

Aims, Methods and Experiences in Teaching Computer Network Knowledges

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Abstract—Computer networks form a very important area of today's technology. Therefore we have to teach network knowledges for the students of all faculties. This paper deals with the differencies among the our faculties from the points of view of topics, approaches and methods. The problems are partly similar to teaching other areas of computer technology, e.g the use of languages, terminology, teaching and examination methods, etc. A special problem is the quick change of ideas and terminology. The paper also deals with the experiences collected in the course of using the e-learning system of Cisco Networking Academy.

I. INTRODUCTION

Nowadays every respectable computer is connected to network – or it will be connected. Every student needs network knowledges.

In Alba Regia University Center students of three different faculties study information technology and network knowledges from different aspects. Although the basic questions are quite the same, we have different aims on the three faculties. At the Faculty of Economics we focus on the application of the networks, at the Faculty of Informatics on network system technology, and at the Faculty of Electrical Engineering on hardware and system software aspects of computer networks.

This paper deals mainly with the common problems.

II. PROBLEMS IN TEACHING COMPUTER NETWORK KNOWLEDGES

Problems are partly similar to other areas of computer technology. These problems are connected with the technical terms. Computer technology is too young, so technical terms are not properly evolved, they are not uniformly used. Different firms use different terminology, and terms change from time to time.

Sometimes old terms get new meanings and old ideas get new namings; e.g. a firm collects some old and some new ideas and creates a product family using a common name (virtualization).

A. Technical Terms

An important decision is wether we use English or Hungarian technical terms. Hungarian is important for communication with users, while English is important for following the development of our subject, therefore in the most cases we endeavour to use both languages.

The work of our students is made more difficult by the fact that translations are sometimes not too perfect.

A good example is the term „Operating system”. It means a software system wich operates the computer, so the proper translation would be „működtető rendszer” similarly to the French name „Système de gestion”, the German „Betriebssystem”, the Russian „Рабочая система”. However, the official Hungarian term is „Operációs rendszer”, wich is not too expressive.

Another case is when different materials use different translations. Let's see an example from the subject of computer networks: “Router” is translated sometimes as „Forgalomirányító” and sometimes as „Útválasztó”.

Note: Formerly using of Hungarian terms was controlled by a few publishers. Today different translations circulate on the Internet.

B. Special Problems Relating Networks

Networks evolve and change particularly quickly considering not only the communication rate and the applications, but operating principles, network devices and technical terms as well. E.g. within a few years all the wired LAN technologies disappeared, except switched Ethernet. Ethernet can be used in MANs and WANs as well. At the same time, wireless LANs became general.

C. Administrative Difficulties

Curricula change too often on all the three Faculties, especially on the Faculty of Electrical Engineering where at the moment we have students studying by curricula K, B and C as well. In curriculum C the order of network-related subjects is different for full-time and part-time students.

I think, „Computer Networks Special Professional Training Program” is a good exception. This curriculum was worked out in our centre, and we did not change the curriculum table for a long time. So we could concentrate on the development of the contents of the subjects.

III. METHODS

Lectures are given on all the three faculties. Teaching of operating principles and ideas requires lectures, explanations.

Practices on simulation programs are used for individual network design and configuration. Simulation programs substitute a large number of real devices.

These practices are done by Electrical Engineering and Informatics students. Sometimes they do laboratory practices on real devices as well.

Students of the Faculty of Electrical Engineering do a lot of laboratory practices on network operating systems

and network applications. Network applications are studied on laboratory practices by the students of Faculty of Economics as well.

E-learning materials are used on facultative courses of Cisco Networking Academy. They are very useful first of all for individual studying.

IV. EXPERIENCES WITH THE E-LEARNING SYSTEM OF CISCO NETWORKING ACADEMY

A. E-learning Material

Cisco organized a world-wide networking academy system, called Cisco Networking Academy. We collected experiences in using its excellent e-learning material, made by a lot of leading experts, using much resources. It may be used only for Cisco courses (see Fig. 1).

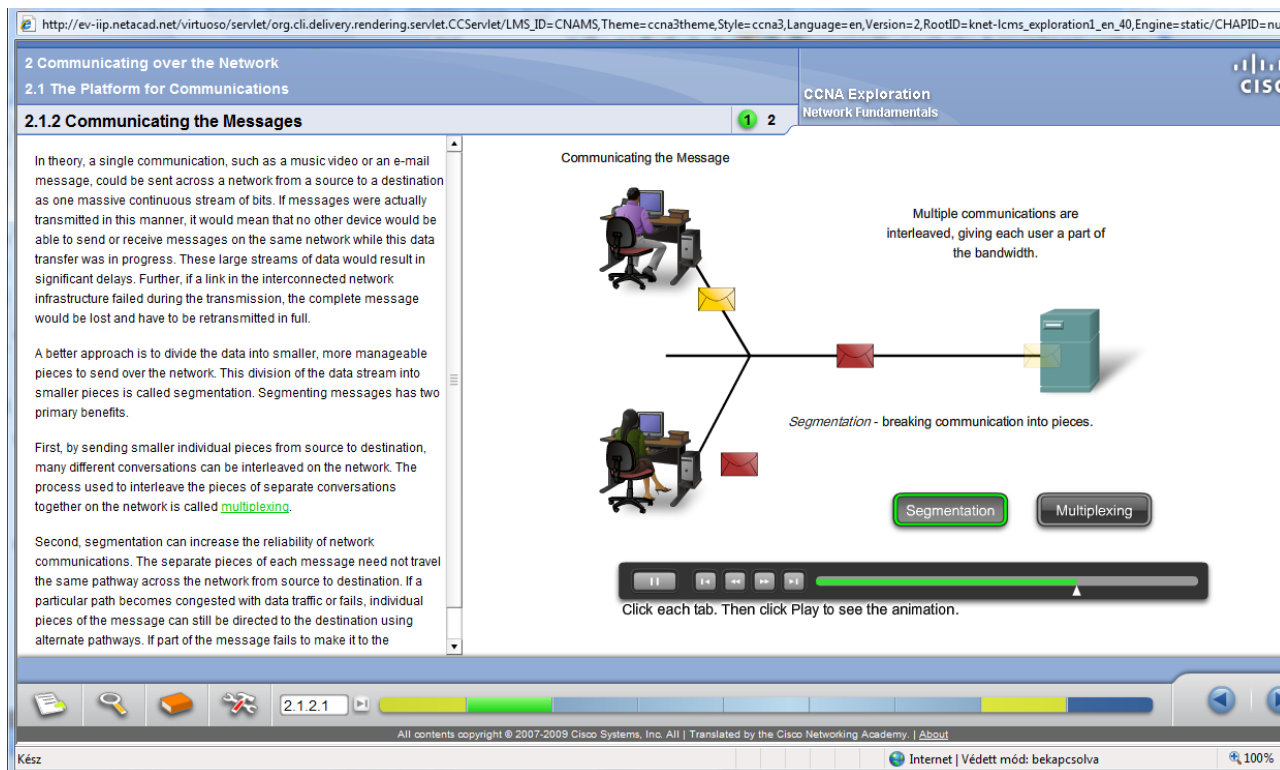


Figure 1. Example page of the e-learning material (contains an animation) [2]

B. Assessment, Testing

Every teacher, instructor knows that making really good test questions and answers is extremely difficult. Cisco Academy questions are excellent, but of course not perfect. Sometimes answers are unambiguous only for those who read the material of Cisco Academy itself. Hungarian translations are not always perfect. It can be easier to take the exam in English.

A typical (and good) test page can be seen on Fig. 2.

C. „Custom Scores”

Cisco Academy recognized, that assessment done only by remote tests evaluated by programs gives not a proper view of the student’s knowledge. Instructors are encouraged for making oral and written examinations where students should explain important ideas and connections. Custom scores mean the results of these locally made and evaluated examinations (see Fig. 3).

V. SUMMARY OF MAIN STATEMENTS

- Technical terms are not uniformly used and translated
- Networks evolve and change particularly quickly
- Relative stability of the curriculum is favourable
- Several methods should be used
- Good e-learning materials need a lot of resources, they are important for individual studying
- Assessment should contain human examination as well

ACKNOWLEDGMENT

Thanks to all of my students, and to my former colleagues: László Csapó and Zoltán Balogh.

http://assessment.netacad.net/virtuoso/delivery/pub-doc/exam.shtml

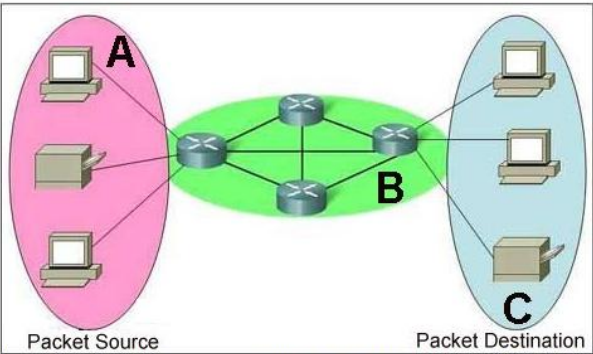
2 What is the proper order of the layers of the OSI model from the highest layer to the lowest layer?

- physical, network, application, data link, presentation, session, transport
- application, physical, session, transport, network, data link, presentation
- application, presentation, physical, session, data link, transport, network
- application, presentation, session, transport, network, data link, physical
- presentation, data link, session, transport, network, physical, application

3 Which statements correctly identify the role of intermediary devices in the network? (Choose three.)

- determine pathways for data
- initiate data communications
- retine and retransmit data signals
- originate the flow of data
- manage data flows
- final termination point for data flow

4



Refer to the exhibit. Which term correctly identifies the device type that is included in the area B?

- source
- destination
- network
- host

Figure 2. Example test page [2]

Academy Connection

ADMINISTRATOR HOME
 INSTRUCTOR HOME
 ADMIN HOME
 Home
 exp_2010_11_1
 Manage Class
 Add Class Information
 Student Class Roster
 Assessment Home
 Gradebook
 Add New Class Information
 Add Official Course Material
 Add Curriculum

Type a keyword GO

- Membership Directory
- Academy & Class Locator

About this page

Instructors can add or edit student scores for class activities not shown in the main gradebook. The weight of each custom score column can also be changed, however the total weight of all custom score columns must be 100. The summary of all custom scores shown here displays in the Gradebook for each student, based on the proportionate value of each column.

Click Add New column to add a new custom column. To delete a column, check the column you want to delete, then click either Save Change or Save and Return to Gradebook.

View by
 Username VIEW

Custom Scores for expl_2010_11_1 [Add New](#)

Label (Max. of 10 Characters)						
Weight (Totals 100)						
Max Score						
DrTomi						
MaXIP21						
...						

Figure 3. Page for “custom scores” [2]

REFERENCES

This paper is based upon my own experiences. For teaching network knowledges I use a lot of books and other materials (among others

[1]), but the paper contains no direct quotations from them. I took figures from [2].

[1] Tanenbaum: Számítógép-hálózatok (Panem, 2004.)

[2] http://cisco.netacad.net