

## Training in mathematics with games. Math educational games. Module from [www.planeta42.com](http://www.planeta42.com)

Ognian Bobchev

*Online Didactic Game Model for Educational and Cultural Learning: The modern computer technologies and the internet gives the opportunity for every user to reach various information and to educate him self from home. That, what is needed, is this information to be given trough systematized, simple and even fun type. Using the online didactic game will enable the online users to rise their overall culture level. Learn new knowledge and compare their current education level, playing games.*

**Key words:** educational, math, mathematic, online, didactic, games, self learning, entertainment, Internet

### INTRODUCTION

The education with a computer game is not something new, but it is necessary the whole idea to be developed further more, to be discussed and integrated more and more. The aftermath is a development of better, high quality, more educational and more competitive games. The online research show, that there are not many sites on Internet, where a good educational games can be found, and a lot of them aim a definite age or academic group of people. The computer games meant for education have many advantages and applicability. They may be used at home, under or without supervision of parents. At school, under or without supervision of teachers. They may be included as addition under a lesson in any textbook for any subject. They can be used for practicing and trainings as well as at home and at schools. Games can be used as a valuation method, especially under the form of test games. Eager to learn children can use them for self-evaluation. With the rapid development of the computer technology, games will found more and more suitable places with education matter like simulators and 3D visualization. This report will represent a computer game for education in math subject, which may be used as well as third grade children and adults for practicing and training.

.....

.....

### PRESENTATION

#### I. GOALS

**1. Didactic game goal:** The aim of the game is to give knowledge, which is represented in memorising of simple but important mathematical equations, which are used in every day life. With the constant training of a given situation, a definite pair of neuron connection are combined to form a "Stalakton", which eliminate the time dely for finishing the corresponding thinking process and avoid making mistakes.

**2. Technical accessibility:** Accessibility is an important technical element during development of a computer game. If the application will start on a given computer is a characteristic that must be under tight observatron – operation systems, active X controls, platforms, updates and so on. A good decision is the use of older technologies, so more work stations can be coverd, but that must not be for expense of quality!

**3. Accessibility:** The applications developed under [www.planeta42.com](http://www.planeta42.com) flag are free and are distributed trough internet. Future cooperation with magazines, papers and education institutions is immanent.

**4. Efficiency:** Efficiency is a function of the game structure, the game idea, the interest, and the desire for learning of a given person. It is different for the different subjects, but average efficiency can be ascertained with a test experiment, which scale is impossible for the team for now.

**5. Motivation for research and science activity:**

- ❖ Curiosity, the need for new knowledge and sights. Creativity;
- ❖ Motivation for achieving a concrete scientific;
- ❖ Motives, used for acquiring new skills and experience, and not solving a given problem;
- ❖ Motives, involving diversity and variety in education, or pleasure from learning.

Motivation is:

- Internal – the learner acts to satisfy internal needs for new, complex feelings; it is expressed as interest, passion and pleasure from the learning process;
- External – the learner acts to achieve a particular result, which meets its needs, for example, from a high success motivation tension is reduced and the actions are suspended.

In the proposed project, the motivation is examined in two aspects. One is through different methods and techniques to attract the attention of students (children) to use games for learning, and the second time was when these very games incentive to learn new knowledge.

**6. Player objectives/ rules /:** The rules of the game are conventional. Intentionally is simplified in order to be more understandable. For a certain time the player must decide a few simple equations, choosing the correct answer in symmetric network of figurines. In the true answer the correct figure disappears with effective animation. With advancement in stages, the complexity of the equations increases, as for each stage completed the player is rewarded with beautifully painted medal. Upon successful passage of all stages the player is rewarded with the overall title, which represents the image of a certain size and number to obtain bonuses to the site [www.planeta42.com](http://www.planeta42.com). There are two levels of difficulty for beginners where erroneous answers do not restart the level, and advanced - for a wrong answer level restarts, having not lost earlier won medals in other levels. Each level is passing for a specific time that is defined in the testing of the game with 5 grade children in the school computer hall of Primary School "Brothers Miladinovi" - Rouse.

**7. Goals related to education:** Providing easy and fun way to store and easy handling of basic knowledge such as multiplication table, countries in Europe and others; Promotion of knowledge and culture of Bulgaria and Europe; Offering useful information in an interactive and fun kind; Enrichment of broad-cultural knowledge of the new generation of children who use the computer more than the book.

## II. TASKS

**1. Understandability:** The first task is to ensure the application that immediately understood what it comes and what is being done. Small shortcoming of existing games is that they involve complex formulas and ideas that are difficult to understand at first glance. This can lead to loss of interest in children, and interest is important for motivation. One of the techniques that our team used to attract the interest is in short "pictures and animation".

**2. Achieving motivation:** Development of a master Titles for interest and incentive.

**3. Achieving didactics:** The introduction of educational elements in electronic formats. Effective combination of "education", "convenience" and "entertainment"

**4. Development:** Choice of platform (s), Interface, structure, graphics, parity; Study of the audience and finding the best option for delivering knowledge; Create / invent / game, concept, genre, insertion element in the educational concepts, programming, schemes and algorithms.

**5. Support:** Maintenance of functionality, timeliness and interactivity of the site and games. The games are updated each year if there is new information about this matter or geopolitical, economic and scientific and theoretical changes.

## III. GAME AS EDUACTION AND TRAINING TECHNOLOGY

To train someone through the game has been used long before the creation of the computer. Sport and military training and strategies are examples of this.

Today there are already many studies of different educational games, with electronic encyclopaedias and other tests, only that there is no opinion that the use of these programs is good for students and children and encouraging them to use these electronic educational games is not a priority nor in schools nor in houses. Still seems the computer is enemy of the child rather than his assistant. Certainly in the future this will change, so we need more from now to persuade institutions and parents that not all games are harmful to children and that games can be used even in formal education.

Examples:

<http://atemi.pip.digsys.bg/media/download/SolarPuzzle.html>

<http://atemi.pip.digsys.bg/media/download/GeographyPuzzle.html>

Which areas can be used by a computer training game is a matter of opinion. How to make a game that teaches basic engineering concepts, without weakening the responsibility of the engineering work is not an easy task.

### **THE GAME IN NO EVENT WILL REPLACE THE CONVENTIONAL EDUCATION AND TRAINING!**

*Its use as an educational technology will be in addition to supplementing or manual to the common theory and practice of a subject, and to distinguish the educational game in only entertaining games, we will call them Interactive Electronic Solutions (IES)*

## 1. Types of games appropriate for education and provoke of interest among children, toward education and knowledge:

❖ Puzzle game. IES are arranged pieces, objects or parts of certain places, and are very suitable for testing the knowledge of students after every lesson or after each period. They can be used as an exercise and evaluation. A great advantage is the use of visual memory of students in learning and memorizing.

❖ Test games. IES's in which we have set of condition and must select the correct response, image or situation. This type of interactive application is not as interesting as the puzzle, but includes specific test information that can be deducted directly from a textbook or exercise. The test games can even write evaluations. Electronic tests can be developed to absolutely every area of knowledge and education. A detailed description of the game can be found at the test project page - valuation.pdf.

❖ Adventure games. If the test IES's are the most difficult and boring, the puzzles be interesting medium and medium-hard, the adventures are the most interesting and most simple. But they can not be used to provide knowledge for all scientific and educational fields. They are suitable for articles such as: History - which can be traced historic event in the form of an adventure of the main hero or heroes of the event. Geography - which may be presented by various cities throughout the planet:

<http://atemi.pip.digsys.bg/media/download/RousseQuest.html>

❖ Simulators – This could be specialized IES. Can simulate conditions especially in technical and technological-industrial spheres.

❖ Arcade/hand-eye

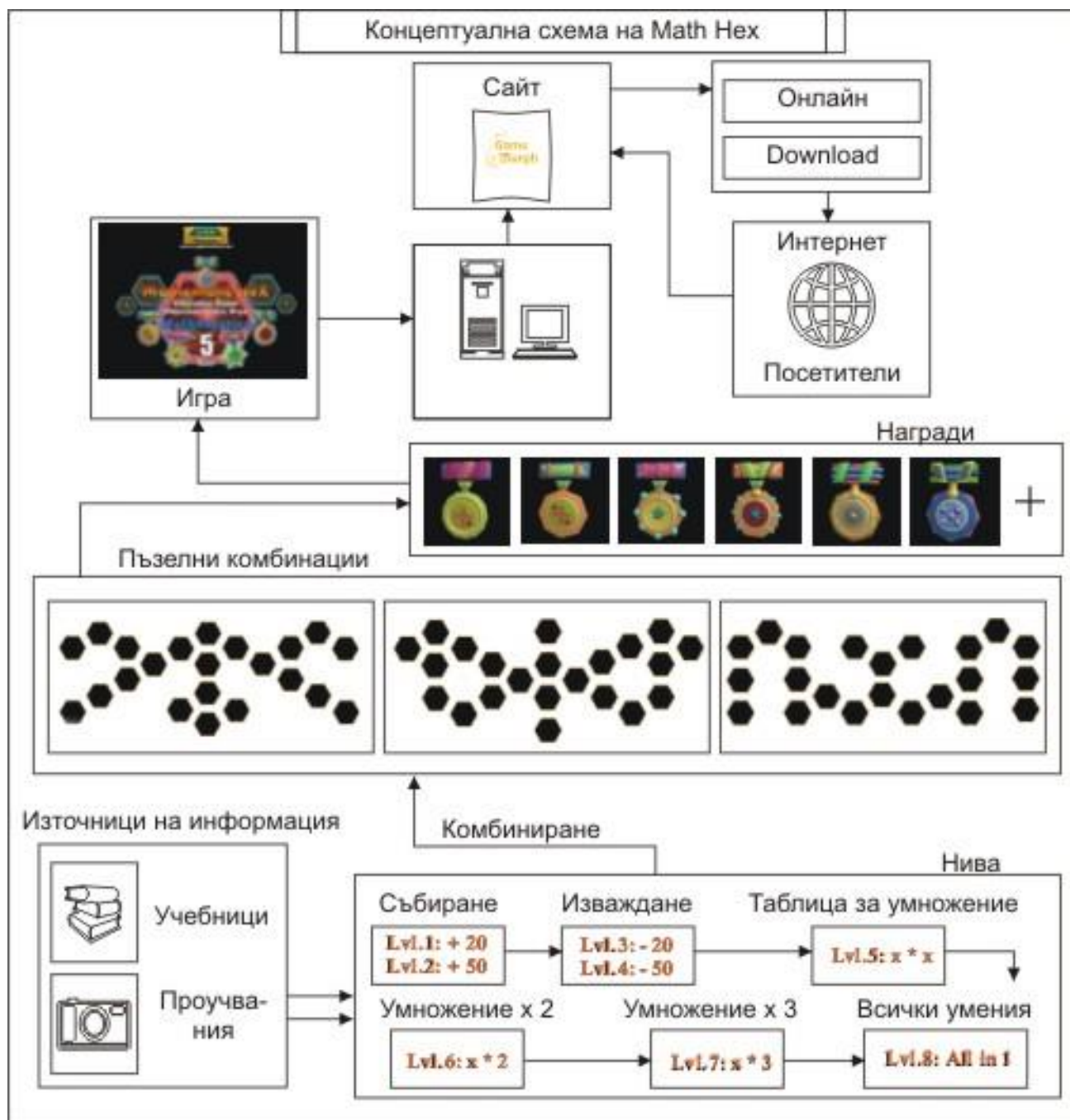
## 2. Critical points, to be followed in developing educational IEA.

- Ethics;
- Accuracy of the information;
- Techniques to attract attention;

## IV. MATHEMATICAL HEX

“Math Hex” is a complex combination of some of the types described above. This is a game that will practicing player in major arithmetical operations. In Figure 1 and 2 are shown some patterns of the development.

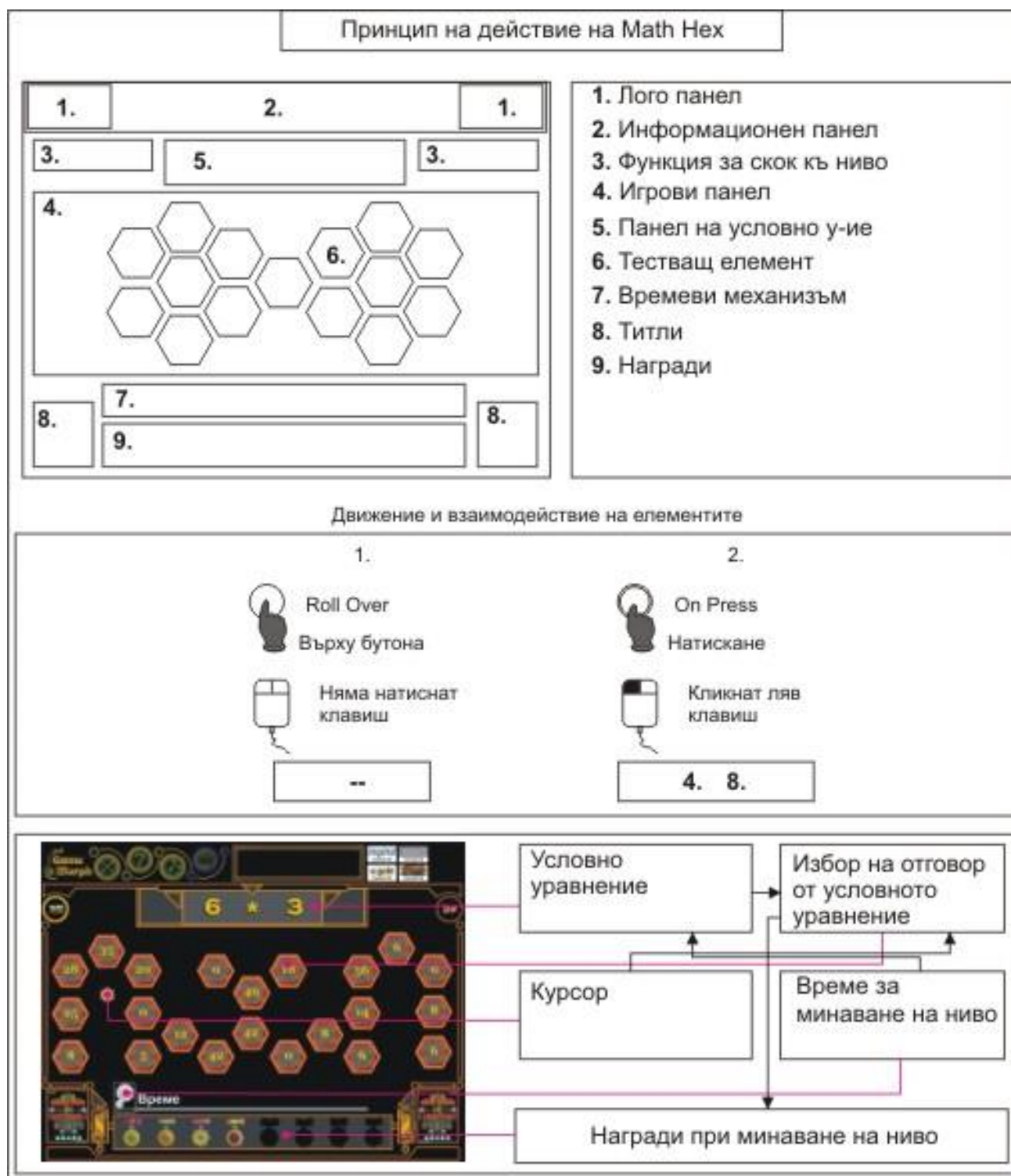
Figure 1  
Concept scheme



**Short description:** After a brief investigation into the textbooks there are lay down basic operations and implementations in stages. The combination matrix of responses is correlated in different symmetrical figures. Following is conditional end of the stage and receiving awards. After that, the game goes compiled, uploaded on the site and over the Internet to be accessible to users.



Figure 2  
Technical principle



**Description:** The game is played only by clicking on the correct hex. The logo panel is universal for all EGS games. The information panel houses all the texts. Panel for choosing the language - English / Bulgarian. (3) Panel to jump to level allows for choosing the desired level. (4) Game panel, or the body is the operational range of the mouse, where are located and the test items/elements/ (6). Panel (5) shows the task. (7) Time mechanism. Titles and prizes are located at the bottom.

.....  
.....  
**CONCLUSION**

The games or interactive electronic solutions (IES), which can be technology for education, testing, provoking interest in children for education and knowledge, can always be used as training tool to a subject or lesson, even without being recommended by the Education Ministry. For this purpose, a special project [www.planeta42.com](http://www.planeta42.com) is developed, which will help students, teachers and parents.

The practical use of the proposed model will allow the group of children, adolescents and young people using the Internet in an interactive and fun way to increase their overall level of culture and education. Compare their qualities and skills applied in different fields of knowledge. To learn about the latest achievements of mankind through the transfer of information from organizations like Discovery Channel and NASA News.

.....  
.....

**LITERATURE**

- [1] „Research in the teaching of geometric transformations” Emilyya Velikova
  - [2] Encyclopedy of Psychology, 1998
  - [3] Internet
- .....  
.....

**CONTACTS:**

**Ognian Bobchev** - RU „Angel Kynchev”  
**Faculty:** Natural Science and Education  
**Department:** Pedagogy  
**Profession:** Information and Educational Technology  
**Session:** Summer 2008 on  
**E-mail:** xxxxxx@[gmail.com](mailto:xxxxxx@gmail.com)