POSSIBILITIES IN THE USES OF THE INTERNET AND MULTIMEDIA IN THE INSTRUCTION OF PHYSICS

In the world today it is impossible to adequately teach the study of physics and related natural sciences without the use of computers and the simulation programs that they provide. Some say that computers are not necessary if you have a decent teacher. Others fear that teachers will no longer instruct but, rather, leave everything to the student and the computer. These objections are understandable, but it can no longer be misunderstood: computers are essential to even moderate levels of instruction in the world at this time.

Computer simulation programs offer a unique opportunity for students to see and work with systems and substances that they would rarely, if ever, be able to actually practice with in reality. Dangerous substances and situations, expensive equipment, and theoretical, even fantastical, ideas can be explored in a way that is more thorough than practical teaching has ever been able to do before. Never before has there been a situation in which the creative mind can be so safely and precisely indulged in this most important area of education.

These benefits of computer simulation programs must not be misunderstood to mean that a computer can be the sole provider of instruction for students of physics and natural sciences; nothing can replace the experience of a good physics teacher. However, a physics teacher is human and subject to the laws of space and time. Students who are slower, or faster, have the benefit of working on more, or less, advanced experiments regardless of the pace of the class. This is particularly helpful for students who need to practice material in which the class has already covered. Slower learners can continue to explore previous experiments without needing the classroom instruction to be repeated time and time again. They can replicate experiments until they actually see the correct results. Likewise, advanced learners have the freedom to experiment on subjects that may not be understood by the majority of the class yet. In both cases the slower, and the faster, students of a class benefit from the new

methodology of combining the power of the computer with the wisdom of the teacher.

In the last fifty years incredible advances have been made in information technology. This revolution has made previously inconceivable notions commonplace and necessary. In order for the vanguard of study to proceed as efficiently as the rest of the world, the natural sciences need to be using the tools for study that the rest of the world uses. Household appliances and business systems are readily relying on the simple silicon chip to increase productivity. It is my intention that we not let the natural sciences, the most important studies, to fall behind the common housekeeper in the use of such an important tool in daily life.

For these reasons the Hungarian school systems and teachers must introduce their students to the digital culture. With the help of the modern technology, which we helped to create, we can arouse the interest of many people, and students, and we can get Physics Back On Stage. It is a big task, but it can be realized with collaboration between secondary school teachers and scientific researchers.

I would like to present some methods of instruction which I have conceived during my short career in the sciences. These have both advantages and disadvantages, but they may present a more colorful and dynamic form of instruction of the study of physics in a secondary school than the current methodology employs.

It is my hope that we can make the “hard sciences” more attractive and understandable to more students with the help of computers and multimedia instruction. In the words of Pierre Curie (the English translation is my own with the help of a colleague) “ . . .if we cultivate the sciences, we can be sure that we are doing something: here the ground is solid and every discovery, even the smallest, is conserved.”