LESSON PLAN

Technical / Telecommunications / Mechanics

High School	Grup Scolar Industrial Metalurgic, Galati
Level	Intermediate
Area	Computers / Mecatronics
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Time	3 classes, 50 minutes each

LESSON 1

What is Telecommunications

I. Pre-reading

1) Make a spider-web with words connected to telecommunications. (Interactive exercise T-Ss)

---------- transmission | telecommunications

2) Introduce the words of the web in definitions of your own. (Work in groups of four and choose a representative of your group to read out the definitions to the other classmates).

According to Newton's Telecom Dictionary (Newton, 1998), the term "telecommunications" is defined as "the art and science of 'communicating' over a distance by telephone, telegraph and radio." It is "the transmission, reception and the switching of signals, such as electrical or optical, by wire, fiber, or electromagnetic (i.e. through-the-air) means" (p. 711).

O'Neil and Everett (1988) define "telecommunications is like communications, except that it involves communicating electronically across distances (generally over telephone lines) without any changes occurring to the original message. All forms of information may be sent electronically: voice, text, data, graphics, and video" (p. 2).

Another definition is given to "telecommunications technology" as "the electronic communication of information over distance" (Mitchell, Hendricks & Sterry, 1993, p. 7). The key word "electronic" in this definition "refers to the present-day use of telecommunications, which involves the use of technology for signaling purposes" (Mitchell, Hendricks & Sterry, 1993, p. 7).

Kooker and Brey (1991) state that telecommunications is broadly defined as "the process by which information gets transferred electronically from one place to another" (p. 6). They also pointed out some examples of telecommunications in our society, such as basic telephone system, cellular and mobile phones, credit card verification network, facsimile transmission, broadcast and cable TV/radio, etc.

***NOTE**: The text **"What Is Telecommunications"** is extracted, with copyright permission from the author, from the research paper **"Technical Competency Needs Assessment for the Graduates of Telecommunication Systems at UW – Stout",** written by **Tien-chen Chien**, for a Master of Science Degree in Training and Development – The Graduate College University of Wisconsin – Stout, December 1999.*

II. Reading / while reading

Find words / expressions in the text which mean the following. (Work in pairs):

a) a book which contains words of a specific language, ordered alphabetically, explained in the same language or translated into a foreign one;

b) a reality mirrored through esthetic images in sculpture, painting, cinema, music, etc.;

c) a branch of Physics that studies phenomena linked to the movement of electrons and ions in different electric and magnetic fields;

d) conventional signs (acoustic or optical) which can transmit a command or a piece of information at long distances;

e) an oral or written form, formal or informal addressed to a person or to a collectivity;

f) it refers to a representation through drawing of various sizes, lines, dots, figures, maps, etc.;

g) the totality of operations that lead to finite products.

LESSON 2

The Evolution of Telecommunications (1)

People who live in the last decade of the twentieth century are so accustomed to the convenience brought by modern technologies that most of the time they seem to take it for granted. If we review the history of human communication, we will find that the communication technologies we are using today were not achieved in one day; they are the result of evolution.

The ancient Egyptians, Athenians and Romans utilized fire, smoke, and flags to communicate at a distance. Men also knew to send news by pigeons because they could fly hundreds of miles at speeds up to eighty miles an hour. Messengers strongly relied on horses to deliver written documents (Oslin, 1992).

Although electricity had been discovered early in ancient China, it was not widely known until the famous experiment of Benjamin Franklin in 1748: Franklin successfully discharged electricity through a wire across the Schuylkill River at Philadelphia. Later on, more electrical devices were invented one after another and were applied to our lives (Oslin, 1992).

During the 1800's, telegraph (1836), telephone (1876), and radio (1895) were invented (Heldman, 1993). They soon became new communication tools and brought a dramatic change to human lives.

For telegraphy, early in 1753, people were suggested that using a wire for each letter of the alphabet. In 1787, a French mechanic used a wire to send words in code to another room. In 1794, Russer and Salva found that telegraph could be operated by "interrupting electric circuits on the desired wire and causing sparks to appear" (Oslin, 1992, p.3). More scientists continued improving telegraph devices. Among them, Samuel F. B. Morse designed the first commercial telegraph apparatus for public and practical use. The dot-and-dash Morse code, the Morse key, and the stylus recorder became the most well-known telegraph inventions (Oslin, 1992).

Like the telegraph, the telephone is a result from its preceding inventions. In 1861, a German physics teacher created a telephone with a make-and-break transmitter. It could be used to exchange words and sentences. After experimenting a number of telephone instruments, in 1876, Alexander Graham Bell demonstrated a telephone that could send voice at a distance through a wire from one end to another (Oslin, 1992).

As we look back at the history of communication technology, we found that it is also the "story of how man overcame the barriers of time and space" (Oslin, 1992, p. 474). Man adopted new technologies such as telegraph or telephone to communicate at a distance more efficiently, and no longer set fire to inform each other like his ancestors did.

After radio was invented, communication advances widely changed people's lives. Radio broadcasting had not only met people's need for the latest news and information but also entertained the masses. Simply turning knobs, people at homes or on farms were able to listen music played by radio stations from a thousand miles away. In the 1920s, amateur radio operators could set up short-wave stations in their homes and talk with other "radio hams" all over the world (Oslin, 1992).

Telecommunications innovations continued evolving in the twentieth century. There was television (1920), analog computers (1930), radar (1935), xerography (1937), digital computers (1954), artificial satellites (1957), lasers (1960), integrated circuits (1962), digital transmission (1964), VLSI computer (1980), super computer (1982-88), fiber optics (1985), broadband switching (1990), photonic switching (1990), optical amplifier (1990), voice recognition (1994), and more are coming (Heldman, 1993).

It is obvious that the later it is, the more rapidly the new technology emerges. Modern society is an "information society", which is built by advanced communication technologies coupled with computers (Naisbitt, 1984). The world we are living now is a computer world. It is hard to imagine that about two thousand years ago, the Chinese did calculating by moving beads on an abacus; and it was considered to be the fastest and most versatile way of calculating at that time (Oslin, 1992).

The development of computer also resulted from many previous inventions. In 1642, Blaise Pascal of France invented a gear-driven adding and subtracting machine. In 1801, Joseph-Marie Jacquard of France invented the automatic weaving loom.

The design of computer is originally from the idea used to operate the machine. In 1822, Englishman Charles Babbage designed a calculator with the elements of a digital computer. It was able to do complex calculations and set up its results in type. In 1887, Herman Hollerith of the United States created a punched-card system to do statistical work (Oslin, 1992).

At the early stage of computer development, computer was conceived to be a bigger, faster, and more sophisticated electronic calculating machine. It was primarily a device for numerical calculations. However, the utilization of computers at modern stage is much more than numerical calculating. They can be used for editing, storing, manipulating, and retrieving text (Pool, 1990).

Four major elements have evolved into a computer: binary logic, stored programs, storage medium, and input and output devices. Computers can function so sophisticated that sometimes they are called "artificial intelligence" or "thinking machines." Due to the combination of telecommunications and computers, people in the information society not only interact with each other but also with media machines. Modern communication is a phenomenon of "talking and thinking among people and machines" (Pool, 1990, p. 50).

After we review the history, we know that technologies have evolved from one another. Each new technology adopted something from the existing technology and often replaced the older technology (Carne, 1984). In the 1900's, newer and better computers are created, and old computer devices are no longer in use. When a new technology is introduced to our society, it brings us a greater convenience and efficiency; therefore, old technology sooner or later will be replaced. For instance, telegram is no longer a major communication means in our society. Telephone has been widely adopted; and nowadays, cellular telephone is even getting more popular.

III. Reading / while reading

Scan the text and identify means of telecommunications in the text above. (Oral exercise, interaction T-Ss). There are 25 versions designating means.

IV. After-reading

1) Decide if the following sentences are true / false and correct the false ones. (Oral exercise, interaction T-Ss)
   a) The ancient Egyptians, Athenians and Romans used pigeons to send news to hundreds of miles away;

b) In 1836 Benjamin Franklin successfully discharged electricity through a wire;
c) F. B. Morse designed the first commercial telegraph apparatus, the dot-and-dash Morse code, the Morse key and the stylus recorder;
d) Telecommunications innovations continued evolving in the nineteenth century;
e) The world we are living now is a computer world;
f) The development of computer also resulted from many previous inventions made by Italians, Spanish and Chinese;
g) At the early stage of computer development it was primarily a device for numerical calculations;
h) Telephone has been widely adopted and called "artificial intelligence";

2) What innovations and inventions have been made in telecommunications starting with the 20th century? (Pair work). Include the information in the table below:

DATE	INVENTION	WHO

V. Grammar

1) Make a list of all the verbs in the Passive Voice in the first four paragraphs of the text.
Choose five of them and make sentences of your own. (Individual work).
2) Identify linkers in the text and make sentences with them. (whole class involvement).
3) Complete these sentences with the appropriate noun from the text. (Pair work).
a) In 1937 ..... was important invention for multiplying written copies;

b) Modern communication is a ..... of talking and thinking among people and machines;
c) Four major .....have evolved into a computer: binary logic, stored programs, storage medium and input and output devices;
d) ..... is no longer a major communication means in our society;
e) Telegraph, telephone and radio became new communication ..... and brought an important change to human lives;
f) Benjamin Franklin successfully discharged electricity through a ..... across the Schuylkill River at Philadelphia.
g) In the 1900's, newer and better computers are created and old computer ..... are no longer in .....;
h) computers are also called "artificial ....." or " thinking .....".

VI. Writing

1) As computer is considered to be one of the most important means of telecommunications, give arguments for / against to deal with the following:

Is the spread of Internet one of the major events of the 20th century? Take into account:

a) Internet as source of information (good or bad);
b) its importance for students' interests;
c) hobby or waste of time;

Express your opinions about this topic in writing. (Individual work)

2) Write a dialogue imagining that a horrible interviewer asks you about taking a job in one of the telecommunications branches and makes fun of your answers. You may use the following words: *network, broadcast, cable TV, radio, device, telegraph, transmit, operator, short-wave stations, digital transmission.* (No more than 15 lines). Act out your interview for the rest of the class.
3) Reflect on having a job in telecommunications and write an essay about it. (250 words)

LESSON 3
The Evolution of Telecommunications (2)

VII. Discussion and debate

Several recent reports indicate that there is a shortage of skills in the telecommunications industry. Here is a complete list of competencies for the occupation of telecommunications specialist published by the Ohio State University in 1995:

1. employability skills;
2. professionalism;
3. teamwork;
4. professional and ethical standards;
5. economic and business principles;
6. customer relations;
7. problem analysis;

8. project management;
9. technical documentation;
10. basic personal computer;
11. concepts;
12. packaged PC applications;
13. general accounting functions;
14. operating systems;
15. network operations;
16. basic mainframe concepts;
17. computer hardware design;
18. supervision.

According to your own qualification, which of the competencies above do you consider that you are capable to prove for a future job, after graduating high school? Discuss this in small groups (4 - 5): express your opinions and be honest with yourselves.

VIII. Round Up

What do you think are the most important steps in the evolution of the telecommunications? Discuss them with your classmates and write the information on the board.

IX. Homework

1) Write a summary of the text entitled **The Evolution of Telecommunications**.
2) Use a dictionary and complete the grid with the appropriate words:

VERB	NOUN	NOUN (PERSON OR DEVICE)
to annotate		
to connect		connector
to cover		
to detect		
to download		
to filter		
to request		
to retrieve		
to signal		a signal
to share		
to store	storage	--
to synchronize		
to switch		
to transfer		
to transmit		

3) Complete the following sentences with words referring to key technologies and standards:

a) ..... is a device that links two LANs together so thy can share data;
b) ..... refers to any transmission at a speed higher than 2 million bps;
c) ..... is a method of computing in which one computer acts as a central repository for files and programs that can be shared by a group of PCs connected to a network;
d) ..... a transmission standard for sending data over public or private leased phone lines. Data is broken into frames, each the same sizes, for relaying;
e) ..... is an efficient way of moving data through a network. A file is broken up into little packages that are sent by different routes through a network and then reassembled at the receiving end;
f) ..... a device that connects LANs that use different standards; essentially a more sophisticated type of bridge.

ANSWER KEY

II. Reading / while reading

a) dictionary
b) art
c) electronic
d) signals
e) message
f) graphics
g) process

III. Reading / while reading

1. fire, smoke, flags
2. pigeons
3. messengers
4. electricity
5. telegraph
6. telephone
7. radio
8. the Morse code/the Morse key
9. stylus recorder
10. television
11. analog computers
12. radar
13. xerography
14. digital computers
15. artificial satellites
16. lasers
17. integrated circuits
18. digital transmission
19. VLSI computer
20. super computer
21. fiber optics
22. broadband switching
23. photonic switching
24. optical amplifier
25. voice recognition

IV. After-reading

1. a) ***F***; b) ***F***; c) ***T***; d) ***F***; e) ***T***; f) ***F***; g) ***T***; h) ***F***.

V. Grammar

1) are accustomed, had been discovered, were invented, were not achieved, was not known, were applied, were invented, were suggested, could be operated;

2) although, as, no longer, after, however, due to, not only...but also, therefore;
3) a) xerography; b) phenomenon; c) elements; d) telegram; e) tools; f) wire; g) devices, use; h) intelligence, machines.

IX. Homework

2)

VERB	NOUN	NOUN (PERSON OR DEVICE)
to annotate	**annotation**	**-**
to connect	**connection**	**connector**
to cover	**coverage**	**-**
to detect	**detection**	**detector**
to download	**downloading / a download**	**-**
to filter	**filtering**	**a filter**
to request	**a request**	**-**
to retrieve	**retrieval**	**retriever**
to signal	**signaling**	**a signal**
to share	**sharing**	**-**
to store	**storage**	**-**
to synchronize	**synchronization**	**-**
to switch	**switching**	**a switch**
to transfer	**a transfer**	**-**
to transmit	**transmission**	**transmitter**

3) a) bridge; b) broadband; c) client-server; d) frame relay; e) packet switching; f) gateway router.