ELEMENTS OF MOTIVATION AND OBJECT-LESSON TEACHING IN TEACHING PROCESS

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Abstract: The article is dealing with influence of electronic teaching materials on non-cognitive dimensions of educational process. The use of modern information technologies with integrated audiovisual elements and with high extent of interaction to support education is one of motivation factors. At some extent this factor can eliminate students passivity and their negative attitude towards not "favourite" subjects. Our assumption is that modern technologies are very popular among young generation and intervention of these instruments in education may contribute not only to cognitive development of the students but also may help to change their attitude, interests and motivation factors. Mentioned facts are discussed by authors in relation to selected less favourite subjects which is for example physics.

1 Modern Teaching Technologies as a Means of Elimination of Negative Attitudes to Subjects

Due to an intense development of information technologies and their massive expansion in society we wetness increasingly broader use of them also in education and that on the both sides: on teachers side as well as on students side. Currently modern teaching technologies and multimedia assisted teaching are used to enhance humanitan and science education efficiency and quality. Within the education research a great attention has been paid to a question how the use of the new technologies of education affects increase of didactic effectiveness of various teaching forms and methods (e. g. Burgerová, 2003). Less attention has been paid to possibilities to affect students` attitudes towards particular subjects and to increase students` learning motivation through utilization of these media in the particular subjects teaching. Issues of motivation and students` activity enhancement is a very topical problem within the education research mainly in a context of natural science subjects because they are in the long term keeping a position of the least favoured subjects. This can be caused by the fact that in a comparison with humanitanly and socially oriented subjects they are characterized by a high level of abstraction. Many times students` unsatisfactory learning results achieved in natural science subjects are only consequences of their desinterest and weak motivation. It is evident from such students` statements as: „*Physics, chemistry, math is stodgy, it is something I will never learn in my live!*", „*Full of formula, rules and laws!*", „*I will never need it in the future!*", „*I will never understand it in my live!*" and many others which are nothing new for the natural science teachers. Currently a possibility how to solve this situation can be seen the use of graphical animation applications to bring near and refresh the subject matter and to present it in a more visual way. Moreover, the new information and communication technology and multimedia are very popular at the youth and has a certain fascinating power on them, which can be used within computer or multimedia assisted teaching to decrease or eliminate the level of particular subjects` unpopularity. In this context we are speaking about a shift of the focus from the use of the object-lesson teaching for a more exact and deeper understanding of the taught subject matter to the use of object-lesson teaching for interest evocation.

Undoubtedly physics belongs to a group of the least favoured subjects or it is even one of the most unpopular subjects. It uses logical and abstract thinking, creative working and considerable imagination in a large extent. Ordering and character of the students` cognitive activities course are mainly in this subject a very important factor influencing formation of students` learning interest in it. But physics lessons offer a lot of potential possibilities for using students` activity to evoke and

form their interest in this subject. Here belong for example laboratory measurements and physical experiments, problem tasks solution, effective use of education technology and electronic teaching aids. To enhance students` learning interest formation an important element represents content of the subject by itself. But if a student does not become an active actor of the teaching and learning processes, then any anyhow interesting teaching material will evoke only a vague slight interest at him or her.

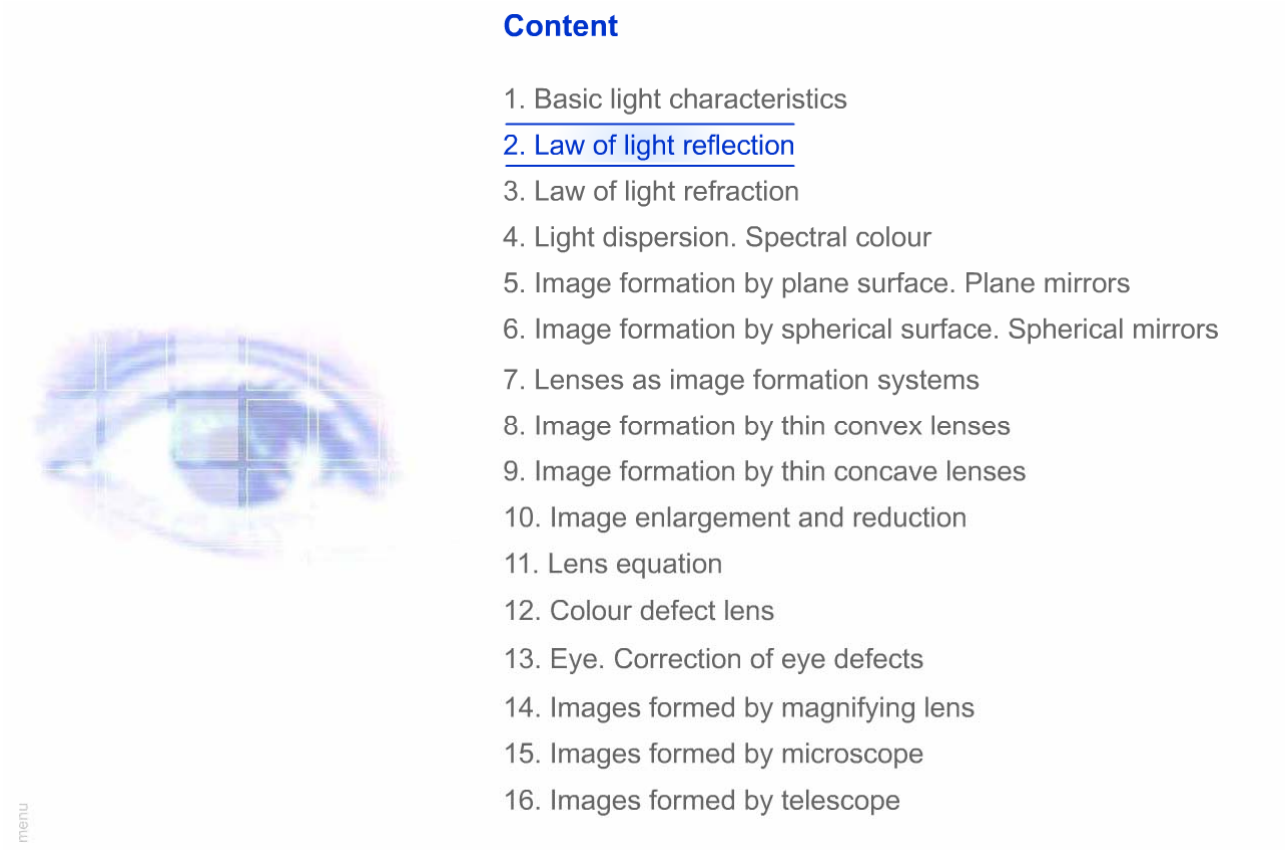

Figure 1
Content structure of the course *Principles of Geometry Optics*

2 Multimedia Course *Principles of Geometry Optics* as a Means of Elimination of Negative Attitudes to Physics

Members of the Institute of Technology of Education at the Faculty of Education, Constantine the Philosopher University in Nitra, have been involved except other also in development of new interactive teaching aids which should enhance particular subject teaching quality. One output of a project carried out in the period of the years from 2005 to 2006 at our institute is a multimedia education programme *Principles of Geometry Optics*. The course was developed with an intention to help to increase the youth` interest in physics and to decrease its status of an unpopular subject. A reason why we decided to deal just with the topic of geometry optics was the fact that on the one hand one can find this part of general physics in each secondary school curriculum but on the second hand its elaboration in physics text books is not usually very attractive for students because of considerable abstraction of the basic terms which are necessary to acquire and to understand the presented topics. In our opinion the level of the abstraction can be pressed down using interactive animations, which by their visual character contribute considerably to a better understanding of the

presented phenomena and their dynamics. According to us just multimedia electronic teaching materials utilizing object-lesson teaching, interactivity and feed-back could act as a motivation factor influencing students` attitude to physics and could be used as a means to promote their physics acquisition positive motivation at schools of any type.

3 General Information about the Created Course

The created multimedia teaching programme *Principles of Geometry Optics* is designed as „a course" content of which results from the basic knowledge necessarily needed to understand geometry optics basic principles. Its extent corresponds to curricula of the subject matter theme *Light and radiation* included into the subject matter of the high school 4th grade subject matter. Structure of the particular chapters is presented on the figure 1.

Working on the course content development we tried to avoid any sign of encyclopaedian information accumulation and a principal accent was set on visual presentations of the introduced phenomena using interactive animations.

Our intention was to create a user friendly and effective teaching environment, in which:

- control of the teaching presentations is intuitive, the main menu is constantly at user`s disposal and is easy-available,
- flash-presentations have operating push-buttons to allow to step the presentations and repeatedly to set them in motion,
- time behaviour of the animated physical phenomenon is properly complemented by an accompanying text describing the simulated situation,
- the text complement to the animated physical phenomenon is an appropriate one as to its extent,
- object organisation in a presentation is simple and transparent,
- Java applets are activated through an icon menu,
- whole design of the teaching presentations and animations is transparent and properly harmonized.

To prepare the course from the technical point of view, we used the programme Adobe Flash which currently represents a standard not only of teaching materials creation and distribution but also of business and internet applications or interactive videos. To its strong features belongs possibility to perform easy vector animations during a stay of any objects on the stage and to apply a lot of effects. By a small size of an exported file and thanks to a possibility to stream it, the final animation SWF-pattern insures a quick animation playback of a high quality in Flash Player, which currently is already an automatic component part of web browsers and operation systems installation.

Basic subject matter of the course is processed in 15 flash-presentations (in software environment of the Adobe Flash 8 application – previous Macromedia Flash) and these are accompanied by additional 60 flash animations assigned for a better explanation and understanding of the presented

physical terms and phenomena. The designed presentation package is further complemented by wholly interactive physlets. Physlets, small simple applications written in Java programming language, enable physical phenomena interactive simulation allowing students to enter into the simulations. They are flexible enough and they are suitable to be used in various pedagogical strategies (in both traditional and alternative teaching methods). A part of the course is tests modules, which are designed in Java programming language similarly as the interactive physical phenomena simulations in a physlet form.

To program all presentation settings, including control of the objects in a presentation, we used scripting language ActionScript 2.0. A user controls movement in particular teaching units through control panel

The panel is created on a basis of an active cross-references form and is available in the right bottom part of each multimedia screen.

Materials created in this way were converted consequently in a form recorded on a CD. So the package of teaching flash-presentations is distributed on a CD carrier, and after its insertion into a disk drive a file *index.exe* is activated automatically. After this file activation an introductory screen with the project logo and a mail contact on the author will open. Next screen in the structured hierarchy of the e-materials performs content function with references to concrete teaching presentations. As an environment to design the Java applets we used a fully integrated development environment NetBeans, which is a Sun Microsystems software product released under open source CDDL.

Our presented software product in a form of an electronic interactive aid is completely functional under various system platforms containing Adobe Flash. Operation of the teaching materials requires to have installed Flash Player 9 and Java Runtime Environment. To ensure an optimal operation it is advisable, if it is possible, to set up the screen resolution 1280 x 1024.

4 Practical Use of the Course

As it was already mentioned, our intention was to create a course which would enable students to acquire geometry optics basic terms in an active form and to develop correct imaginations of the learnt basic phenomena but which would simultaneously also promote their positive attitude towards physics. The form of the presentations, we carried out, enables a teacher to use these presentations directly in the teaching process and at the same time it enables students to work with the teaching materials themselves (e. g. within an independent work during the lessons or within the subject matter home repeating or within self-study processes). Their appropriate incorporation into the education processes gives a possibility to enrich a traditional text-book with certain interactive teaching materials containing visual object-lesson computer animations and interactive simulations of the chosen physical phenomena and principals.

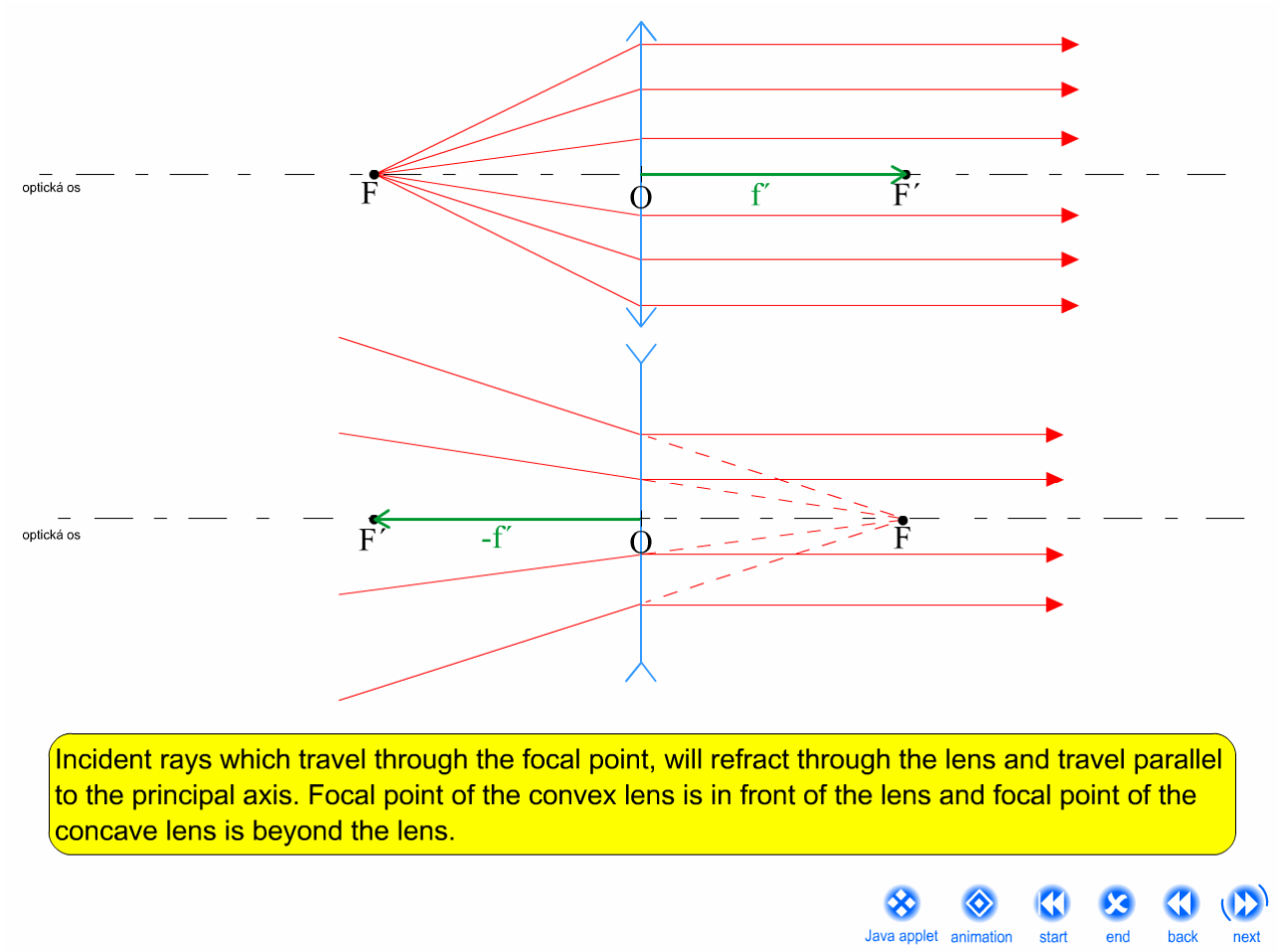

Figure 2
Example of a flash-presentation teaching environment

Literature

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