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Information technology in forming cognitive skills

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Abstract:

In the authors opinions, the most important role of education process is forming developed cognitive skills, such as interdisciplinary critical thinking, problem solving, decision making, but enabling role of information technology in forming cognitive skills is not estimated enough. Accomplishing the investigation of the forming cognitive skills authors discovered similarity between study modules method and work with information.

1 Module method

On the one hand according to the theory of constructivism (Daugiamas, 1998) teacher's role is seen as a facilitator guiding students generate their own knowledge. The teacher can use different strategies to develop the higher level of cognitive skills. In the course of our work experience with students the conclusion has been drawn that many students are capable only of concrete thinking (according to Piaget), many of them lack background knowledge and they are not aware of conscious study process methods, i.e. students "do not know how to learn".

On the other hand on accordance with the requirements of the Bologna process the curriculum in higher schools must be developed in compliance with the credit – module system. Practice shows that there are various approaches to forming modules:

1. Modules can include various parts unites according to subject (lectures, exercises, practice);
2. Modules can include courses of several semesters and have the exam after completing the module;
3. Every module requires knowledge, skills and abilities acquired in previous modules;
4. Modules are defined by number of credits and hours in semester week.

Term "**module**" in the Longman Dictionary of Contemporary English (1995) is explained as one of the units that a course of study has been divided into, each of which can be studied separately. Study module method's goal is to provide a certain amount of knowledge and skills, which are realized, integrating separately divided study modules.

The authors have worked out a structural scheme of the study modules method. The separate themes have been divided into contents modules: The Title → Background Knowledge → Problem → Additional Information → Theme Solution → Conclusions.

BACKGROUND KNOWLEDGE is based on the conclusion, that studying is efficient only when a student can refer new information to the previous knowledge. The goal of this module is to indicate, which questions should be known in order to follow the solution of the scheme successfully. Thus this module is structured into methods, concepts, and regularities. In the module PROBLEM it is important to formulate the problem. The module ADDITIONAL INFORMATION is considered as the continuation of module BACKGROUND KNOWLEDGE. If the questions included in BACKGROUND KNOWLEDGE can not supply with the solution,

then there is necessity to study new methods or come to an agreement about new concepts. This module contains also regularities, which are not learned before, but which will be necessary for the solution. The module SOLUTION OF THE THEME a logic solution of regularities is presented which is based on background knowledge and additional information and that leads to the solution of the problem. The perception of an individual is always selective and everyone in his/ her lifetime has created the evaluation criteria, according to which all new information is classified into significant, less significant and negligible. Consequently, the module CONCLUSION is considered to be of great importance. Structural scheme of the study matter modules (*Fig.1*) shows the cognitive learning way.

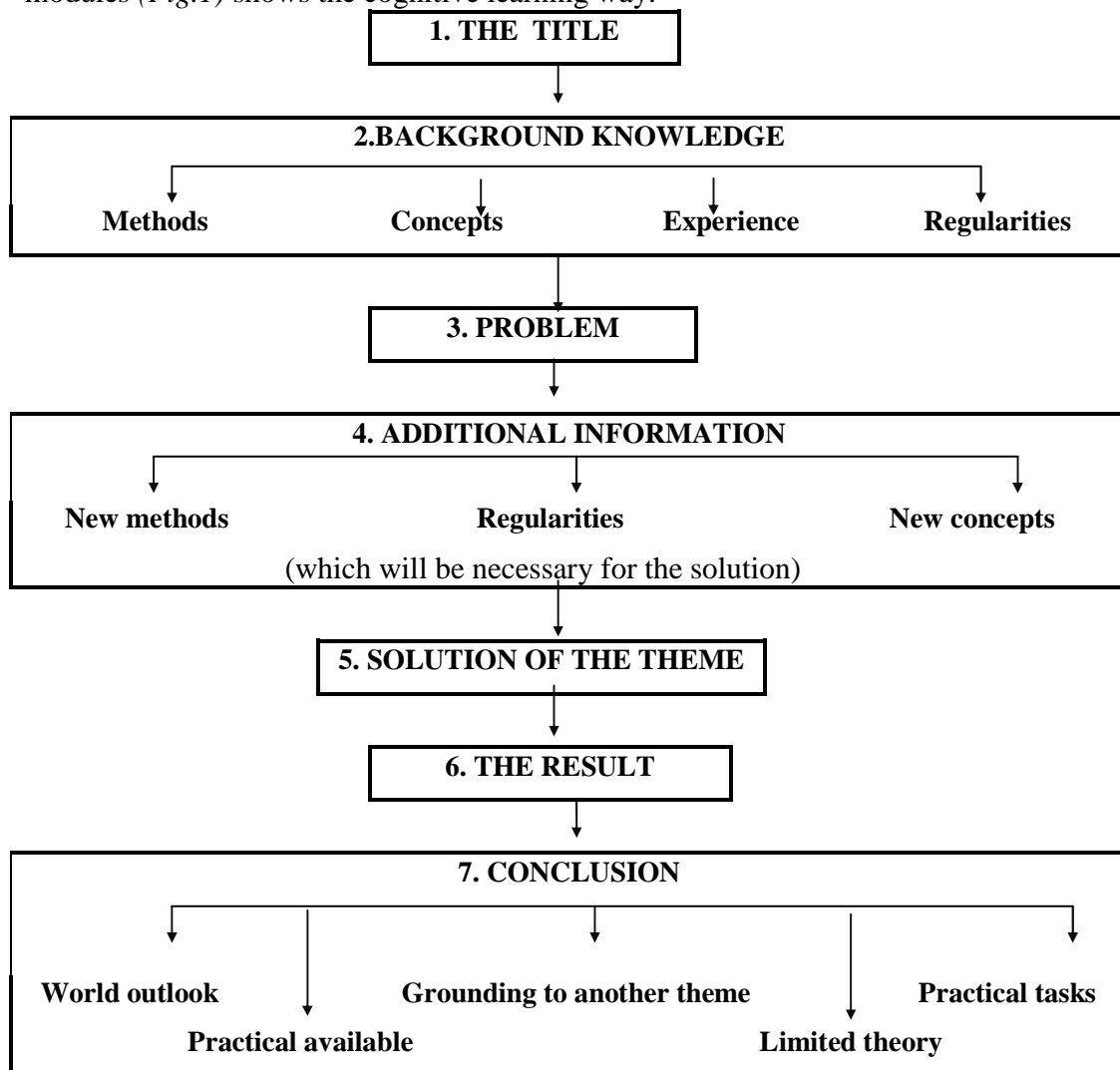


Figure 1. Structural scheme of the study matter modules.

2 Information culture

The main prospective effect is from efficient studies' with computers. The aim is to enhance the understanding of concepts and the acquisition of skills. Information technologies play a fundamental enabling role in forming cognitive skills among others because it:

1. Provides the means to record contributions of anyone permanently with a minimum of effort;
2. Makes the complete collective record accessible for every, no matter at which location they stay. It means that knowledge is self-similarity, role-following;
3. Allows for a quick reorganisation of contributions and stores previous stages of organisation automatically for reflection or unforeseen reuse. It is intensive reuse property.

One of the characteristic features of the development of modern society is a rapid growth of the information flow. It is more and more complicated to find one's way in it at present. That's why the question of acquiring the necessary knowledge, abilities and skills for work with increasing the flow of information. It means that nowadays are actualized the question about information culture.

Information culture can be defined as the culture of work with information. The process of forming information culture is aimed to training and developing creative person and his self-development. In the authors opinions information culture is an extent of knowledge, abilities and skills connected to the search for, processing, storing and creation of information items using new information technologies, realizing the necessity of using information resources; principles and rules of person's behavior in information and communicative systems; vital aims, estimations and attitude to the world. Therefore information culture (American librarian association possessing) can be characterized as methodological devise of cognition:

1. Understanding necessity of actual and significant information;
2. Skill to find the information sources, using the most effective search strategy;
3. Skill to estimate information critically and competently, to differ facts from opinions;
4. Skill to estimate the found information creatively;
5. Skill to use the received habits on information search at personal purposes and in professional activity;
6. Understanding information meaning in the development of democratic society;
7. Knowledge and following ethical standards in the sphere of information technologies;
8. Skill to cooperate in search and use of information, skill to share the results of one's activity.

3 Conclusions

The basic conclusions of the investigation have been approbated in practice with students according to the managing of the cognitive activity making use information technologies. In order to optimize the study process in physics the following should be observed:

1. The course should be divided into separate themes, the sequence of which is appropriate to the *logic of the given science*;
2. To avoid dogmatism in studying the theme, the problem is formulated for every theme using essential facts or natural phenomena and the ways to solve this problem are searched' ;
3. General regularities should be reflected in problem solving;
4. Additional facts, phenomena and processes, which could be concluded from these regularities, should be analyzed.

By distributing study contents into study form modules and controlling success in studies in separate modules the students are offered the opportunity to become aware of their knowledge and skills, to make the most of the existing and acquire new ones. Effectiveness of learning process and quality of specialists' training in many aspects depend on the right organization of

control. Among other thing efficient quality control of a learning process can be ensured by overall and operative application of information technologies. As we see there are similarity between study modules method and work with information.

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