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METHODS OF INTRODUCING SCIENTIFIC ACHIEVEMENTS OVER THE LAST SEVEN YEARS INTO THE PHYSICS COURSE

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Introduction

In the past seven years, a scientific revolution has taken place in physics. However, its content is not reflected in most textbooks. Authors introduced the use of a system of electronic manuals that provide the basis for new sections of general physics. These manuals are on topics such as: the processes of the emergence of chemical elements, the synergistic features of changes in the structure of the Earth, the physical foundations of climate change, etc. The features of the methodology for using the manuals are described in the article.

The main problems highlighted in the article:

- The course of general physics content is mainly based on a description of phenomena discovered more than 50 years ago. Meanwhile, a scientific revolution has taken place over the past seven years. Paper publishers do not have time to update all the information.
- The courses in physics and natural sciences were excluded from training for a large number of specialties, even among students of information technology. And these courses are one of the foundations for shaping the students's worldview of technical specialties.
- The disadvantages of the traditional system of teaching physics can be attributed to the fact that it is based mainly on verbal methods of presenting material.
- The problem of the formation and interaction of learning motives among students in the process of studying physics courses through electronic manuals.

Synergetic processes of planet Earth formation

The most important result of the development of science over the past seven years is that planet Earth represents an object that is developing according to catastrophic synergetic scenarios. The discussed article presents the physical mechanisms that ensure the development of planet Earth.

The widespread use of computer methods of data processing and mathematical computer modeling has shown that completely different structures consistently existed before classical model of the planet Earth. Each of them was realized during approximately 25% of the Earth's existence: the Hadean, the Archean, the Proterozoic, the Phanerozoic.

System of electronic manuals in physics

The advantages of using this form of benefit were as follows:

- The amount and content of benefits was updated every year. There was no such opportunity for paper editions.
- The electronic form allowed the use of color illustrations that enabled the use of a non-verbal, that is, a visual channel of information.
- The discussed form made it possible, if necessary, to provide remote work with students.

Motives of students' learning

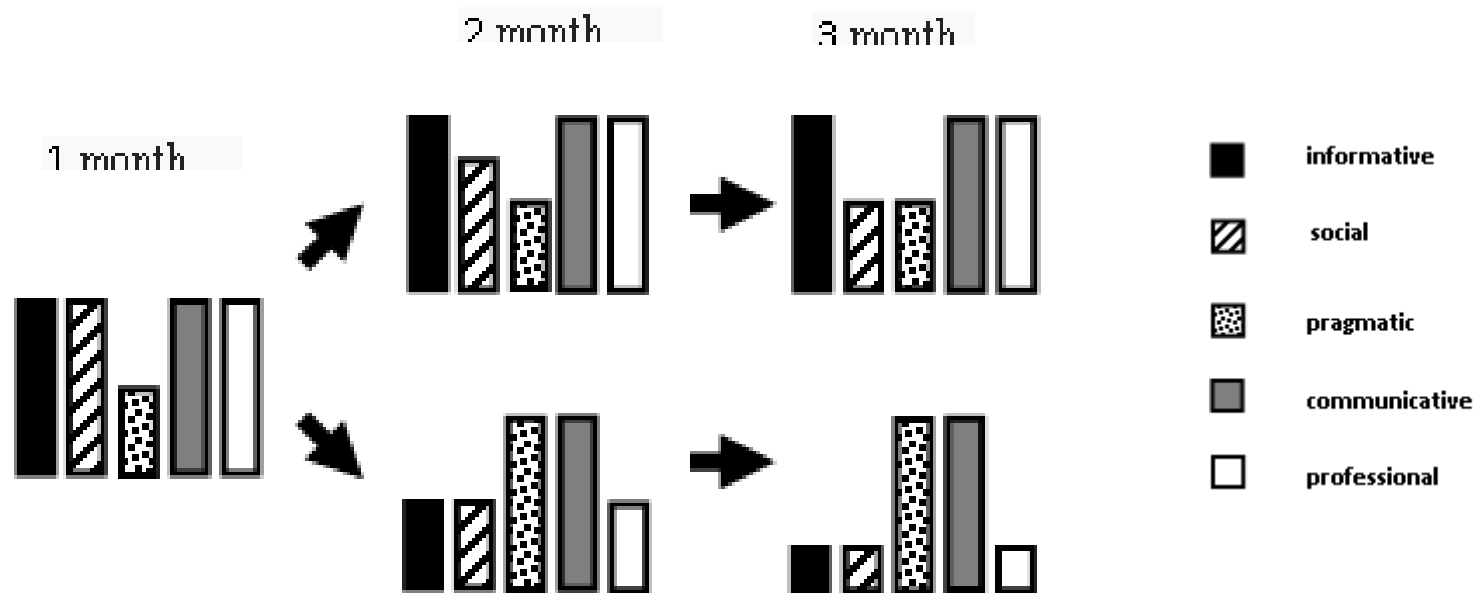


Fig.1. Possible dynamics of motives during the first three months of study

Conclusions

The authors created electronic manuals on the following topics:

1. Fundamentals of the synergetics of global physical phenomena.
2. Synergetic processes of planet Earth formation.
3. The largest global geophysical disasters.
4. The basics of computer models for the development of the Earth's climate.
5. The solar wind.
6. The processes of heat-mass transfer and synergistic structures on the planets of the solar system.
7. Planetary magnetic fields and the problem of inversion of the Earth's magnetosphere.
8. Fundamentals of quantum computers.

Thank you for your attention !