

# **Experience of developing and using automated teaching aids in Moscow State University of Geodesy and Cartography**

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## **SUMMARY**

Innovative, automated means of training have already shown their efficiency when applied to training process. So, these advanced technologies are being developed at many universities of the world. They include the following technologies:

- educational videos,
- slide films,
- video lectures, electronic textbooks,
- training and supervising programs,
- programs simulating various processes,
- testing systems, etc.

Now Internet-technology is used more and more extensively.

Of course, creation of such means needs great a lot of time, financial expenses, high quality experts. Such innovative technologies, however, pay off quickly. They allow students to acquire training material more effectively, spending less time. Besides, technologies like those make it possible to reduce the costs of the training process.

In the present paper the authors would like to acquaint you with some developments which are performed at Moscow State University of Geodesy and Cartography.

## **AN EDUCATIONAL VIDEO ON GEODESY.**

In 2005 an educational video on geodesy was shot. It is shown to the first-year students as some auxiliary material. It lasts 55 minutes. The video consists of 10 parts.

In the first part there is a general presentation of geodesy is given.

The second part presents the general notion of coordinate systems and reference frames.

The 3-rd part includes the concept of geodetic measurements.

The 4-th part. The concept of azimuths and directional angles is described.

The 5-th part. It defines topographic maps.

The 6-th part illustrates cartographic designing.

The 7-th part. Measurement of lines in the field is shown.

The 8-th part. Measurement of angles in the field is presented.

The 9-part describes geometrical and trigonometrical leveling.

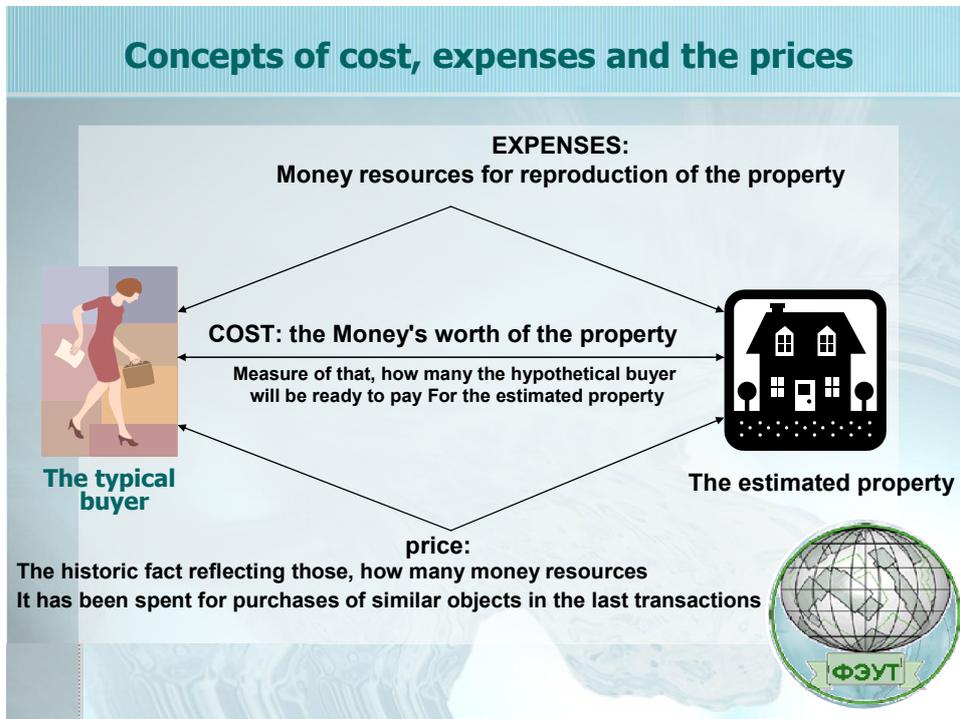
The 10-th part depicts field traverse.

The given film is shown to the first-year students before they start doing their course of studies. Through it students get a general notion of geodesy. Each part of this video is connected to a certain topic of their future studies. At classes students study each of the topics in detail under supervision of their teacher. At the end of the course the video is shown to the students once again. Now they comprehend it more intelligently.

## **SLIDE LECTURES.**

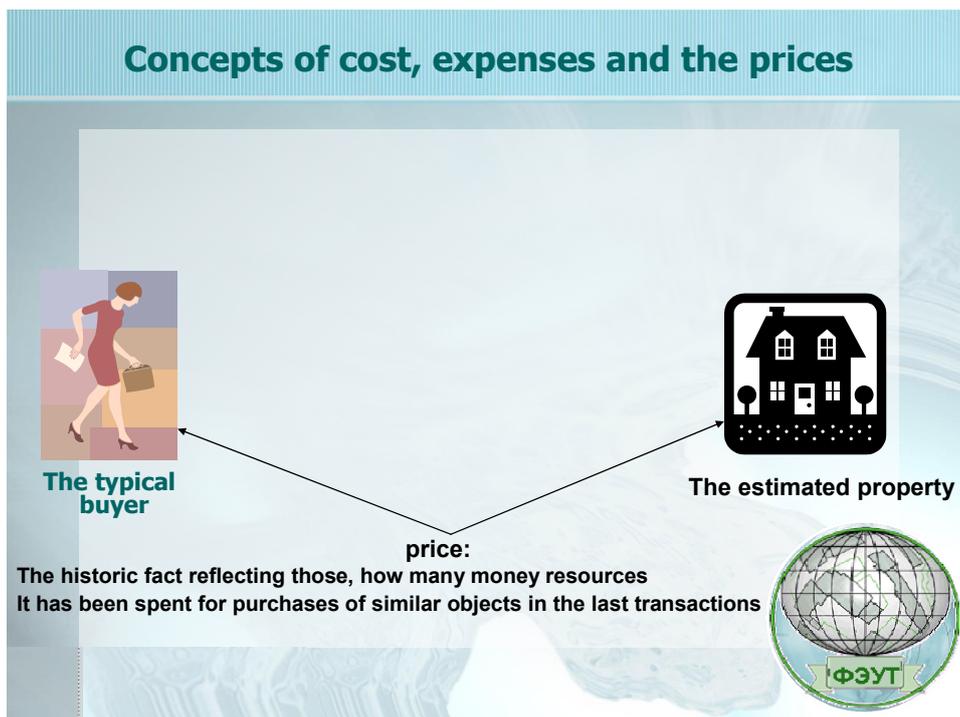
The authors faced a problem to choose some subjects and make slide lectures illustrating the whole course of them. Now we have got slide lectures for the whole courses of such subjects as *Real Estate Economics*, *the Theory of Mathematical Treatment of Geodetic Measurements*, *Internet Technologies in Geodesy and Cadastre*.

Slide lectures are a set of slides made in PowerPoint. Each slide uses animation and transitions of PowerPoint to emphasize your points. For example, the definition of concepts of cost, expenses and price is given with the use of the following slide.



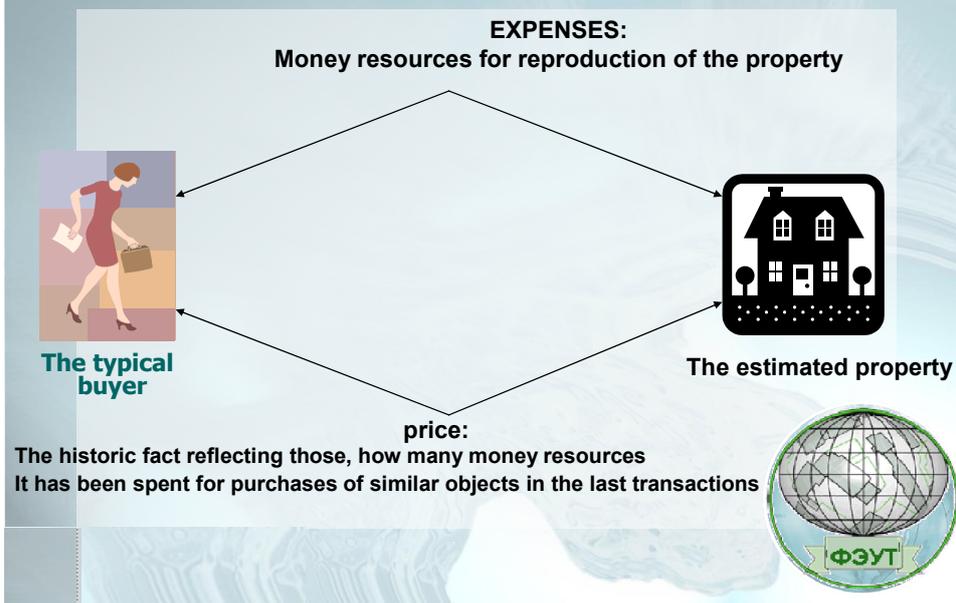
Animated slide.

In this case, animation allows consistently, to give definition of the price, expenses and cost. The one slide on which contents consistently vary is used. Certainly, the same slide can be presented in the form of sequence of three slides. But the perception thus will be worse.



Slide 1. Definition of the price

## Concepts of cost, expenses and the prices



Слайд.2 Definition of Expenses.

Other example is connected with concept of current cost annuity. Animation effects which allow to generate a logic chain of a statement of a material are here used again. Firstly on a slide demonstrate geometrical annuities sense, then analytical sense and the final formula.

Further the example of definition of cost is shown at a market method which we use at lecture. On the first slide of an example are shown an initial material.

And then the technology of the calculations. And then the technology of calculations. It is consistently shown, how to get all.

On a slide there is shown the process of definition of adjustment of price, because of distinction in dates of sales is.

### Adjustment by date of transaction

The characteristic	Estimated object	1	2	3	4	5
price thousand.\$		61.46	52.06	44.37	69.03	43.45
S object m <sup>2</sup>	60	70	65	45	78	55
Financial calculatoin	market	market	market	overestimated cost 7000\$	market	overestimated 5600\$
Date		0.5 year	0.5 year	month	2 weeks	year

$$\frac{0.885 - 0.688}{0.688} \cdot 100\% = 28.6\%$$

The characteristic	Estimated object	1	2	3	4	5
Cost 1 m <sup>2</sup>		0.878	0.801	0.986	0.885	0.790
adjustment		0	0	-0.155	0	-0.102
Corrected price		0.878	0.801	0.831	0.885	0.688
adjustment %		14.3	14.3	0	0	28.6
corrected		1.003	0.915	0.831	0.885	0.884

On a following slide we see the text where lines cover each other. But actually at demonstration of slides one text replaces another. And this action together with respective alterations in the block diagram is carried out. The block diagram shows various theories of management: traditional, neoclassic and the theory of the system approach.

Thus, on one slide it is possible to show all three theories, changing only elements which distinguish these systems.

The resulted examples are taken from disciplines « Economy of the real estate » and « Management of the real estate ». Below the slide from other area is demonstrate. Equalizing of geodetic networks by correlate method. Here animation allows to show evidently process of drawing up of the conditional equations of links. First there is a scheme of a network, then the arrows showing corresponding polygon, then the equations of links which are made on these polygons.

**The conditional equations of communication**

$n=5$   
 $k=3$   
 $r=n-k=2$

$Y_2 + Y_3 - Y_4 = 0$   
 $Y_1 + Y_2 - Y_5 - (H_{M2} - H_{M1}) = 0$

Two superfluous measurements - two equations of mathematical communication between measurements.

$\varphi_1(Y_1, Y_2, \dots, Y_n) = 0$   
 $\varphi_2(Y_1, Y_2, \dots, Y_n) = 0$   
 .....  
 $\varphi_r(Y_1, Y_2, \dots, Y_n) = 0$

}

(1)

System of the conditional equations of communication

**Use of electronic boards.**

Now on faculty there are three electronic boards which are used in lecture auditories and two electronic panels which are used in computer auditories. All devices of Japanese firm " Hitachi ".

**Interactive boards** not only combine in themselves advantages of the big screen of a projector and marker boards, but also allow to keep all notes and the changes made during discussion and even to operate computer appendices, not departing from a board and not interrupting performance.

This device allowing the lecturer to unite three various tools: the screen for display of the information, usual marker board and the interactive monitor. The board enables to show slides, video, to do notes, to draw, draw various schemes as on a usual board, in real time to put a notes on the projected image, to make any changes and to keep their kind of computer files for the further editing, a print on the printer, dispatches by fax or e-mail.

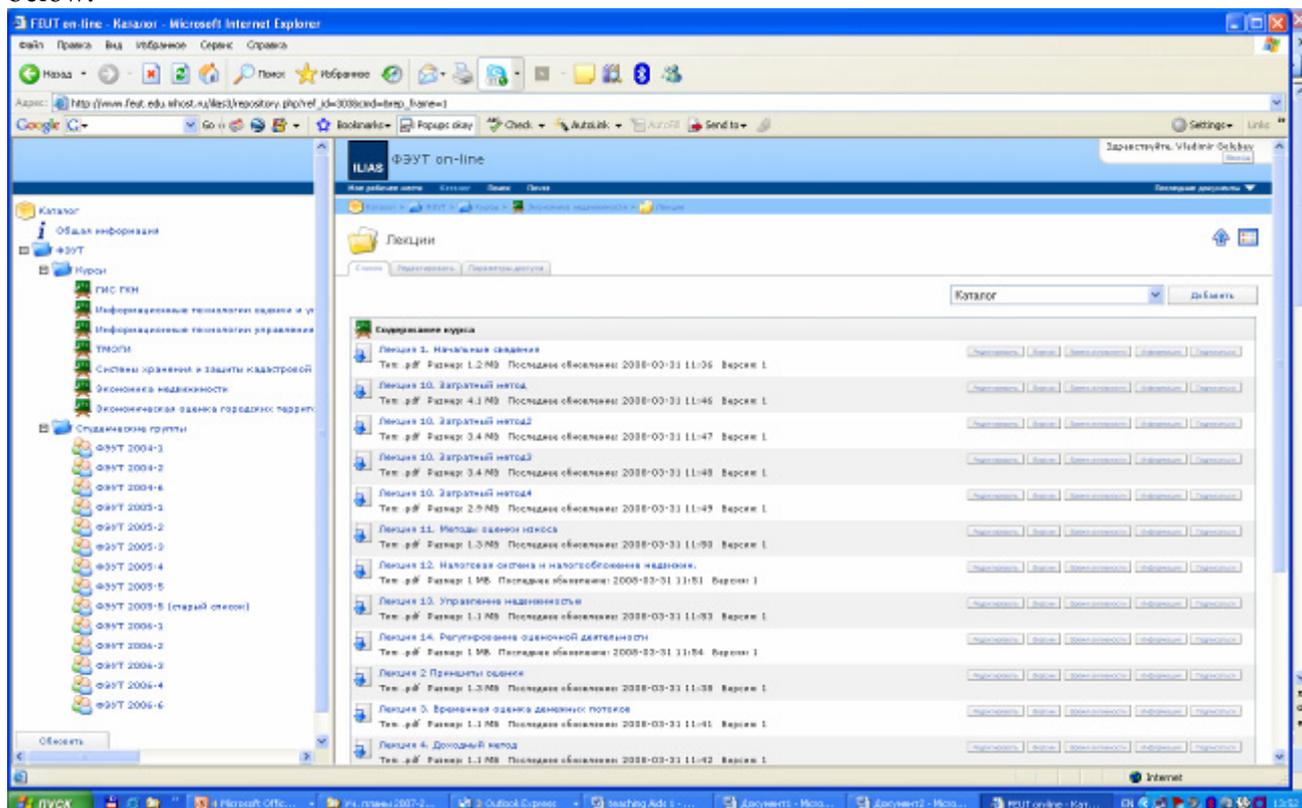
In **sphere of education** they enable the teacher to work with an electronic map, the scheme, figure, a picture. The opportunity of data transmission on Internet does an electronic interactive board by the magnificent tool for remote training.

At the faculty, on a lot of subjects opportunities of electronic boards and technologies a slide-lectures, videofilms and opportunities the Internet are incorporated.

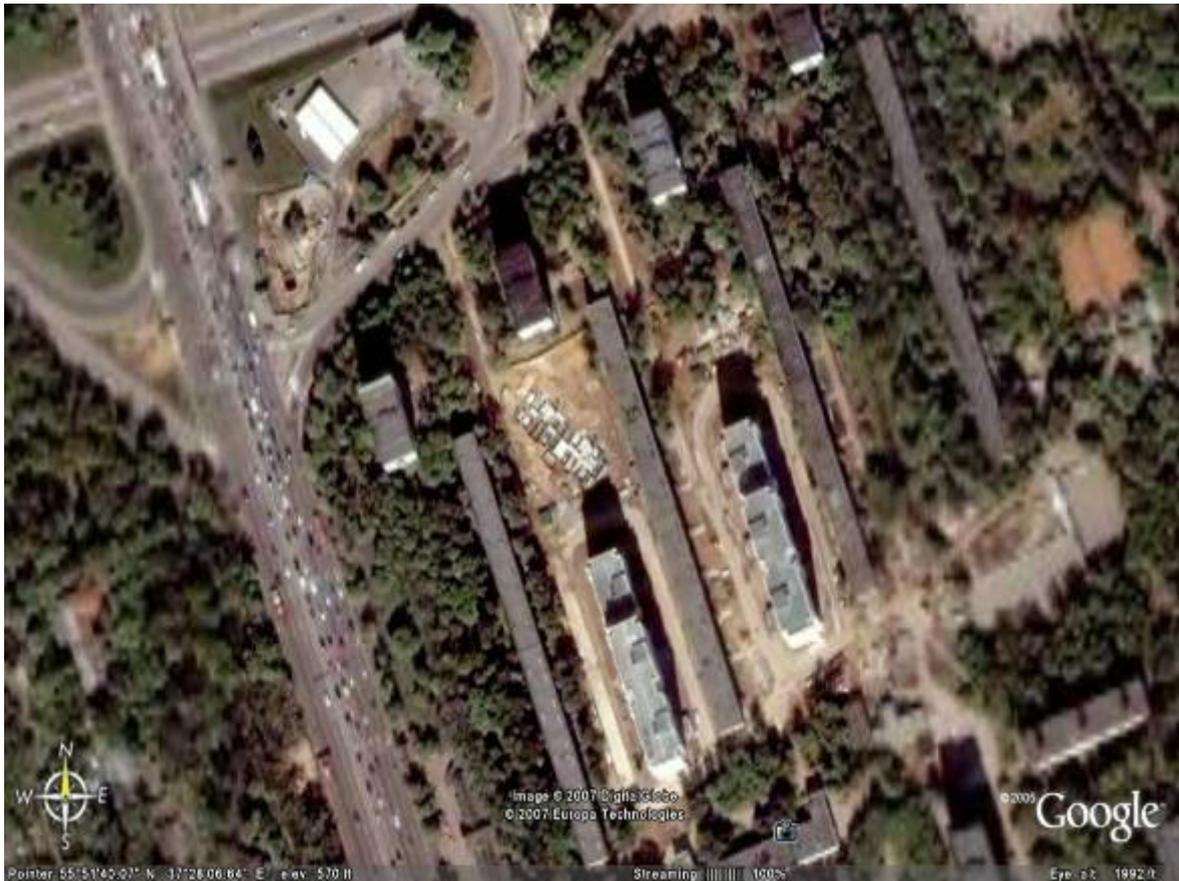
### Use the Internet in educational process.

Electronic boards allow at any moment, at lecturing, to enter into the Internet and to show the necessary material. For example, to find a site, allowing to calculate values of functions of complex percent or to receive differential amendments at processing satellite GPS-supervision. Then to return to a slide-lecture.

At university educational sites where teaching materials are placed all, tasks for students are generated and the account of the tasks executed by students is conducted. The view of this site below.



For the purposes of a cadastre, territorial planning very effectively it is possible to use system GOOGLE.



For example, in a photo reconstruction of one of microdistricts in Moscow is presented. (Dot building). Two are constructed семнадцатизэтажных at home. The ground floor for construction of one more house is visible. But it is inadmissible close settles down to the old house, old house in a shadow almost all the day. It breaks building norms.

### **Media player.**

For complex use of various training means at university it is developed by media player. Media player allows teaching lecture, practical employment according to in advance made plan.

For example, the teacher plans to show video film, to stop on any the staff, to make atop this staff any explanatories, in the form of figures, formulas, etc. After that to deduce Power point, till the certain moment, then it is necessary to cause exel, then to come into the Internet, etc. MT allows to realize it the plan automatically, on an interactive board, actually the board represents the large-format, interactive screen of a computer. Instead of the mouse the electronic marker is used. Each touch a marker to a board, is equivalent to pressing of the left button of the mouse. Each touch of a marker to a board at work of media player according to the made plan changes rates on a board alternates activization of software.

### **CONCLUSION.**

The combination of various technologies on automation of process of training allows to improve considerably quality of training, is more evident and is accessible to represent a material. Such innovative technologies of training are very effective, but demand careful methodical study of teaching materials, greater expenditures of labour at a stage of preparation. But considerably facilitate work of the teacher at training and allow students to master better and more quickly even difficult themes. Therefore such technologies is the future technologies. They can be used and at remote methods of training that is very effective for system of retraining of personnel.

## CONTACTS