Boris Rosing, a Russian scientist known for his early experiments on television in 1907 back in his home country. After the Russian Revolution, Rosing disappeared while Zworykin, his assistant, took the work to the US and got in agreement with Westinghouse in order to work on the research of television. In 1923 he applied for patent on an iconoscope tube designed to electronically break up a picture by scanning an image focused on the tube with a beam of electrons. The image was reproduced in very rough form by a type of

cathode ray tube. In 1929 he demonstrated a receiving or picture tube that produced high – fidelity pictures that he called a kinescope tube (Becker and Roberts, 1992: 312).

Meanwhile, a high school student called Philo Farnsworth was carrying out a remarkable work. Encouraged by his chemistry teacher, Farnsworth made a similar invention as Zworykin's but much sooner in 1922. He described an all – electronic television system for which he received two patents in 1930 while Zworykin's system was not patented until 1938.

Not surprisingly, the similarities in the works turned into a patent fight, which ended up in favor of Farnsworth after four years. RCA, for whom Zworykin was working then, agreed to pay Farnsworth $1 million for the use of his patents so that both his inventions and those of Zworykin could be used in the manufacture of modern television cameras and receivers.

The electronic television system simplified the problem of synchronizing the camera and the receiver. It also made possible the braking down of the image into finer bits, which resulted in better quality (Becker and Roberts, 1992: 313).

The first broadcast test began at the late 1920s. By 1932, RCA had built a complete TV station in New York ready to launch a full broadcast. Though the Second World War assassinated the development in television. The TV industry had had to wait until 1945 to turn into manufacturing TV sets instead of arms. In the immediate postwar years, TV stations were quickly established in a number of major cities and the public was ready to buy sets. TV was finally ready for home use.

The use of TV spread across the world especially the US. It became the most popular medium ever. The adaptation to TV was sensational. It came to the point that TV was a must from there on.

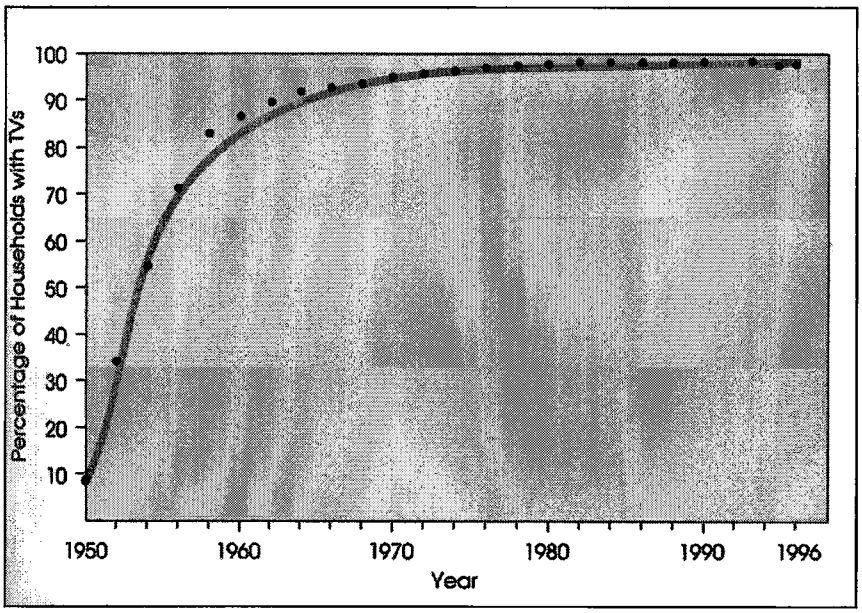

Figure 2.13 The Curve of Adaptation of Television 1950 – 1996 (DeFleur and Dennis, 1998: 197)

The color got in to the life of TV to make it more enjoyable and realistic. Early experiments were carried out during 1929. Technology improving in years, still the perfection in color broadcasting was not established. In 1946 a color system was perfected but the existing TV sets of black and white were not capable to receive this signal. In other words a new set was required. In 1953, RCA developed a color system that could be caught by black and white TV sets as well.

The transition happened very smoothly. First a few programs were on air in color. In 1967 mostly all the programs were in color. Step by step the new and recent ones replaced the technicians and technical devices. By the mid – 1990's almost all American homes had color TV receivers (DeFleur and Dennis, 1998: 198).

TV took off the crown of radio in a very short time. Watching TV at home, welcome the sound with the moving pictures to the living room just made it spread all around the world. Simply it became the favorite medium ever.

2.3.1.6 The Video Cassette Recorder

The first years of TV broadcasting was carried out live only. As a matter of fact there was no medium to record the programs. But this problem was not far to be solved. In 1951, engineers at Bing Crosby Enterprises gave a demonstration of a black and white video tape recorder. Though the picture had many problems it was the first working VCR piece (Fang, 1997: 175).

After many experiments an American company called The Ampex Corp. developed the VCR that lead to today's technology. The picture was much better. Without any discussion the paths to this technology was cleared.

Ironically as an American invention the VCR was not a successful device until the Japanese were involved in the business. The first VCR's were for studio uses only. With the help of the VCR programs were able to shot offline for later use on TV. Also mistake – free shows could be performed this way.

In the 1970's the American companies saw the potential of the market for the VCR. Though the manufacturers could not agree on standards. That's exactly where the Japanese step in. They standardized the machine and sold it all over the world.

The VCR became the fastest selling medium. Just like the TV, the adaptation for the VCR was remarkable. The home use of VCR's and videotapes simply changed the industry. Moviemakers followed the trend and shot videotape movies. Lots of stores of videotape renting opened all over the world. It gave the home user some sort of a freedom. TV shows could be recorded and stored for later watch. So everybody was able to form his own prime – time. Also all the adds in the TV could be skipped at one time. Messages could be stored and passed. Though it was not an event for sure. It was more like a domestic – in house – entertainment act.

2.3.1.7 Cable TV and Satellite Broadcasting

The quality of the picture on the TV screen has many arguments. But for sure one of the most important arguments is the broadcast itself. Early broadcasting was carried out with antennas. In time wires surrounded the TV broadcast as well. In order

for better picture quality, cable TV was a solution. It started to spread in the 1960's. Unlike the first broadcasting system, cable TV was not free. But it had better quality.

During the same years a larger antenna system was about to appear: The Satellite Broadcast. The history of the satellites begins in 1957 when the first satellite Sputnik was launched by the Soviet Union (Fang, 1997: 207). For many years the satellites were used for military services and communications. But after, the services appeared to stand for the civil as well. After many years of standardization problems and with the development in technology many satellites were set on their orbits and started to direct broadcasting. For instance the Olympics of Munich / Moscova was put on broadcast via satellites (Aydın, 1989: 40). As a matter of fact the broadcasting via satellites were very expensive. Not only the service, also the home – use sets were pretty expensive at the first sight. But in time everything formed its today shape and satellites became a natural part of human communication. Not only in TV broadcasting but also on many platforms of communication.

2.3.2 Computers and The Internet

People were always in search of a device that could do calculations. The Abacus is the first device known for calculations that can be found in ancient Mediterranean, Asian and African civilizations. Leonardo Da Vinci drew a design for a computing machine as well as two 17^{th}-century philosophers, Blaise Pascal and Gottfried Leibniz, built working models (Fang, 1997: 195).

2.3.2.1 The First Computers

In 1833, Charles Babbage, a 20 – year – old math student at Cambridge University, designed a device called The Analytic Engine. The Engine contained most of the key features of the modern computer. Punch cards were used to enter both data and instructions. This information was stored in the Engine's memory. A processing unit

performed operations on the data and wrote the results to memory; final results were to be printed out on a printer. The Engine was capable of doing any mathematical operation; not only would it follow the program fed into by cards, but it would also decide which instructions to execute next, based on intermediate results (Manovich, 2001).

The first computers were introduced in mechanical forms. But the efficiency lay in electricity. Three machines have been promoted at various times as the first electronic computers. These machines used electronic switches, in the form of vacuum tubes, instead of electromechanical relays. In principle the electronic switches would be more reliable, since they would have no moving parts that would wear out, but the technology was still new at that time and the tubes were comparable to relays in reliability. Electronic components had one major benefit, however: they could "open" and "close" about 1,000 times faster than mechanical switches.

The earliest attempt to build an electronic computer was by J. V. Atanasoff, a professor of physics and mathematics at Iowa State, in 1937. Atanasoff set out to build a machine that would help his graduate students solve systems of partial differential equations. By 1941 he and graduate student Clifford Berry had succeeded in building a machine that could solve 29 simultaneous equations with 29 unknowns. However, the machine was not programmable, and was more of an electronic calculator. A second early electronic machine was Colossus, designed by Alan Turing for the British military in 1943. This machine played an important role in breaking codes used by the German army in World War II. Turing's main contribution to the field of computer science was the idea of the Turing machine, a mathematical formalism widely used in the study of computable functions.

2.3.2.2 The ENIAC

The existence of Colossus was kept secret until long after the war ended, and the credit due to Turing and his colleagues for designing one of the first working electronic computers was slow in coming. The first general purposes programmable electronic

computer was the Electronic Numerical Integrator and Computer (ENIAC), built by J. Presper Eckert and John V. Mauchly at the University of Pennsylvania. Work began in 1943, funded by the Army Ordnance Department, which needed a way to compute ballistics during World War II. The machine wasn't completed until 1945, but then it was used extensively for calculations during the design of the hydrogen bomb. By the time it was decommissioned in 1955 it had been used for research on the design of wind tunnels, random number generators, and weather prediction.

Eckert, Mauchly, and John von Neumann, a consultant to the ENIAC project, began work on a new machine before ENIAC was finished. The main contribution of EDVAC, their new project, was the notion of a stored program. There is some controversy over who deserves the credit for this idea, but none over how important the idea was to the future of general-purpose computers. ENIAC was controlled by a set of external switches and dials; to change the program required physically altering the settings on these controls. These controls also limited the speed of the internal electronic operations. Through the use of a memory that was large enough to hold both instructions and data, and using the program stored in memory to control the order of arithmetic operations, EDVAC was able to run orders of magnitude faster than ENIAC. By storing instructions in the same medium as data, designers could concentrate on improving the internal structure of the machine without worrying about matching it to the speed of an external control. Regardless of who deserves the credit for the stored program idea, the EDVAC project is significant as an example of the power of interdisciplinary projects that characterize modern computational science. By recognizing that functions, in the form of a sequence of instructions for a computer, can be encoded as numbers, the EDVAC group knew the instructions could be stored in the computer's memory along with numerical data.

The notion of using numbers to represent functions was a key step used by Goedel in his incompleteness theorem in 1937, work that von Neumann, as a logician, was quite familiar with. Von Neumann's background in logic, combined with Eckert and Mauchly's electrical engineering skills, formed a very powerful interdisciplinary team. Software technology during this period was very primitive. The first programs were

written out in machine code, i.e. programrs directly wrote down the numbers that corresponded to the instructions they wanted to store in memory.

By the 1950s programrs were using a symbolic notation, known as assembly language, then hand translating the symbolic notation into machine code. Later programs known as assemblers performed the translation task. As primitive as they were, these first electronic machines were quite useful in applied science and engineering. Atanasoff estimated that it would take eight hours to solve a set of equations with eight unknowns using a Marchant calculator, and 381 hours to solve 29 equations for 29 unknowns. The Atanasoff-Berry computer was able to complete the task in under an hour.

The first problem run on the ENIAC, a numerical simulation used in the design of the hydrogen bomb, required 20 seconds, as opposed to forty hours using mechanical calculators. Eckert and Mauchly later developed what was arguably the first commercially successful computer, the UNIVAC; in 1952, 45 minutes after the polls closed and with 7% of the vote counted, UNIVAC predicted Eisenhower would defeat Stevenson with 438 electoral votes as where he ended up with 442 (www.schoolnet.edu).

For sure the computers were not designed for communication at the first sight. But the introduction of the word processing computers was a huge step for the mass media community. As the personal computer (PC) term was spreading step by step, the promotion of the Macintosh computer in 1984 brought the reality of desktop publishing (Fang, 1997: 195). Later on the PC's started to take an important role of human – daily – life. Today we cannot think of a human related area without a computer. And simply computer became a mass communication media.

2.3.2.3 Search for a New Medium

It was 1964, the height of the Cold War, and Americans spent their free time building bomb shelters and stockpiling canned food in preparation for the impending nuclear attack. The government, however, had a more pervasive problem. If war did come, how would the military be able to communicate? A centralized system might

easily be destroyed in wartime, and so traditional technologies wouldn't work. This fear impressed a need on the government to do something different; to develop a whole new scheme for post-nuclear communication.

The roots of today's Internet come from the Advanced Research Projects Agency (ARPA). Instead of performing its own research, ARPA (a branch of the Department of Defense), which became DARPA in 1972, regularly funded research projects related to technological development or military problems. In the 1960s, ARPA became interested in developing a way for computers to communicate with each other and began to fund programs at universities and corporations, including MIT and RAND. A network would both advance American technological development and provide a secure command and control over information during wartime. To this end, in the mid-1960s, ARPA began to support research into building an effective network.

On January 2, 1969, designers began working on an experiment to determine whether computers at different universities could communicate with each other without a central system. The corporation Bolt, Baranek and Newman had been awarded the contract to develop the Interface Message Processor (IMP), the basis of the new communications system. IMPs were small machines that were part of each host and were dedicated to forming the network between computers (Lynch and Rose, 1993). IMPs would use a technology called packet switching, which split large sections of data into small parts called packets, each labeled with its destination address. Packets could be sent in any order and through different routes which all led to the same destination (Wiggins, 1994). Upon arrival at the destination computer, the packets could be reassembled.

While these developments were looking quite positive, the designers soon ran into trouble. The original systems only supported client-server applications like telnet and FTP, and couldn't handle host-host relationships (Lynch and Rose, 1993).

This limit would impair the functionality of the network. A new protocol to take care of this went into development soon afterwards; called Network Control Protocol (NCP), it became the primary concept behind networking. Armed with these tools, researchers were ready to unveil their creation: ARPAnet.

2.3.2.4 ARPAnet and TCP / IP

ARPAnet made its first public appearance flashily, as the star of Washington D.C.'s International Conference on Computers and Communications (now International Conference on Computer Communication) in 1972. Arranging for an ARPAnet IMP to be on-site, head researchers demonstrated the abilities of the network. Terminals set up at over 40 locations were able to locate the IMP and other processors. More than 1000 people witnessed a new technological revolution, as remote access to files became possible. Vendors and manufacturers were now taking what had once only been research seriously. After the unveiling, technologies to help develop the network began to sprout. By 1973, a satellite link to Hawaii was running; by the end of the year, more distant hosts were connected over telephone lines.

While the technology was growing quickly, the number of terminals hooked up to ARPAnet was still moving slowly. Between 1969 and early 1977, ARPAnet only added 107 hosts. Even so, engineers at DARPA and RAND recognized that this new communications network was going to grow into something far larger than they had ever imagined, and needed to develop a design suitable for a large network. (Giese, 2003: 144)

Knowing that NCP was not ready for a mass influx of hosts, researchers at DARPA began working on a new protocol which would be able to handle larger numbers of users, and Transmission Control Protocol / Internet Protocol (TCP/IP) was born in the mid-1970s. The U.S. government in 1978 accepted this more sophisticated technology, and TCP/IP became the preferred networking tool. Many people view January 1, 1983, when all of ARPAnet was switched over from NCP to TCP, as the "official" beginning of the Internet (Dern, 1994).

During 1983, to provide operational separation, the military broke off from ARPAnet and formed MILnet. The Department of Defense continued to run and fund both networks. Further, more networks were popping up; educational and commercial organizations that didn't fall into ARPA's original charter wanted to use the same packet-switching technologies.

In the early 1980s, two large networks sprang up: CSnet (Computer Science Network), for members of the computer science academic and industrial community, and BITNET (Because It's Time Network), for the general academic community. Other small networks, like ones for space scientists and high-energy physicists grew for specific needs (Lynch and Rose, 1993). The latter also helped develop the foundation of the World Wide Web in 1989. While these networks existed separately from ARPAnet, there was a need for interconnection between all of them. In 1983, CSnet and ARPAnet negotiated an agreement that allowed members of the two networks to exchange electronic mail. Further agreements followed, and the networks began building gateways between one another.

For several years, the myriad networks were effective; organizations were able to complete their work and communicate without trouble. However, by mid-1985, more resource-intensive programs became widespread, and even the most advanced networks could not keep up with the demand. At the same time, the National Science Foundation's Office for Advanced Scientific Computing became interested in high-speed computing. A combination of technological advancements and the availability of funds led the NSF to encourage the use of supercomputers in networking, and begin funding the construction of its own network (NSFnet).

The planners envisioned a three-tiered system. Instead of user organizations (like universities and manufacturers) connecting directly to the backbone of five top supercomputers, they developed a mid-level tier, where regional networks would connect the two levels together (Wiggins, 1994). Starting in 1987, the NSF funded research organizations at IBM, MCI, and the Merit Computer Network. Originally, the NSF wanted to incorporate its network into ARPAnet, but a number of political and technical difficulties caused it to build its own network.

The original supercomputer centers turned out to be unsuccessful; few of them worked, and still fewer were cost-efficient enough to maintain. The NSF kept up its network, though, adding more than a dozen backbones and more large regional networks. By 1989, ARPAnet had been co-opted; it folded, having provided the impetus for technologies that far exceeded its capabilities (Bonner and Bonner, 1997).

2.3.2.5 Internet and the World Wide Web

Tim Berners-Lee is credited with having created the World Wide Web while he was a researcher at the European High-Energy Particle Physics lab, the Conseil Européenne pour la Recherche Nucleaire (CERN), in Geneva, Switzerland. (www.cern.ch). A tool was needed to enable collaboration between physicists and other researchers in the high-energy physics community.

Tim Berners-Lee wrote a proposal called *HyperText and CERN* and circulated his proposal for comments at CERN in 1989. The proposal was the solution to the technologies that would enable collaboration in the high-energy physics community. Tim had a background in text processing, communications, and real-time software. Tim Berners-Lee and Robert Cailliau further refined the proposal in 1990.

Berners-Lee's proposal was an extension of the gopher idea but incorporated many new ideas and features. Three new technologies were incorporated into his proposal. Briefly, they were HTML (Hyper Text Markup Language) used to write the web documents, HTTP (Hyper Text Transfer Protocol) to transmit the pages, and a web browser client software program to receive and interpret data and display results. An important concept of his proposal included the fact that the client software program's user interface would be consistent across all types of computer platforms so that users could access information from many types of computers.

A line-mode user interface (named at CERN, the world wide web or www) was completed in late 1989. The interface was used on a minor network in March 1991. May 1991 was the first time that the information-sharing system using HTML, HTTP, and a client software program (www) was fully operational on the multi platform computer network at the CERN laboratories in Switzerland.

The availability of CERN's files was announced in the UseNET newsgroup, alternative hypertext, in August 1991. This was the first time that the availability of the files was announced to the public.

All of the documents coded with HTML elements were stored on one main computer at CERN. This special type of computer was called a "web server" (by the physicists at CERN) because it "served-up" batches of cross-linked HTML documents.

There was only one Web server located at CERN, but by the end of 1992 there were over 50 Web servers in the world. Many of these earliest Web servers were located at universities or other research centers. These servers were using line-mode interfaces. By June 1999 there were more than 720,000 public information servers. In April of 2001 there were over 24 million servers (www.netcraft.co.uk/survey).

Here and now the media revolutions come up–to–date. Human needs formed the technology and now the technology forces changes in the media. The following chapter will discuss the concept of the New Media.

3 NEW MEDIA

It is not easy to map out the new media. As we already had the definition for media, it is essential to define what the new media is. The concept of being new is not an actual term. It was used in the past like it is used right now. Here the meaning of the word new is still the same. In short the new media that we are talking about is the most recent one in the family tree of media.

Referring the history of media, we can find a starting point of the new media. As mentioned in the first chapter it took a very long time to reach the new media for humanity. Step by step the revolutions happened and lead us to today's results. In the first chapter the last section was based on computers and the Internet. For today's conditions computers and the Internet are essential media. Especially the computer became such a tool that cannot be left in any means.

3.1 DEFINITION OF NEW MEDIA

Nowadays when we talk about the new media we will be aware that it is defined by using computers, the Internet, websites, computer games, CDs and DVDs, virtual reality, cyber space etc. as separate definitions. As a condition these media are over ground to form the new media or vice versa. Briefly the popular understanding of new media identifies it with the use of computer as a distribution and exhibition rather than a production.

Lev Manovich points this idea very clearly in his book titled *The Language of New Media.* But he rather stresses the background of the use of computer that is not as popular as the foreground: The computer as a production tool.

It is not a wrong to define new media with the help of a computer as a distribution and exhibition tool. But this is limited. For instance there is the simple argument of a still image. Is a still image or let's say a photograph, a new medium when it is stored in a CD rather than on film? Or is a text an old media when it is published on a sheet of paper rather than on a website? If an idea is expressed either on a website or a

printed book, the ability to change something remains the same in many wise. So what makes the old media new?

We are aware of the first printing machine and the first image capture device. They were revolutionary tools for communication and the media itself for sure. But if we take a closer look the revolution had a sense to speak only for it's own branch of media. In other words the printing machine was effective only in one stage of cultural communication that we can call the distribution. Also the introduction of photography was effective only on still images. In contrast the computer and the revolution it causes is effective on many stages of communication, including acquisition, manipulation, storage and distribution. It also affects all types of media; texts, still images, moving images, sound and spatial constructions (Manovich, 2001: 19).

The New Media is the recent media that uses the computer as a tool in:

- Production
- Manipulation
- Distribution
- Exhibition
- Storage

3.1.1 Production

From simple text to still images, sound to moving pictures new media is produced digitally. It is almost impossible not to define any of these in binary codes. For instance it is possible to produce any kind of image via using pixels in the necessary forms. In other words, there is no image that cannot be produced with the right pixel combination.

Today every branch of media is using computers to produce the needed elements. Newspapers, magazines, books are published form the desktop. TV shows, programs, movies, series even the broadcast itself is produced via computers. The images, photographs, moving pictures are produced and edited digitally. Visual effects are a must in cinema films. 3D environments in these movies are produce with computers.

Video games simply are a result of computer production. VR simulations for architecture, military and everyday use are computer products in brief. The Internet and websites would not be if the computer didn't exist.

It is pretty clear that computer is an essential tool of production for the new media. Using the computer just makes many things possible that were not possible in the past. Also it makes the production more reliable and fast. The fact of rolling back the action, like when you do something on the computer you can undo, gives the safety feel that makes a media laborer work more comfortable. Also the production process is faster than ever. Mostly the production is carried out in real-time environments. That means you get the result of your work as soon as a click-time. This is one of the key elements to define new media on the background. The new media is a fast living fact. It can form a change every minute. So time is important.

3.1.2 Manipulation

Nowadays it is hard to believe in many things. The specific ideas of "impossible" have changed its concept indeed. History shows us that many things that were considered as impossible have happened. The first radio broadcast, the founding of television, first airplanes and the moonwalk of Armstrong was definitely impossible in the past. But all of them happened.

Back to today we are aware that impossible is not a word defined, as something cannot happen anymore. We know that what we call impossible is a fact that can happen and is limited to only a matter of time. Our beliefs have changed. Proofs that matter are not the proofs of that kind anymore.

What we are talking about is simply the fact of believing of something you can see. That used to be the greatest proof for decades. But now this has changed as well. There is the interesting question that cannot be answered very clearly like it used to be: Do you believe in what you see?

Well it is hard to say, yes, anymore. The new media has an ability to manipulate things. Actually this is the ability of the computer.

Above we have mentioned that it is possible to create any image by using the right pixel combination. Not as means of production, computer technology allows us to manipulate these images just as many things. Photomontage has never been so easy and spread on world ever. You can simply add your own photograph on any image you want by using software like Adobe Photoshop or Ulead Photoimpact. You can create a large scale of manipulation on any image. Adjust the color, brightness, hue, and saturation; add many filters to change the atmosphere of the existing real image and many things so on. Not only still images, a whole film can be manipulated the same way. Also real motion pictures can be combined with computer made images, environments, characters and this way it can be manipulated so that the reality gives birth to another reality. Actual examples are the films The Lord Of The Rings and The Matrix. Both films are shot both in real and virtual environments. The computer had an important role in producing the virtual elements as well as manipulating the real ones. The result is significant: Fascinating products of new media.

3.1.3 Distribution

In the previous chapter we mentioned about books. Books were the first media that could be distributed. The ability to carry the message through time and space made them the first mass communication media. Although it was possible to copy books by hand it was very cumbersome way of process. The printing revolution made the distribution reasonably possible in order to communicate between masses.

Today the computer is a significant tool of distribution in any means. It is possible to publish printed material form the desktop. Also the computer itself has the ability to carry a message through space.

The Internet, e – mails, instant messaging, real-time chat-zones, the mobile phone communication, SMS', even satellite connections... All are done with computers. Although still the analog way of distribution does exist, the computers carry out the maintenance and services. It is obvious that banks and post offices use computers to follow their work in order. So the distribution has its own way from digital to digital as

well as from analog to digital. Besides the fastest way of communication today is possible with computers. Real-time chat is almost no different than telephone conversations. While in the same time the telephone is bound to the computer digitally.

The visual communication is carried out this way, too. Today people prefer to talk to their far relatives via Internet by using their microphones and cameras. It is possible to see many foreigners living in Europe, talking with their beloveds in their home country in the East in every Internet Café.

3.1.4 Exhibition

The products of the new media are also exhibited via computers. For instance the films produced digitally are not only shown on theaters. It is possible to watch them on computers. Also books or newspapers produced digitally do not have to be printed. It is possible to read them on the screen. The Internet itself is an exhibition area. Many digital art galleries, TV channels, radios are on the Internet and their primary, sometimes only, exhibition tool is the computer.

Many of us know the importance of visual media. When we want to present something we would like to support the ideas with visuals. At this point most of us spend time on production for presentations in the digital environment. Surely we use the computer to exhibit these presentations as well. Here we can simply see the fact that the computer is an extraordinary exhibition tool. Using text, audio and video we aim to present ideas more efficiently. With the interaction of human and computer we stress our words via making an ideal presentation.

Besides all it is a matter of fact that material produced via computers does have a feedback that asks simply to use the computer as the exhibition environment at the first sight. In other words, whatever is produced on the computer can simply have a playback on the computer that makes the computer an exhibition center in its nature.

3.1.5 Storage

The computer is a very significant device of storage. First of all it has the capability to store everything that it can produce, manipulate, distribute and exhibit. The digitalization of the material makes it possible to store in any computer. Also computers have a very large capacity of storage. So to say it is possible to store thousands of books in a high capacity hard disk. This can also be called as a digital library. Considering thousands of books need a very large space to be hired, instead a computer hard disk needs only a tiny space. Besides this makes it possible to carry anywhere that is necessary.

Digitally storage is not only efficient to carry the medium through space and time. Also it is efficient by finding a desired data / information very easily. Today libraries use computers to form their book databases. Throughout these databases we can easily find the sources we need in minutes. But computers are not limited on searching book names, authors and topics. Also digitized books can be searched through in order to find a desired phrase or even a word. This is the most efficient way to reach the necessary data / information. The new media allows an efficient access to the right information immediately.

3.2 FORMULATING NEW MEDIA

So far we have traced down the chronology of the media from the first days of human communication to the definition of the new media. The computer dramatically affects the identity of the new media. Thus, there are key differences between the old and new media. In his book ***The Language of New Media***, Lev Manovich formulates new media via 5 principles (Manovich, 2001: 27):

- Numerical Representation
- Modularity
- Automation
- Variability
- Transcoding

He claims that not all types media obeys these principles. Though as the computerization affects deeper and deeper layers of culture, these tendencies will increasingly manifest themselves.

3.2.1 Numerical Representation

New media works, both made on computer and converted from analog are made of codes. This means new media objects are discreet. This fact has two key consequences:

- "A new media object can be described formally (mathematically). For instance, an image or a shape can be described using a mathematical function.
- A new media object is subject to algorithmic manipulation. For instance, by applying appropriate algorithms, we can automatically remove "noise" from a photograph, improve its contrast, locate the edges of the shapes, or change its proportions. In short, media becomes programmable." (Manovich, 2001: 27)

The numerical representation of new media refers to key elements like sampling and quantization. For instance the digitization process of a traditional photograph done by a scanner is transforming continuous data into discreet form. Not only new media object are examples for numerical representation. Film itself is has a structure of sampling. Though it is a sampling example it is not quantified.

According to Manovich without discreet units, there is no possibility to form a language. From his perspective the reason modern media has discreet levels is because it emerged during the Industrial Revolution. The modern structure of new media is just as same as a contemporary factory structure. It brings factory organization to new media and standardizes the production of images, text and sound (Mackenzie, 2003: 13). The numerical representation of new media makes it programmable.

3.2.2 Modularity

Modularity is an important structure element of new media. Media sub – elements such as images, sounds, movies are represented as collections of discrete samples. "A new media object consists of independent parts, each of which consists of smaller independent parts, and so on, down to the level of the smallest "atoms" — pixels, 3-D points, or text characters." (Manovich, 2001: 31).

As we take a closer look to new media works this can be seen clearly. For instance the structure of a website is modular. Texts, images, applets, movies, animations, even behaviors contain individually information. As they come together coded by HTML they form the website. Another example is a flash movie. The flash movie on a website can contain many different other movies, text and sounds. All can be edited separately. Even computer programs today are written by modules and compiled together to form the whole program. This is actually no different than building an automobile.

The automobile has different parts such as the engine, wheels, and chassis. All of them are produced in different departments. Also all of them are built with different knowledge and put out in different and unique ways. After the sub – production they are compiled together in order to form the aim: The Vehicle.

This action is another proof and cause for the non – linearity of new media. Though the form is concrete it does not have a beginning or an end. In this means modularity provides easy editing and manipulation for new media. Also it provides fast and accurate reach for information. Thus new media elements can be assembled and composed with a new "identity" (German, 2003: 8).

3.2.3 Automation

New Media objects can automate many things without the user. Today there are many softwares that contain plug – ins or commands to generate ready codes. For instance in Photoshop there are filters, which are actually a combination of permutated tool actions that can provide direct manipulations without trouble. Another example is the 3-D rapid prototype modeling software Rhinoceros. This software allows the user to save the actions history for later use just as the well-known Alias | Wavefront 3-D modeling and animation software Maya. In Maya the user gets introduces to shelves. These shelves can be edited in order for a special use. The MEL (Maya Embedded Language) Scripts provide the user to define actions, which normally are a heavy-duty job, for a later "one – click" use.

Motion picture films like "The Lord of the Rings" and "The Matrix" are other examples from a different area. The Lord of the Rings is an epic story with a large scale of panoramic views. Battle scenes are peculiar on this film. These scenes contain armies of thousand of soldiers. As it is very hard and expensive to gather and educate thousand of stunts, producers prefer to use computer graphics effects. Softwares that are used in post – productions have the ability to create non – existing objects that can be implanted in to live – action footage. So the sequence is shot with a countable number of stunts and the rest of the army is added on the computer. As a further step, these "extra soldiers" can move freely as they have their own choices.

Today, chat rooms on the Internet are full with "bots". Bots are computer generated imaginary persons that can react to written texts. Also computer game players are familiar to bots. Hit games like "Counter Strike" and "Quake" provide artificial characters that can react as teammates and opponents. On the other hand many game genres from action to fighting or strategy to racing, the opponent is the computer at many times. Thus there are things that are not in control of the user. This requires the state of Artificial Intelligence (AI).

Artificial Intelligence is the unique intelligence carried out by codes. The aim is to provide a reaction to human actions. So the interaction between human and computers will be more complex and accurate. With the development of artificial

intelligence many areas of human use can be disregarded. "Thus human intentionality can be removed from the creative process, at least in part." (Manovich, 2001: 32).

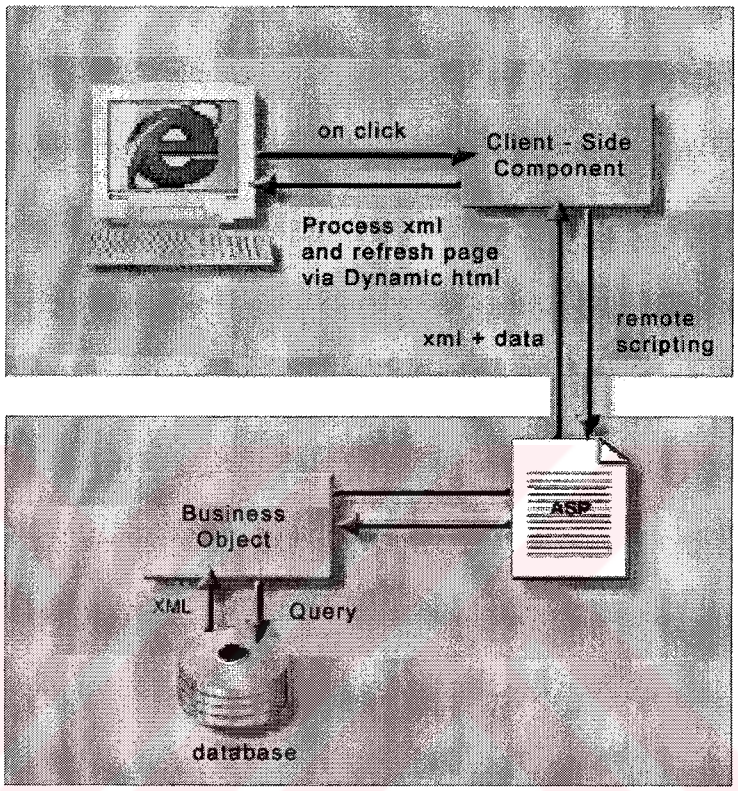

Figure 3.1 Web page automation generation (German, 2003: 11).

Today it is very easy to produce but very hard to find something in new media. If you consider that it is possible to prepare web pages from ready templates and generated codes, the explosion of information, which is directly bound to technology, makes it hard to find the desired information or data. For instance the easy use of digital photograph machines attracts the consumers. Thus the storage drives of computers are full with lots of images. This requires an accurate form of searching in order to find what we need.

Search engines are good examples in these means. Today it is possible to find words, images even sounds on the Internet as well as in our computers. Even printed

sentences can be scanned and digitized and with the help of text recognition software's a whole book can be searched in order to find one single phrase or word.

3.2.4 Variability

"New media allows us to create versions of the same object that differ from each other in substantial ways." (German, 2003: 16). As a result of being discreet, modular and automated the new media can appear in many different faces. This is a contrary state of the old media that has an involvement with a human creator that assembled the information / media together to form the art.

"Some particular cases of variability can be order as:

- Media elements are stored in a media database; a variety of end-user objects, which vary in resolution and in form and content, can be generated, either beforehand or on demand, from this database

- It becomes possible to separate the levels of "content" (data) and interface. A number of different interfaces can be created from the same data. A new media object can be defined as one or more interfaces to a multimedia database.

- A computer program to customize automatically the media composition as well as to create elements themselves can use information about the user.

- A particular case of this customization is branching-type interactivity (sometimes also called "menu-based interactivity"). The term refers to programs in which all the possible objects the user can visit form a branching tree structure.

- Hypermedia is another popular new media structure, which is conceptually close to branching-type interactivity (because quite often the elements are connected using a branch tree structure).

- Another way in which different versions of the same media objects are commonly generated in computer culture is through periodic updates.

- One of the most basic cases of the variability principle is scalability, in which different versions of the same media object can be generated at various sizes or levels of detail." (Manovich, 2001: 37 – 39)

Thus, new media objects exist in potentially infinite versions (Mackenzie, 2003: 16). Simply the instance for a website that has two versions for high – connection and low – connection users can be envisioned. Also the resolution can differ for different interfaces like 800 x 600 pixels, 1024 x 768 pixels and 1280 x 1024 pixels. This state of new media can be called also as mutable or liquid.

3.2.5 Transcoding

"New media in general can be thought of as consisting of two distinct layers — the "cultural layer" and the "computer layer." Because new media is created on computers, distributed via computers, and stored and archived on computers, the logic of a computer can be expected to significantly influence the traditional cultural logic of media; that is, we may expect that the computer layer will affect the cultural layer." (Manovich, 2001: 46).

As suggested above whatever enters the computer, in other words whatever is digitized, becomes computer data. Once the computer is in charge in every means of this data – production, manipulation, distribution, exhibition and storage – it turns into a form that is discreet, modular, variable and also automated.

As we know the computer data is represented in variable formats. For instance image files are stored as JPEG, GIF, PNG, TIFF and similar; movie files are stored as MPEG, MOV, DIVX, XVID and similar; sound files are stored as WAV, MP3, AIFF and similar; text files are stored as TXT, DOC, RTF and similar. Mostly these formats are recognized by each other. Of course the talent of the compatible software is a variable as well. But still mostly all formats – sometimes with the help of some plug – ins – are recognized by each other. This leads to the point of transcoding.

"Transcoding is the act of converting from one medium format to another." (German, 2003: 17). It is possible to convert almost any file format to another one. For instance the movie formats MOV, MPEG, MPEG2, MPEG4, DIVX, XVID can be translated into each other without any problem. The only question the user needs to ask is "which file format is what I need?" The file formats are variable because they offer different qualities. The frame per second rates, compression levels, file sizes are different in every format.

The transcoding principle does not only point the fact of file translation in a certain class like movies only. It is possible to convert a different file class data into another file class via embedding. For instance it is possible to import image files into a Word document. There is no need to write any text on the document. It can consist of sole images. But this time the file extension will not be JPEG, GIF or any other. It will be DOC or RTF. The same thing goes for Adobe Acrobat files. It is possible to import images in Acrobat files while the result format will be PDF.

3.2.6 Further Definitions

Manovich's five principles – explained above – are formulating new media. Many scientists and researchers reach to an agreement on these principles. Though there are some other definitions for new media.

Vin Crosbie, defines new media via four fundamentals (Crosbie, 1998). These are:

- "Bits, not Atoms"
- Digital Addressability

- A Quantum Shift in Control Towards Consumers
- Open, Autonomous Systems Triumph over Closed, Proprietary Systems

According to Crosbie these fundamentals are distinct and have a "stratal" relationship. At least three of them are necessary to make the old media "new".

The idea of "Bits, not Atoms" is cited from Nicholas Negroponte, the former chairman of the MIT Media Lab. Negroponte claims that "information and non-consumable services, now and into the future, will increasingly be delivered in the form of electronic bits and not as physical atoms of material and packaging. Words, images, sounds, software, data, plus as many non-consumable services as economically practicable, will be distributed electronically, rather than in the traditional forms of paper, disks, boxes, or other physical materials." (Crosbie, 1998)

"Digital Addressability" is the corollary of *individualization* and *individualized products and services*. Crosbie claims "the New Medium has the capability to deliver individualized information and certain non-consumable products and services to each and every person that fits the person's unique mix of specific and generic interests and needs. It is the first medium capable of fully satisfying these universal human needs."

The media control started with the founding of the first writing medium. As discussed before the history of media lead to the point of mass communication. Though it is not possible to say that there was a control legend, formed by any possible participant from any level of the society. "The Quantum Shift in Control Towards Consumers" is based on the high – participation level that the new media provides. The quantum shift takes place with the Internet indeed. Thus the control moved from "one" to "many".

Manovich represents New Media's social shift as "What was private became public. What was unique became mass – produced. What was hidden in an individual's mind became shared." (Manovich, 2001: 61) At this point Crosbie, suggests his fourth fundamental; Open, Autonomous Systems Triumph over Closed, Proprietary Systems. He discusses that the former closed systems are not resistant anymore and the reform of open systems gain a triumph over the former ones. His perfects example is the Internet

and he states his reasons as "One reason was that the Internet's open nature allowed consumers to have far more access to the information they need to live their lives than was provided by the closed systems. Another reason was that the Internet's open architecture and protocols allowed thousands of software and hardware vendors to manufacture products that utilized it; compared to the expense and travail of having to license the architecture and protocols of any of the proprietary systems." (Crosbie, 1998 – 2002)

The principles of Manovich and the fundamentals of Crosbie are based on parallel ideas. "Bits, not Atoms" is similar to the notion of the "Modularity" principle. "Digital Addressability" has key points just as "Numerical Representaion". "Open, Autonomous Systems Triumph over Closed, Proprietary Systems" is like a sub domain for the "Automation" principle.

3.3 PROPERTIES OF NEW MEDIA

After the formulation of new media we need to take a brief look over the properties of it. These properties are actually not only limited with the new media itself. As means of terms, they seem to be very new, but as means of ideas they have a background in the old media.

3.3.1 Digitization: Discreet Forms

"New media is analog media converted to a digital representation. In contrast to analog media, which is continuous, digitally encoded media is discrete. The digital representation consists of specific codes. In other words in limited samples. For instance, a still image is a matrix of pixels, which can be called as a 2D sampling of space. Every single pixel has its own information that forms the whole form a single part or detail. This is discreet data and it cannot be changed. The change in this data will affect the whole sentence that will lead to another result." (Manovich, 2002: 50).

As the medium itself is digital the idea of sampling is not new. Cinema sampled time twenty – four times a second. So we can say that this idea was prepared a long time ago by cinema. Of course the sampling type of cinema was mechanical. But as a result the continuous becomes discreet if we consider that a whole motion picture is made of at least 24 stills together.

3.3.2 Multimedia: Convergence of the Media

As we would like to introduce Multimedia in the following chapter, we will not describe its status for new media." But simply we can say that all digital media (texts, still images, visual or audio time data, shapes, 3-D spaces) share the same digital code. This allows different media types to be displayed using one machine — a computer — that acts as a multimedia display device." (Manovich, 2001: 50) This is an important part of the new media but not all alone indeed.

That's because cinema can be claimed as the first multimedia. Filmmakers had already combined moving images, sound and text before. The basis of multimedia goes that far back. But identically the physical part missing is the direct interaction, which is the sole topic of the next chapter.

3.3.3 Non - Linearity

"New media allows for random access. In contrast to film or videotape, which store data sequentially, computer storage devices make it possible to access any data element equally fast. For example, once a film is digitized and loaded in the computer's memory, any frame can be accessed with equal ease." (Manovich, 2001: 51) Thus new media is in a non – linear structure. This structure leads again to the essential point of interactivity. Because non – linearity is the state of being ready to be used in anytime anywhere concept. That means it does not have a start or an ending.

3.3.4 Prevention of Information Loss

"Digitization inevitably involves loss of information. In contrast to an analog representation, a digitally encoded representation contains a fixed amount of information." (Manovich, 2001: 52)

There are many ideas on analog and digital media. The best known is the one that claims that analog media always contains more information than the digital one. The theory foresees this but the reality does not show a difference. If we consider that there are many scanners on the market that can scan images at a resolution of 2400 and even higher, it is possible to store digital images with a much higher quality and information than traditional photographs can. "By the end of new media's first decade, technology had already reached the point where a digital image could easily contain much more information than anyone would ever want." (Manovich, 2001: 53)

As a matter of fact multiple copies of digitized information can be made without and loss of data, quality or similar. Also in means of data transfer, which can be considered a way of copying, the loss is prevented. Of course the distortion in the communication model in here is disregarded because it is not in the concept of the compiled information.

3.3.5 The State of Interactivity

"New media is interactive. In contrast to old media where the order of presentation is fixed, the user can now interact with a media object. In the process of interaction the user can choose which elements to display or which paths to follow, thus generating a unique work. In this way the user becomes the co-author of the work." (Manovich, 2001: 55)

At this point, as discussed above, we need to move into another subject directly; Interaction. In my opinion interactivity is the most important matter that new media brings on stage.

4 INTERACTIVITY IN NEW MEDIA

"Tell me and I will forget.
Show me and I may remember.
Involve me and I will understand."

Chinese Proverb

4.1 MAPPING INTERACTIVITY

Interactivity is clearly a result of communication. As the source and the receiver gets into communication, the message forms some sort of influence. This influence causes the receiver to react and give feedback. The feedback forms another message. This time the former receiver becomes the source and the former source becomes the receiver. The former source, the new receiver, gets the influenced feedback and this time he gets influenced by this message and gets ready to react to give a feedback. The story carries on until the conversation – communication is over.

At a certain point it is obvious that human communication is based on interaction. If we consider that nature is the best pattern to model, almost all communication models are based on it. Just as human body is the perfect machine working as an ideal model for all of the machines that human do produce.

Computers, as discussed in the first chapter, are machines that are programmed to act like human in certain modes. That means a subject related with human, e.g. accounting, is directly a subject and also an existing area for the computer.

Back to our subject, computers as a production, manipulation, distribution, exhibition and storage tool for the new media, they became very powerful machines. For sure the computer has its own jargon and language. Though it is based on many natural facts of human body and way of thinking, still it is not in the same manner. Human need to communicate with the computer in a very efficient way. This leads us to the studies of

Cybernetics and Human – Computer Interaction (HCI) and from there to interactivity (Huhtamo, 2000: 97)

Before the subject gets in to a deeper point it is essential to define interactivity and interaction design. Simply interactivity in our point of view is, the action of reaching certain information / data or activation of a mechanism by a user while interaction design is the design of the tool that makes this reach or activation possible (Özcan, 2003: 16).

Within this definition we can go back in history of interactivity. Although the world scene is familiar with the term interactivity in electronic media for only a few decades, interactivity itself is pretty elder than this.

4.1.1 A Brief History of Interactivity

We have already mentioned that human communication simply is interactive. As for all most all of the mechanical tools are products of interaction design. For instance the first model of wheel can be named as an interactive tool. But further as our point of view we are in search of interactive media (Iuppa, 2001: 9)

The examples are pretty simple in the history. One of them are the natives of America, the Indians. It is for sure that every single person that has watched old Hollywood western movies is aware of them and their way of far – communication. Communication by smoke is one of the most primitive ways. But it is totally interactive. As the first signal of smoke send out the message, the receiver gets the message and the message has an influence on him. Right after the receiver signals back with smokes and it carries so on. The natives of Africa are another example. Just like the Indians they formed a primitive but strangely effective communication medium: the Tam – Tam drums. Signals send as sound waves through the air just gets the feedback the same way in a total interactive way. We can call it almost real – time communication. And in real – time communication interactivity has much more effect at a shorter period of time.

Obviously it is pretty hard to draw a line of definition in interactivity. But the perspective leads us to media and we have to limit the subject with it. Hereby the history

of interactivity in means of communication is walking together with art in many times. Oguzhan Özcan, claims in his book *İnteraktif Media Tasarımında Temel Adımlar,* that the main idea of interactivity in media lies in the ancient shadow plays.

Shadow plays appear to have found by the ancient Chinese. At night when indoor was illuminated the shadows of the people inside was reflecting on the window curtains which later became a way of entertainment for the audience. Also the arts of ombromanie and shadowgraphy was spread across Europe. In this art, the artist was using his hands and fingers to perform in front of a light source.

Today shadow play can be seen in various cultures such as Turks, Indonesians, Malaysians, Thais and some Europeans. Shadow play is just as interactive as theater plays and even more. For instance in ombromanie, while the artist is performoning in front of the audience, any person could take a role in the play, which is a great proof of interactivity (Özcan, 2003: 21).

Although it is relatively easy to specify different interactive structures used in new media objects, it is much more difficult to deal theoretically with users' experiences of these structures. This aspect of interactivity remains one of the most difficult theoretical questions raised by new media. Without pretending to have a complete answer,wewould like to address some aspects of the question here.

All classical, and even moreso modern, art is "interactive" in a number of ways. Ellipses in literary narration, missing details of objects in visual art, and other representational "shortcuts" require the user to fill in missing information. Theater and painting also rely on techniques of staging and composition to orchestrate the viewer's attention over time, requiring her to focus on different parts of the display. With sculpture and architecture, the viewer has to move her whole body to experience the spatial structure.

Modern media and art pushed each of these techniques further, placing new cognitive and physical demands on the viewer. Beginning in the 1920s, new narrative techniques such as film montage forced audiences to bridge quickly the mental gaps between unrelated images. Film cinematography actively guided the viewer to switch from one part of a frame to another (Helfand, 2001: 119). The new representational style

of semi-abstraction, which along with photography became the "international style" of modern visual culture, required the viewer to reconstruct represented objects from a bare minimum — a contour, a few patches of color, shadows cast by the objects not represented directly. Finally, in the 1960s, continuing where Futurism and Dada left off, new forms of art such as happenings, performance, and installation turned art explicitly participational — a transformation that, according to some new media theorists, prepared the ground for the interactive computer installations that appeared in the 1980s (Manovich, 2002: 57).

Here are some examples of interactive media works of a near past:

- *The French Novel:* Originally published in 1950 a French novel was one of the first interactive works in the concept we do use the term right now. The novel consisted of chapters that were written on single pages and then placed in a box. The reader was free to choose randomly and read the novel.
- *Six Characters in Search of an Author:* This is the first know contemporary theater play performed completely interactive in 1922. The audience had the chance to take a part of the play and act in it.
- *Blue Moon:* This is a movie direct by a Thai director called Ko-I-Chen in 1998. The movie operator could change the places of the sequences and playback it in any form. Thus the movie had a different sequence every time.
- *Three Colors; White, Blue, Red:* Directed by Krzysztof Kieslowski, the trilogy contained feedbacks in the scenario. For instance an old woman walking on the street seen on *White* could be seen closing to a recycle bin on *Blue* and throw empty bottles in the bin in *Red*. When the movies are being watched continuously, the audience can track down the sequences, join them and watch a fourth movie in the trilogy. This can be called as an interactive watching (Özcan, 2003: 18).

4.1.2 The Aim of Interactivity: Reaching Information

The aim for interactivity in new media is obviously the need of user involvement. This is an extension of the need for reaching information quick and accurately.

It is the age of information we are living in and the new information technologies changed the global information infrastructure and influenced the style of life and professional methods of communicators. There appeared great changes in speed, geography and quality of production and transmission. The power of hi-tech features penetrated also into the virtual and verbal text models (Aydın, 1999).

The communication media, which establish the Information Bridge between different societies of social and cultural structures, gain new form and context every day (Aydın, 1998). Thus the need of reaching information gets both important and difficult.

The age of information is based on building societies by producing and using information efficiently as it was never used before (Webster, 2002: 8). Nowadays it is obvious that the new media is full with information. Most of them are open sources and they wait for the user to reach them.

The new media gives the opportunity to the user both to find information and also submit it on the same directory. That means the receiver can quickly turn in to a source. At this point we can claim the source / receiver to be the receiver / source at the same time.

Thus an information explosion is on stage. All kinds of information can be reached and also submitted via new media technologies. Once it was important to find the information. Now it is important to reach the necessary information indeed.

The new media needs to form interactivity in order to show the right paths for the user to find this information. Former communication models provide the user a feedback channel, which is not enough anymore. The user needs to cut the transmission whenever he needs to in order to reach information as soon as possible in the most accurate way. Thus interactivity takes an important role to give this freedom to the user.

The user has the opportunity to manipulate the message into his needs. Interactivity allows the user to interact with the source / sources as long as he wants to.

That means the receiver is not bound to the source until the transmission is finished. Hypermedia structures are designed according to this mentality. Thus it is clear that the aim of interactivity is to help the user to reach the desired information; accurately and quickly.

4.1.3 Cybernetics

Cybernetics is the theory of man – machine control and communications. The specific interest area of this theory is the comparison of human and mechanical working systems and understanding of the functions of this system (Aydın, 1999: 138).

The term itself was used first in 1947 by Norbert Wiener to name a discipline apart from, such established disciplines as electrical engineering, mathematics, biology, neurophysiology, anthropology, and psychology. Wiener, Arturo Rosenblueth and Julian Bigelow needed a new word to refer to their new concept, and they adapted a Greek word meaning "steersman" to invoke the rich interaction of goals, predictions, actions, feedback and response in systems of all kinds.

Not going deeper into the roots it is wise to discuss the role of cybernetics in interactivity. The new media interactivity is based on the interactivity between the computer and the user. Briefly, cybernetics studies the communication between human and non – human. The existence of this idea and theories were important to understand the nature of the interaction between human and machines. Of course cybernetics is important but not enough to explain the situation of today. Thus another important study area was found.

4.1.4 Human – Computer Interaction

As a extension of cybernetics, human – computer interaction is very important for the new media. Information and interface design are very important subjects and they

become essential for a new media designer as high skills. Obviously what ever is designed needs to be introduced to the user in the most efficient way.

"Human-computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them" (Hewett et al., 1996: 5).

Human-computer interaction arose as a field from roots in computer graphics, operating systems, human factors, ergonomics, industrial engineering, and the systems part of computer science. Computer graphics was born from the use of CRT and pen devices very early in the history of computers. This led to the development of several human-computer interaction techniques. Many techniques start from Sutherland's Sketchpad Ph.D. thesis (1963) that essentially marked the beginning of computer graphics as a discipline. Computer graphics has a natural interest in HCI as "interactive graphics".

In his article called Sketchpad (1963), Sutherland introduces his system as the following:

> *"The Sketchpad system makes it possible for a man and a computer to converse rapidly thorugh the medium of line drawings. Heretofore, most interaction between man and computers has been slowed down by the need to reduce all communication to written statements that can be typed; in the past, we have been writing letters to rather than conferring with our computers. For many types of communication, such as describing the shape of a mechanical part or the connections of an electrical curciut, typed statements can prove cumbersome. The Sketchpad system, by eliminating thped statements (except for legends) in favour of line drawings, opens up a new area of man – machine communication."* (Fruin and Montfort, 2003: 111)

Today the basic interactions in human – computer interaction is defined as (Myers, 1998: 44 – 54):

- Direct manipulation of graphical objects
- The Mouse and pads

- Operating Systems

Besides these basic interactions there are application types defined as well:

- Drawing Programs
- Text Editing
- Spreadsheets
- Hypertext
- Computer Aided Design (CAD)
- Video Games

Finally the upcoming areas of human – computer interaction can be listed as the following:

- Gesture Recognition
- Multimedia
- 3D
- Virtual Reality
- Computer Supported Cooperative Work
- Natural Language and Speech

Thus it can clearly be seen that human – communication interaction and the related activities / studies it brings make a certain approach on new media as a very effective tool and area.

4.2 From MULTIMEDIA to HYPERMEDIA

Multimedia is known popularly as the convergence of text, images (stills and video) and sound (audio). As a matter of fact produced by computers or digitized, it does not matter, as long as these media conform together in the eras medium it is multimedia.

As mentioned before cinema had these properties as well. But the factor of making the media new is the concept of interactivity.

Today we cannot think of a computer that does not serve as a tool of interaction. Actually it is not wise to think like that either. Because as in its nature, once an object is represented in a computer, it automatically becomes interactive (Manovich, 2001: 55). Whenever we stand in front of a computer screen we look for an icon or text to "click".

The structure of much interactive multimedia is based on both technical and theoretical work on hypertext. Hypertext is an interactive text that lets readers add their own comments and follow different pathways (Spalter, 1999: 372). Theodor Nelson felt that traditional methods of writing ignore the way the mind really worked, which is by association and linking. He proposed the term *hypertext* in the 1960s, and said that; "*Hypertext is non-sequential writing. It is no good to use, though, unless we can go instantly in a choice of directions from a given point. This of course can only mean on computer display screens*".

In his article he introduces hypertext as this (1965):

> "....
> *Let me introduce the word "hypertext" to mean a body of written or pictorial material interconnected in such a complex way that it could not conveniently be presented or represented on paper. It may contain summaries, or maps of its contents and their interrelations; it may contain annotations, additions and footnotes from scholars who have examined it. Let me suggest that such an object and system, properly designed and administered, could have great potential for education, increasing the student's range of choices, his sense of freedom, his motivation, and his intellectual grasp. Such a system could grow indefinitely, gradually including more and more of the world's written knowledge.*
> ...."(Fruin and Montfort, 2003: 144)

The concept had been envisioned in 1945 when Vannevar Bush (a noted scientist and President Roosevelt's science advisor) published his seminal article "As We May Think" in the *Atlantic Monthly* (it was subsequently reprinted in *Life).* This piece influenced a generation of researchers in both the sciences and the humanities. However, hypertext's conceptual history goes back even farther: to footnotes, indices, tables of contents, and annotation in general.

Bush proposed a machine that he called a *Memex* that would assist the mind in dealing with what we now call "information overload." In "As We May Think" (1945), he wrote, "*The summation of human experience is being expanded at a prodigious rate, and the means we use for threading through the consequent maze to the momentarily important item is the same as was used in the days of square-rigged ships*" (Fruin and Montfort, 2003: 144) conceived the Memex to be a mechanical, microfilm-based, desk-like device that not only could take in and store information for easy retrieval, but would let the user

- Create associative links between texts,
- Form a web of trails through large quantities of material,
- Save these trails for use by the same reader, or others, and
- Record personal comments about the original texts; these additions would in turn be recorded and could be interlinked.

In the 1960s, Douglas Engelbart, working at the Stanford Research Institute, built a fully hypertextual system called Augment / NLS that he considered not only a technical feat but a social one — a new way of working with information that would "augment the human intellect." A large public demonstration of the Augment / NLS system in 1968 showed hypertext in action, as well as fully operational remote computing, telecollaboration, and the first appearance of a device Engelbart called a "mouse." This demonstration influenced many young researchers in computer science, including Theodor Nelson and Andries van Dam, whose pioneering work together in hypertext at Brown University had started in the early 1960s. (Spalter, 1999: 373).

Bush introduced the now common terms *link, associative linking, web,* and *trail to* describe the Memex. Barthes discussed literature in terms of *links, nodes, networks, lexia* (blocks of text), and *paths.* Thus hypertext research has merged theoretical and technical areas.

As with many other forms of computer technology, hypertext tools were available for decades only on expensive workstations. Not until T987, with Apple's free interactive design tool called HyperCard, did hypertext became familiar to the average computer user. HyperCard allowed even nonprogrammers to set up links among text, images, and sounds.

Bush said in 1945 "*the world has arrived at an age of cheap complex devices of great reliability; and something is bound to come of it*". Taking the words *cheap* and *reliability* with a grain of salt, artists working today with complex interactive multimedia programs realize how far-sighted his vision was (Fruin and Montfort, 2003: 48).

In the 1970s and early 1980s, creating interactive artwork required programming skills; today, most interactive authoring tools offer ways for nonprogrammers to develop different and interesting works. However, interactivity is still a "large" term. It is used to identify the simple-minded menu-choosing activity offered on an ATM machine and the more interaction made possible by, 3D physically based model statement and artificial intelligence. Computer-based interaction holds potential for almost any type of multimedia production. The reason for that is interactivity involves the user; it is a cornerstone of education and training software. Artists and designers can draw ideas from its today's uses in fields such as marketing and promotion, education, home banking, and video games.

4.2.1 The Innovations of Hypermedia

There are five main reasons why hypermedia is a radically new communications medium. Firstly it is a digital medium that can exploit all the opportunities offered by the powerful combination of computers and telecommunication technologies. Secondly, it is interactive, requiring active contributions from its users in order to function. Thirdly, it is non-linear with no beginning, middle or end. Fourthly, it employs multiple media that can be brought together in a variety of different combinations. And finally, the same technology that is used to experience the medium can be used to create it.

It is this combination of features that makes hypermedia a new medium unlike any other. Of course there are aspects of the medium that are similar to previous media. Many commentators have pointed out that books are often used in a random access, non-linear manner. Film, television and video can use combinations of multiple media in different ways. And, as we have discussed in an earlier section, many of the

ideas and concepts underlying hypermedia as a creative medium can be seen as extensions of the experiments of twentieth-century avant-garde arts. Nevertheless, while there are clearly links with earlier media, hypermedia is also moving out into uncharted territory where there are no obvious precedents or landmarks to guide us.

The explosive and surprising development of the World Wide Web served as more than a signal that hypermedia was moving into a period of very rapid development and innovation; it also marked a significant shift in the way people were thinking about the medium.

In the late 80s and early 90s the predominant model of the medium and its future was based on publishing. This was partially due to the influence of commercial interests. Many publishers saw the medium as an opportunity to repackage material that they already owned. Many computer and electronics companies saw this medium as an opportunity to sell new equipment, which could play this repackaged product. However, commercial interests are only part of the explanation. Equally significant is what Marshall McLuhan called "looking at the future as though through a rear-view mirror". Most people involved in working in the medium were, as McLuhan would have predicted, seeing it in similar terms to "the horseless carriage" - only their version was "the electronic book" or "the interactive movie".

The advent of the World Wide Web was a powerful reminder and demonstration of an older and, curiously, more forward-looking tradition. While the idea of publishing did feature within that tradition, the idea of using hypermedia as a means of communication between people, rather than simply communicating to people, was much stronger. The coming of the Web reaffirmed the concept of hypermedia as a communication medium more like writing or the telephone rather than just a publishing medium like the book, or film or television.

The idea of the intranet (a private internal network within an organization or company, using Internet and Web technology), which grew out of the success of the World Wide Web, revived another part of that older tradition. Some organizations have been developing their intranets to promote the exchange of ideas and knowledge, or as Douglas Engelbart put it, "to augment the human intellect". In other words, they are attempting to use hypermedia to improve their collective thinking.

So as we enter the more dynamic and expansive phase of hypermedia development, we can see three main focuses of activity: publishing, communication and thinking. In the following pages we will discuss each of these in more detail. But before we do so. it is worth reflecting on one further point.

Hypermedia is a product of information technology (IT) - which can crudely be defined as computers plus telecommunications. This technology has already radically transformed our world and will continue to do so for some time to come. Hs use has meant that many things are done In new ways. Labour has been replaced. Work has often become more abstract. The world has become more connected. Decisions have to be made faster. The pace of change seems to be constantly accelerating. Patterns of work and living are changed and disrupted. While there are many clear benefits from our use of IT, there have also been human costs. Change can be painful.

Hypermedia may go some way in helping to mitigate some of the more negative aspects of the IT revolution by giving it a more human face and by helping us to communicate and think more effectively. But. the increasing use of hypermedia is also going to be disruptive. By enabling us to communicate and interact with one another in new ways, it will inevitably change many of our patterns of living, working and playing. Creating and learning how to use this new medium is an exciting prospect, but that excitement should be tempered by the hope that we can learn to use it wisely and well

4.2.2 Interface

Until the 19th century, very few humans had to learn how to operate a machine any more complex than a winch, but since the invention of the telegraph, typewriters, cars, and later the radio, television, washing machines, video cassette players and the like, most of us have experienced the act of "interfacing" with (sometimes very complex) equipment. Interfacing means being able to control machines by communicating with them, and receiving feedback from them (Cotton and Oliver, 2000: 58). Watching the speedometer on a car dashboard and easing up on the throttle or choosing the correct washing machine program, are good examples. We are used to

turning knobs, pushing buttons and switching switches, following directional arrows, stopping at red lights or changing gear, so it is natural that metaphors of all these familiar varieties of interface are used in hypermedia. We can control volume as well by turning knobs, as by pulling a slider up or down, whether the knob is real ("hard") or virtual ("soft"). The video cassette control-pane buttons for "play" (an arrow pointing from left to right), "fast forward", "stop" and so on, have frequently been adopted to create "friendly" control devices for hypermedia.

These metaphors, or "user illusions", are embodied as still and animated graphics on the monitor screen, and provide the user with a control panel or "console" through which the program can be controlled. Interface design does not just concern the look of the control panel; it also encompasses the ergonomics of the user's control of the program. If, for instance, the "navigational" controls for the program are placed together in one part of the screen, the user can easily select between them without having to make unreasonable physical efforts. Consistency is another crucial element in creating an interface that is easy to learn and easy to use. Both the physical position of controls on the screen and the results of activating them should remain the same.

There is a variety of ways in which these control devices and the interface metaphors can be extended to accommodate the idea of "navigating" around a hypermedia program. For example, arrows may be clicked on to indicate the direction the user wishes to take from street to street in a surrogate travel program. Or the user might click on a location in a street map and the screen would display the view from this location. The console metaphor is extended still further in arcade flight and driving simulators, where the dashboard controls and steering wheel, or even the entire cockpit, are available to bolster the relevant illusion.

Currently, most hypermedia control devices are presented as "soft" tools on screen, and supplemented by some general-purpose pointing device such as a mouse or infrared controller. An increasing variety of interface technologies are becoming available, however, each one gradually extending the physical possibilities of interaction with computer systems and the range of human senses that are engaged in the hypermedia experience. These hardware devices include digit pads, touch screen

monitors, data gloves, eye phones and complete data suits. These use a variety of "gesture-sensitive", telematic, force-feedback, eyeball-tracking and position-sensing devices to foster a one-to-one relationship between man and machine (Cotton and Oliver, 2000: 59).

Interface design is one of the most subtle and demanding aspects of hypermedia design. A successful interface effectively becomes invisible, allowing the user to become immersed in whatever task they are involved in - whether it be playing a game, buying shares, communicating with colleagues or looking for information. An unsuccessful design, on the other hand, intrudes on the task in hand, forcing the user to focus on trying to understand how the system works rather than on what they are actually trying to accomplish. Navigational buttons that appear in different places on different screens, because "they look better that way", or controls that behave in different ways in different contexts without any clear user logic, are all-too-frequent examples of a failure to understand the basic rules of interface design.

The irony is that when all three elements have been fully taken into account, the interface effectively disappears from the awareness of the user. This, perhaps, is the tragedy of the interface designer: the more successful the designer, the less the user will be noticed.

4.2.3 Text and Hypertext

Hypermedia is still predominately a text-based medium. As the medium develops, the balance between the different media elements is likely to change, with images, sound, animation and video taking on a greater prominence and text becoming a less dominant -though still important - element in the media matrix. But for the moment, text is still the major vehicle for communicating ideas, information and emotion within the medium. There are a number of reasons for this, some of them technical and some of them historical.

Technically, text currently enjoys a number of advantages over the other media types that can be used in hypermedia. It is very compact. Anyone who has waited

seconds or even minutes for an image to download on the World Wide Web will recognize its comparative advantage. Several thousand words of text can be stored in the same space it takes to store a single image. Similarly, a couple of spoken sentences can take up more space than many pages of text.

Text is more than just compact; it is also something with which computers can do amazing things. Text can be searched, sorted and manipulated by computer programs in ways that are simply not yet possible with other media types. To take but one example, a search engine such as Alta Vista or Google can search for a word or phrase in all the text in several million documents on the Web and within seconds return a list of all the documents containing that word or phrase. One can do something very similar with images using Alta Vista, but with one very big exception: Alta Vista does not actually search for images; rather, it looks for the textual tags that identify images. This is true for any search engine or database. While many databases can now contain many different media types, the searching and sorting takes place using their text identifiers not the objects themselves

So, technically, it is true to say that text will continue to enjoy a number of advantages over other media types for the foreseeable future. However, the predominance of text is not simply technical, it is also historical. The roots of much of the material on the World Wide Web and in many CD-ROMs lie in work originally intended to appear in print. Thinking of digital media as an electronic printing press is a habit that we still have to break. However, there is another tradition, which may be more fruitful in encouraging an approach to writing that is more appropriate for the medium. One of the most popular and long standing uses of the Internet is e-mail. E-mail is a subject worthy of a book to itself. It seems to encourage a spontaneous style of writing that is often surprisingly revealing about the characters and personalities of its authors. Something of the informal, participatory style of writing associated with e-mail seems to have spilled over into some of the best writing on the Web. Such writing invites dialogue and comment, the author becomes someone speaking to his/her peers, rather than the voice of authority engaged in a monologue.

Writing for hypermedia is still an art that is in the process of being invented. It is also an art that is complicated, like so much in hypermedia, by a kind of generational split. This is perhaps more accurately described as a split between those who are media literate and those who are not. As a crude generalization, people can be divided into those for whom TV and computer games are a taken-for-granted part of everyday life, and those who still see them as new media that are trivial in comparison to print.

For the media literate, hypertext (where clicking on a word or phrase takes you to another related piece of text) may seem little different and a great deal more comprehensible than flicking between channels on cable television. For those more steeped in the literary tradition, a textual link that behaves in the same way as a reference to a footnote or an entry in an index or contents page may be just about acceptable, but some of the wilder reaches of hypertext will simply be incomprehensible.

Writing for hypermedia, then, makes knowledge of the audience being targeted even more important than it already is in print. One needs to know whether the audience is going to need to be gently introduced to the medium or whether it will find such an approach patronizing. It is also a medium that makes its own demands in terms of what does and does not work. Unfortunately, the rules of thumb for determining the requirements of those demands are still not clear. No sooner does one seem to become clear than experience seems to contradict it. For example, it would seem obvious that text should be written in screen-sized chunks rather than forcing the user to scroll through a long piece of it, however, it does not always seem to work that way. Clicking through a series of text-chunks can often seem like a discontinuous process, where the thread of sense gets lost in the mechanics of moving through the text, whereas the ability to move up and down a piece of text can feel more natural. As yet, however, there seems to be one firm rule - it all depends on what you are trying to do and how you do it.

Like so much in hypermedia writing, text or hypertext needs to be approached with a degree of humility, a willingness to learn and an openness to experiment. Above all, the opportunity for instant feedback from readers offered by the Web is something anyone

writing for this new medium should seize willingly and gratefully as a priceless advantage in learning their craft.

4.2.4 Image and Audio

Images are used in a multiplicity of ways: to entice, inform, appeal, communicate and enrich. They can excite passions, express feelings, communicate ideas, explain complex relationships, become objects of aesthetic pleasure, meditation and contemplation, and even tell stories.

In hypermedia, images can be used in all these ways, and they can also be linked together with text and other images in order to create new kinds of relationships that can be explored interactively by the user. Just as a film poster, a stained glass window or a painting can tell us a "story" in an iconic, "all-at-once", non-linear way, so images in hypermedia programs can be devices for providing a variety of different ways of looking at a particular subject or theme.

Innovative hypermedia designers use a variety of such image-based techniques to offer the user a choice of approaches to the information content of the program. These range from pictorial menus and catalogues through interactive illustrations and diagrams, to providing sets of image creation, manipulation and processing tools. Still images can be programmed to gradually reveal themselves in whole or in part according to the user's actions; the image, or components of the image, can be linked to text, diagrams or other images, or to animations, video or audio sequences; or the user can create an image by finding and juxtaposing a set of component parts just as a jigsaw puzzle, a montage or a collage is assembled.

It was Sergei Eisenstein who identified "montage" as a basic principle used by all artists in the exposition of a theme, pointing out that when two images (or sequences of images) are placed together they inevitably combine "to create a new concept, a new quality, arising out of that juxtaposition" (Cotton and Oliver, 2000: 65). In other words, the act of perceiving two or more images (or sounds, or words) in juxtaposition is in itself "interactive": it is the observer who is creating the "new concept" in the

space "between" the different stimuli. In hypermedia, artists and designers have a communications tool that offers a multiplicity of means by which this principle may be applied. From simple sequences of still images (effectively a digital slide show) through the visual kaleidoscopes of multi-image screens, to the complex matting and collage of images within other images, all these techniques can be put under the direct control of the user, so that physical interaction can supplement the "perceptual" interaction of montage. In this way the user gains access to a wide variety of means with which to approach the subject matter. It becomes possible for users to "browse" through these approaches, select the most appropriate, and "fine tune" them in order to optimize their own understanding.

As hypermedia develops, the use of images to communicate, to inform, to arouse emotion and to develop arguments is likely to become ever more sophisticated. The generations who have known television all their lives are generally more visually aware than their text-dominated elders. They are used to reading images as being more than simply illustrations of what has been spoken or written. As time goes on, images are going to become an increasingly important carrier of meaning in what is now largely a text-dominated medium. Watching this transition will be one of the more fascinating aspects of looking at hypermedia's development over the next few years.

Besides image, sound is a very powerful element in the media matrix, rarely fully exploited until recently. In part, this is due to technical reasons. Sound is memory-hungry and limitations on the amount of memory available to the hypermedia designer meant that often it was used sparingly, if at all. But, equally importantly, perhaps our sense of hearing is surprisingly complex. Learning how to use sound effectively in this new context presents a number of challenges to the design team.

There are three aspects to sound that need to be considered very carefully in relation to hypermedia. Firstly, sound seems to engage our emotions and imagination in a particularly powerful way, but how we use this in hypermedia is less obvious than in a medium such as film. Secondly, our hearing is a strongly connective sense: it is hard to hear many sounds without evoking other senses, particularly sight. Finally, although

sound can be thought of as a time-based medium, similar to full motion video and animation; it can also work as a single event in time.

Sound carries a surprisingly high "information load". As an experiment to demonstrate this, try watching a film with the sound turned right down. Then turn up the sound and stop looking at the screen. What you are likely to find is that with the sound turned down the images you see become emotionally more distant, the experience more detached. On the other hand, simply listening to the soundtrack you are likely to find yourself picturing the action in your mind and becoming more emotionally involved.

Playing a computer game with the sound turned off can experience a similar effect. Indeed, here the effects can be more pronounced, because not only does the sense of involvement diminish, but also without aural feedback the game can become more difficult to play.

So sound can play a number of different, but related roles in a hypermedia program or environment.

It can generate an inclusive space that creates a greater sense of involvement with all the other media elements for the user. This may be achieved by the use of music, sound effects and voice-overs. It can provide confirmatory feedback for the user by signaling the effects of an action, for example an aural "click" when clicking a check box with a mouse. It can provide information, help and instruction about how to use a hypermedia media program. In fact, it can be used in a multitude of different ways, many of which have barely begun to be explored.

As the medium develops, sound is likely to take over the role of text as one of the primary carriers of argument, opinion and information. Already on the Web many interviews and speeches are only available as recordings. At the moment this is largely because recording is quicker and easier than transcribing them, but the practice is likely to grow as it is recognized that the "TV generation" has become used to gathering information through hearing and seeing, rather than reading. The great advantage that hypermedia presents is that some of the tactics, which we use to read critically and analytically, can be applied to what we hear. For example, we can very easily repeat sections that are not clear, and can move around speech in a very similar way to how we

move around text, comparing one section with another. The added advantage is that we can also hear the tone of voice, intonation, pace and rhythm, which can further clarify and illuminate what, is being said.

Every media element within hypermedia presents intriguing possibilities for development. But the issue of how we use sound may be one of the most important factors in making hypermedia a truly distinctive medium, with unique characteristics and qualities. From Vannevar Bush onwards, one of hypermedia's primary metaphors up to now has been print. As we learn to use sound more intelligently and more effectively this metaphor may break down. Already many of the other metaphors we use to describe the experience of using hypermedia are spatial. The increasing use of sound to create a sense of an inclusive space, where we are within the experience rather than simply observing, may be a crucial element in establishing the new, more fruitful, spatial metaphors that the medium demands

4.2.5 Animation and Video

Animation is the media element that can most easily express the dynamic nature of hypermedia. In some forms of hypermedia, such as computer games, animation (whether in two or three dimensions) may be the predominant type. In other forms of hypermedia its use may be subtler, quietly providing a dynamic element in what otherwise might be perceived as a series of static events. There are several ways in which animation can be used in hypermedia programs. These include: animation bites", short sequences of full - part screen linear animation that illustrate or processes and are progressively or automatically played in response to the user's interaction; longer sequences in which the user has to make branching choices; as attention-I devices for expressive or decorative transitional effects; feedback to the user; and “autoplay" or "default" devices that activate le user is not interacting with the rime.

Animation bites are used wherever the special informational, explanatory or expressive qualities animation are required, such as in the illustrations of systems and processes that are too mall, fast or slow to be perceived, or that can best be apprehended

in abstract form (like plant or cell growth, manufacturing processes, the workings of an internal combustion engine, and so on). Animations may be linked together in longer sequences, so that an overall animation of the circulation of blood in a human body may serve as a menu through which progressively more detailed animations of the workings of the heart, lungs and kidneys, for example, may be viewed.

Animations can be effective attention-grabbers within an otherwise static information frame or menu. They can take the form of small, looped animations that act as "self advertising" buttons; as animated typography and graphics in a title sequence, dynamic headline or subtitle; as instructional or help messages explaining a diagram or a software tool; or to draw the user's attention to program sections that have not been accessed.

Animations can also be used as mood setters, providing abstract, pictorial or expressive accompaniments to music tracks, monologues or sound effects. Looped animations, fractal generators (computer programs that produce intricate graphic displays), color lookup table animations (where a still image is "animated" by progressively altering its component colors) and animations derived from mathematical formulae and random number generation (such as the "screen savers" used on personal computers) can all be used to create mood. Transitional effects include digital versions of those developed by film and video-makers (dissolves, wipes, cuts, flash pans and the like) as well as various familiar televisual effects, such as zooms, tumbles, peel offs, wraps and pop-ups, and the multi-screen effects derived from PC graphical user interfaces and digital video paint boxes.

Transitional effects are often a form of feedback-they let users know that the system is responding to a command. Most hypermedia programs involve some sort of information hierarchy. The user will have to select the required section, then the sub-section and eventually the frame that is of interest. This frame may link to other frames in other parts of the program. The transitional effects that signal these frame changes can provide important feedback to the user, signaling which level of the program they are currently on, and giving the user a sense of "place" within the program. Another situation in which simple animations can give important feedback to the user is the

"wait state" - where the action taken by the user cannot be performed within the time it takes for the system to display a new screen. The conventions here are a ticking clock, emptying egg timer, moving bar chart, flashing "alert" icon, animated cursor or highlight changing color.

Animation can also play an important role when the user chooses not to interact, or, in the case of a public kiosk for instance, when there is no one there with whom to interact. In such a situation the program could just sit there displaying the frame where the user left off, but there are advantages in designing a "default" or "autoplay" condition - where a specific animation is looped as a "trailer" or attractor for the program should no user-interaction have taken place for some minutes. This default condition can be driven by a program that selects parts of the hypermedia program at random - providing an ever-changing montage of features, or more simply a set of slow lap dissolves between graphic frames, or even a specially designed screen saver.

Animation has featured widely in hypermedia ever since the authoring package HyperCard was bundled with Macintosh computers in the early 80s. Like so much else in the medium, designers are still learning how to employ it to best effect in this new context. It will, of course be used in many different ways, to communicate many different things. But perhaps one of its most interesting uses, as hypermedia programs and environments get larger and more complex, will be to aid users in knowing where they are, where they have been and where they could go. Just as film and television have established a set of conventions and effects to help their audience locate themselves in the action, animation may provide a similar set of conventions and effects to help users locate themselves in hyperspace.

Video has featured in hypermedia right from the beginning. Indeed, it was the key media element in MIT's "Aspen Movie Map", designed in 1978, which many consider to be the first real example of hypermedia. However, there are problems with the successful integration of video into hypermedia programs. Video, like sound, is a time-based medium and there is a difficulty in combining linear, time-based media into the random access (non-linear) structure of hypermedia programs.

Andy Lapping, who directed the "Aspen Movie Map", highlighted the central problem (Cotton and Oliver, 2000: 84):

> *"Look at the Movie Map ... You can: continue, back up, change your view, change the season, or talk to any of ten buildings - there are fifteen different things that you can do at any instant ... Now, if I made you wait until the end of the block - you couldn't touch the buildings, all you could do was control the direction you drive ...okay? Then it's not interactive, it's selective, because you made the decision to go down that street, and having made that decision there is no productive thing you can do until the end of it, until it's your turn again."*

Curiously, the lessons of the "Aspen Movie Map" have often been ignored in the subsequent uses of this media element in hypermedia programs. Too often, time-based media elements such as full motion video, animation and sound become interruptions in the flow of moving through a program. A difference between hypermedia and other time-based media is the user's sense of some control over the pace and direction of the material presented. Even a relatively short video sequence that does not offer the user some means of taking control, if only to stop and get out of it, can seem startlingly oppressive. While undoubtedly, full motion video is going to be an important component in the media matrix, learning how to integrate it within the context of hypermedia programs and environments is going to require considerable experiment and practice.

It is only in recent years that full motion video has become a realistic option in hypermedia. Initially, it called for hybrid technologies with the computer controlling a video disc (an analog medium) or in some cases a video player. The relative expense and complication of this hybrid technology limited the contexts in which it could be used. It was really only in the early 90s with the introduction of digital systems to compress and play videos directly on PCs (such as Intel's DVI and Apple's QuickTime) that the use of full motion video in hypermedia programs became a reality. Even then, the size and quality of what could be shown was relatively limited, with only small sections of the screen available for display and the motion itself being often jerky and crude.

The adoption of DVD (digital video disc) will be the next leap forward. DVD has several times the storage capacity of CD-ROM, and has been designed from its inception to carry full-length movies, making the use of full motion video in hypermedia programs a more compelling design issue. DVD is currently being largely promoted as an alternative to videotape for distributing movies. But the combination of the continuing improvements in compression techniques and the massive increase in the storage capacity of this technology makes it a very attractive vehicle for hypermedia designers who have found the storage capacities of CD-ROMs restrictive, particularly in relation to full motion video. Freed from some of these technical restraints we may find that, at last, the potential of full motion video can find its proper place as an engaging interactive component within the media matrix of hypermedia.

4.3 THE USER

The user is the key element in new media. The usage of the term user is actually on purpose. The idea to call the person standing on the other side of the line as the receiver is actually becoming history. The real – time action in media that is mentioned above simply makes the receiver more than a "receiver"

Many times we tried to define the receiver and through this mission it became clear that the receiver was able to become the source in many conditions. For instance while the person, the receiver, is looking for information on the Internet, he could become the source at once. This is possible via website forums.

Today many websites use receivers as sources. A good example for that is the Rock music portal Turkrock.com. In this portal people are able to find many rock music news, critics, events, shows, etc. While you are navigating through the website you can get a member of the website and submit reviews, news, shows, etc. These submissions are not only held in interactive forums but also on the flash news section on the index page. Besides text you can submit hyperlinks, sound clips, images and much more. In other words the portal gives you the chance to submit ideas on the main page. Thus the ideas do not get lost in forums but get the importance of a magazine-first-page.

From this perspective we can claim that the receiver becomes the source again. This mission change occurs in various kinds. But the consequence leads to the point that the receiver is more than just a receiver. That's the reason why the term "user" is more suitable for the new media people.

4.3.1 Freedom of Selection

The instance mentioned above is a fine definition of freedom that new media provides for the user. Not only acting both as the receiver and source, the user has many opportunities to choose.

As we are aware of the properties of the new media we can clearly see that interactivity just offers many selections for the user. The user feels free to search for any kind of information, click any link, download any image, and watch any animation or video. Hereby the source is always depending on the user, which can only be defined as a property of the new media. Lets consider some examples in order to compare the new and old media from the view of the user.

The newspapers are everyday use medium. As a case study we could examine the newspapers and tell that it seems like an interactive medium. Usually when you read the first page of the newspaper, the story continues on another page. The last sentence of the paragraph of the story tells the reader on which page the story has the details. So the reader turns on to that page and keeps on reading the story. This seems not very different than the hyperlink concept. But hereby we cannot tell that classic newspapers are new media. In means of a production of the computer, as a desktop publishing tool, the newspaper is of course a part of the new media. But the concept is not.

New media is non – linear. That means it has no beginning and no ending. The user can start from anywhere and leave anytime. The newspapers seem to have a non – linear structure. Just like you can begin on any page to read, or from any news you would like to. But the truth is that the newspaper is limited with the page numbers and the information is stuck in those pages. It has the borders and it is not possible to exceed these limits.

Contrary the new media has no limits. This may seem hard to believe at the first sight. But if you think that there are countless computers on this planet and the Internet is a global transmission medium the idea gets clearer. On the other hand everybody is able to submit information on this global server as discussed before. This can happen anywhere anytime. So it is rather the ideas that have limits than the physical ware.

Thus the user has an enormous freedom of selection. He does not have to limit his ideas with the sole given information. Comparison is an open source ideal. Though Lev Manovich claims that interactive media ask us to identify with someone else's mental structure, we disagree. He says;

"...

What before had been a mental process, a uniquely individual state, now became part of the public sphere. Unobservable and interior processes and representations were taken out of individual heads and placed outside as drawings, photographs, and other visual forms. Now they could be discussed in public, employed in teaching and propaganda, standardized, and mass distributed. What was private became public. What was unique became mass-produced. What was hidden in an individual's mind became shared.

Interactive computer media perfectly fits this trend to externalize and objectify the mind's operations. The very principle of hyperlinking, which forms the basis of interactive media, objectifies the process of association, often taken to be central to human thinking. Mental processes of reflection, problem solving, recall, and association are externalized, equated with following a link, moving to a new page, choosing a new image, or a new scene. Before we would look at an image and mentally follow our own private associations to other images. Now interactive computer media asks us instead to click on an image in order to go to another image. Before, we would read a sentence of a story or a line of a poem and think of other lines, images, and memories. Now interactive media asks us to click on a highlighted sentence to go to another sentence. In short, we are asked to follow pre-programmed, objectively existing associations. Put differently, in what can be read as an updated version of French philosopher Louis Althusser's

concept of "interpellation" we are asked to mistake the structure of somebody else's mind for our own.

This is a new kind of identification appropriate for the information age of cognitive labor. The cultural technologies of an industrial society—cinema and fashion—asked us to identify with someone else's bodily image. Interactive media ask us to identify with someone else's mental structure. If the cinema viewer, male and female, lusted after and tried to emulate the body of the movie star, the computer user is asked to follow the mental trajectory of the new media designer."(Manovich, 2001: 60 – 61)

At the certain point of sharing ideas from individual to public is something we agree. But the point of mistaking our mind for somebody else's mind is not the main point. If we consider that media was always a tool of manipulation this idea would not be new. Contrary with the interactivity of the new media, the user has not inherited all the ideas of the source. He can choose where to start and stop. Thus the desired information can be reached more accurately. This is absolutely a new generation of user freedom.

4.3.2 Virtual Reality and Environment

Virtual Reality (VR) is the use of computers and other special hardware and software to generate a simulation of an alternate world. One world could be a place of learning. Another could consist of games and adventure. Yet another could simulate a workplace, and so on. A participant interacts with the simulation through his or her senses. Sight and sound are the senses that are typically engaged (Eddings, 1994: 3).

Today's VR hardware and software are hardly the final word in this sophisticated technology. In fact, the hardware and software evolve every few months. However, the principles that VR is based upon do not change; they are almost oppressed into our genetic code because they capitalize on our senses. If we examine how our brains integrate our entire range of sensory data, we can understand what VR hardware and

software seek to accomplish. Science fiction writers can make accurate projections of things to come largely because they extrapolate from these constant sensory processes.

There are several technological milestones that have been achieved within the last hundred years that have made VR possible. The telephone, radio, and TV; the evolution of semiconductors from diodes into transistors and integrated circuits; the development of integrated circuits into microprocessor chips and liquid crystal displays; the ongoing miniaturization of electronics; and the rapid evolution of computer power have all contributed to the development of VR technology. Early attempts at simulations, including the first flight simulator, the Sensorama arcade ride, 3-D movies, and video games were all precursors to today's VR simulations.

Virtual Reality leads to a certain point that we can call the Virtual Environment. Users enter to a space that is an alternative environment to reality. For instance video games are perfect examples to VR. The navigable spaces in 3D worlds in video games are milestones.

"Looking at the first decade of new media—the 1990s—one can point at a number of objects that exemplify new media's potential to give rise to genuinely original and historically unprecedented aesthetic forms. Among them, two stand out. Both are computer games. Both were published in the same year, 1993 - Each became a phenomenon whose popularity has extended beyond the hard-core gaming community, spilling into sequels, books, TV, films, fashion, and design. Together, they define the new field and its limits. These games are *Doom* (id Software, 1993) and *Myst* (Cyan, 1993)." (Manovich, 2001: 244)

Doom as is a first person shooter game. That means the track eye of the game character is the eye of the user. In other words the interface of the game simulates the user as the first person of the game. The user can only see his weapon on the screen side like he himself is carrying it. It is a fast paced game. The player is running through the corridors – the simulated environments – kill as many opponents as possible and move on to the other level. Lots of monsters and monster like creatures are ready to attack the player. One the desired number of dead monsters is reached the level ends. After a few levels the game comes to an end.

Myst, is an adventure game as in genre. Again the user is not able to see anything of the character. Not even any weapon in like Doom can be seen, either. The reason for that is that in Myst the player is not in need of killing someone. Time is not a challenge in Myst. The player dos not know how he came to this Island and there are no instructions how to get out from there. It is a literary world where books are in charge. The player needs to explore the environment in order to find puzzles to solve and to reveal secrets to understand why he is there. Myst does not have levels but it has worlds. Every world needs to be discovered and studied very carefully. Lots of books need to be read and possible the player needs to have a "real pen and paper" to note many things.

Doom and Myst have different navigation structures as well. Doom is an environment of 3D modeled structures and buildings. The navigation is real time on strait lines and marked angles. But Myst provides the player more freedom. The environments in Myst are highly beautiful. This provides the player to live through the "different worlds" atmosphere. He can navigate into all places step by step without any time or action limiting. Well-rendered 3D environments define the interface. But this interface is not like Doom. The player faces different sets of stills by clicking. Though stills are used very largely, some of them are "animated". Of course these animations are looping ones. Though the renders are highly realistic; shadows and lighting effects are detailed.

As another detail Myst has an original soundtrack. The music composed is a very important element that surrounds the player and pulls into the world. As there are no real time actions such in Doom, still the music keeps the adventure on a thrilling level.

Myst is a perfect convergence of multimedia and interactivity. The narration is perfect and graphics are emotionally deep. But the point that needs to be underlined is that Myst needs a full attention in every aspect of multimedia reality. That means the stills, animations, sounds, texts and level of interaction needs to be very well examined by the player in order to reveal the secrets. For instance many sounds lead to a solution in this game. If the player is not careful enough it will not be possible to solve the puzzles.

"Despite all these differences in cosmogony and game play, the two games are similar in one key respect. Both are spatial journeys. Navigation though 3-D space is an essential, if not the key, component of the game play. Doom and Myst present the user with a space to be traversed, to be mapped out by moving through it. Both begin by dropping the player somewhere in this space. Before reaching the end of the game narrative, the player must visit most of it, uncovering its geometry and topology, learning its logic and its secrets. In Doom and Myst—and in a great many other computer games—narrative and time itself are equated with movement through 3-D space, progression through rooms, levels, or words. In contrast to modern literature, theater, and cinema, which are built around psychological tensions between characters and movement in psychological space, these computer games return us to ancient forms of narrative in which the plot is driven by the spatial movement of the main hero, traveling through distant lands to save the princess, to fine the treasure, to defeat the dragon, and so on" (Manovich, 2001: 246).

4.3.3 Imagination and Interactivity

Having analyzed computer illusionism from the point of view of its production and the longer history of visual illusion, we can take a look at it from a different perspective. While existing theories of illusionism assume that the subject acts strictly as a viewer, new media, more often than not, turn the subject into a user. The subject is expected to interact with a representation — click on menus or the image itself, making selections and decisions.

Web surfing in the 1990s provides a perfect example. A typical user may be spending equal time looking at a page and waiting for the next page to download. During waiting periods, the act of communication itself — bits traveling through the network — becomes the message. The user keeps checking whether the connection is being made, glancing back and forth between the animated icon and the status bar.

Interaction with most 3-D virtual worlds is characterized by the same temporal dynamic. The technique called "distancing" or "level of detail," which for years has been

used in VR simulations and later was adapted to 3-D games and VRML scenes can be taken as an instance. The idea is to render the models more crudely when the user is moving through virtual space; when the user stops, details gradually fill in. Another variation of the same technique involves creating a number of models of the same object, each with progressively less detail. When the virtual camera is close to an object, a highly detailed model is used; if the object is far away, a lesser-detailed version is replaced to save unnecessary processing.

A virtual world that uses these techniques has a dynamic structure that is affected by the actions of the user. As the user navigates through space, the objects switch back to illusions. The immobility of a subject guarantees a complete illusion; the slightest movement destroys it.

Another good example is the QuickTime VR movie. "In contrast to the nineteenth-century panorama that it closely emulates, QuickTime VR continuously deconstructs its own illusion. The moment you begin to pan through the scene, the image becomes jagged. And if you try to zoom into the image, all you get are oversized pixels. The representational machine keeps hiding and revealing itself" (Manovich, 2001: 207).

Games modeled after simulators have been quite successful. In contrast to interactive narratives, such as *Wing Commander, Myst,* or *Riven,* that are based actually narrative style interactive moves, first-person shooters are based on the coexistence of the two states. The player has always an eye on the information bars of the games: How healthy the player is of how much the car or vehicle is damaged as well as how much ammunition is left or how many task are left / done

5 CONCLUSION

The need for communication forced revolutions in media. Step by step innovations and inventions throughout the media history. It is obvious that the interaction between social acts and technology formed the media together.

The cooperation of scientists and media professionals gave its shape to today's media. It is not possible to draw a clear border between these social acts and technological improvements. But it is still possible to observe and interpret the consequences.

It is not the first time that media is called new. Once the newspapers were new, too. Film, radio and television were new as well. In order to call a medium new, something radical needs to happen. Not only in technological or inventive means, but also socially. For instance the television was new in technology. But it was also a new medium for mass communication in means of being a social medium. Moving pictures combined with sound, reaching far distances was a real revolution.

The same thing is happening today again. The adaptation of the computer in the media industry is forming another revolution. Not only in the media industries but also in every aspect of life, computers are taking in command and the social context is changing. Many enterprises are depending on the computer technology and on to its roots. Many universities, institutes and schools are educating students with computers. The new generation is growing up with the computer. Habits are changing in to digital codes. Besides business and education, even art takes a new shape and is going digital.

Media has the social role of leading. That means media leads many social acts and confronts many situations. From this perspective it is not a coincidence that media becomes new first.

Today media uses the computer effectively in every area possible. Of course the most important subject is that the computer is used for production. What we consider as old right now - newspapers, magazines, books, cinema, radio and television – is getting a new face, too, because the computer takes in charge for the production in all of these

areas. Whatever is left outside of this is called traditional today. The traditional needs to be protected but surely the trend is what really counts indeed.

New media comes with different aesthetic values as well. Digitally produced communicative works and art pieces have something "new", too. The medium has changed and today the computer and its environmental units are used such as hard disks, CD and DVD – ROMs, flash disks and computer screens. Of course the critics of the works on these media have different aspects and views.

New media is not only the new state of the old media. It also brings some innovations to front. The most important property is interactivity. Interactivity in new media is a must. It is a natural consequence of digitalization. Briefly, every bit of information that takes space in the computer is interactive.

The information age regards to reach and use information effectively. Interactivity is the involvement in order to fulfill this task that is necessary. The explosion of information needs to be controlled and the only way of it is serving in interactivity. Thus new media is not only interactive because of its genuine nature, but also it needs to be so. Today we cannot think of either a website that does not have hypertexts and hyperlinks or a DVD film that does not have an interface where you cannot "click". Thus, new media professionals are people of interaction and human – computer interface designers. Whatever the production are is the result needs to have an understandable interface and interactivity.

The structure of and interactivity in new media, forms its own influenced persons. These are called "users". The user is the key element that constitutes new media. The cause of this is that the user is not only the receiver but also the source. Both states unite to form the user.

The user likes to interact with every new media product. This interactivity is both sided. It is more than just touching and leaving it on this state. The user likes to get answers to his / her questions. The manipulation of the transmission should be in the users hands. Also the property of new media as being non – linear is an advantage of the user. Thus, the user can join the information flow anytime and anywhere. At last the user

knows what to look for and instead of leaving this conscious aside, he / she prefers to reach the desired information as soon as possible by using knowledge.

It is essential to know what new media is, how it became new, the importance of interactivity in new media and the properties of the user in order to evaluate further studies in this area. Taking a look through this framework may help to illuminate the future media studies.

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