

COMPUTERS AND THE TEACHING OF THE TECHNICAL SUBJECTS

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Summary The contribution deals with the use of computers in the technical subjects teaching. It shows more common view on the possibilities of the computer use. It also shows that there is a link to concrete conditions of the use of computers. So there is not only one common solution of the problem. It is necessary to respect the real conditions of each subject and school.

1. INTRODUCTION

Today the use of computers in the technical subjects teaching is usual. On the other side there is the possibility to find some projects that refer to examples of effectiveness decreased by the use of computers. In the teaching we must respect that it is an interactive process between two subjects – a student (or student as member of the group of students) and teacher. The effectiveness of the teaching depends on respecting this principle – that's because of the process individuality. It is necessary to respect this kind of individuality especially in the relationship to commonly used groups of education tools and operations.

2. CURRENT POSSIBILITIES

The facility of the universities is well equipped with computers and the access to them. On the other side we can find other significant factors:

1. There are a lot of different computers - with regard to a level (beginning from the basic level ending at the top models in each category). Also different configuration of each computers can make different conditions.
2. Fast progress of the program equipment and the increasing tendency to the lost of compatibility among different versions.
3. The issue of licence politics of each producer of software package. The specific condition of using software at schools (using almost during the term) shows us that it is not possible to use common licence conditions.
4. Very various student knowledge in the computer use area.
5. Relative unification of the application use mode in the computer nets (Internet) and increase of the access to Internet.

3. THE RELATIONSHIP WITH THE MATHEMATICAL SUBJECTS

Because of the computers use development there is a big change in the character of this use in each group of the subjects and with also higher differentiation. In the group of mathematics subjects we can more often find the applications of the specialized program equipment

(MAPLE, Mathematic, ...). For the technical subjects there is a little bit problematic benefit of the use. The problems result from following factors:

- In the mathematic subjects students get only basic knowledge oriented to a mathematic application, not to technical one.
- The use of the program is usually part of the subjects that are not obligatory for all students.
- Fast development means of program versions and some problems with the compatibility.
- The problem with access to programs (licence, installation).

4. APPLICATION IN THE TECHNICAL SUBJECT TEACHING

In the mentioned area of the technical subject teaching, the use of computer especially means to be an instrument to eliminate routine work and it also helps with the clarity of explanation. Another characteristic attribute is the necessity of using different software in one subject. The content of subjects is very comprehensive, that it is the reason why there is only very small range to explain students how the software works. It is clear that using mathematic programs that are able to simplify the used algorithms and make different modification of the calculation in the technical subjects is commonly advantageous. The problem is that there is a lot of programs but no unified lesson in one program for all students. In many technical subjects the program MAPLE is used. Its using is advantageous only in cases where it is possible to use one of its toolboxes. But these settings have influence on its price. So it is better to use one of the symbolic programs in these cases. For example the program MAPLE for which library SYRUP (for simulation of linear networks) exists it is very advantageous, because this library has wider usage - for example also for non-linear circuit analyses [1]. Especially for analogue circuit it was at the department of circuit theory FEE CTU created the library SYNTFIL that contents procedures for the LC filters design [2]. The library was then extended to procedures for the filter design by a cascade synthesis. Also the library SCSYRUP [3] was made for a simulation of filters with switched capacitors. Program MAPLE was successfully used at the end of the study

that is specialized on the area of design and use of analogous filters. The reason for using it in the end is that of the students that choose these kinds of subjects. They deal with the area of filters and they know about the program MAPLE and its library and they know how to use it. In the subjects it is the teaching deal on the calculations by a new operation so it is good to reach to basic knowledge of the program in one lesson. The worse situation is on lower levels of lessons because of their common character. At these subjects many students do not know about MAPLE and how to use it. Additionally the program is not so wide to cover the whole point so it is necessary to use other programs. One of possible solution is to create dynamic web sites related to each problematic area. The web sites work like a unified program. They can also content many other topics (information) for teaching. If they are well created it is not necessary to study a special language. There is no problem with its installation. You need only a common browser. The disadvantage is a necessity of net connection. This kind of web sites was creating with the help of library SYNTFIL for a filter design. There is still no clear point of view about its public use so their use is fixed on the licence of program MAPLE. Today it is under construction another program that could probably realize the circuit simulation by the same way [5]. Except this operation there are also available other single purpose programs created especially for a pedagogical use. Their disadvantage is linked to the used operation system; advantage is not necessary net connection. Other variant is to use universal programs for special area of technical issue. The example could be the program NAF [7] for the LC and ARC filters design by cascade synthesis. In this example there is apart the installation of the program also a problem with the access language. The use of those programs is advantageous when the content of program is the same with the subject content.

Types of computers used in the teaching don't mention all of the possibilities but it shows us basic trends.

5. CONCLUSION

From the text above you can see that the application of computer in each technical subject is quite individual question. The application is under the influence of objective and subjective factors. For example - a content of the subject (specialization), licence politic of the school, teacher's knowledge and his orientation on the software etc. It is important to control the use of programs occasionally to find new ways or better use, especially when the conditions are changing. Anyway it is necessary to protect the use of computer without link to the pedagogical goals [8].

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