УДК 378.016: 37.091.33-027.22

ON DESIGNING AN ELECTRONIC EDUCATIONAL MEANS «GEOMETRICAL DESIGNER» BY USING THE ADOBE FLASH

Rybalko Olga,
teaching methods professor in mathematics and teaching methods science in primary school, Humanitarian Pedagogical College named Ivan Franko, Pryluky, RybalkoOlga2009@rambler.ru.

Abstract. It is common knowledge that by program Adobe Flash it is possible to create sites, vector drawings, animations, cartoons, interactive movies, games. The Adobe Flash is less commonly used as powerful tools for creating electronic educational resources. The author disproves this thought and presents a sample of a didactic game — «Geometrical Designer» which is designed for teaching mathematics in primary schools. The game can be designed (even without any assistance of professional programmers) in the program Adobe Flash by using one's personal programming language Action Script. In order to be able to create effective electronic manuals it is not absolutely necessary to know to perfection the language of programming Action Script. It will be sufficient to know the words of command and scripts which should be introduced into frames and stills, buttons, clips.

Keywords: Adobe Flash, Action Script, elementary mathematics, geometry, geometrical designer, geometrical figures.

The present-day changes in the social life require introducing new ways of organizing the process of teaching, introducing some pedagogical technologies, which would be conducive to forming foundations, of ability to study. More and more urgent for the educational process, including the studying of geometrical material, becomes using devices and methods directed on forming the ability to use one's knowledge for solving educational and cognitive-practical tasks, ability to independently obtain new knowledge, to put forward hypotheses, to make conclusions [3].

The present-day electronic educational resources, in the conditions of our society are becoming not only one of the most effective means of teaching, but also an important means of forming the world outlook of a personality, integration of the rising generation's view of the world. The considerable potentialities of the electronic teaching give every opportunity to provide every pupil with a really equal access to a high quality education [10].

The problem of forming the competence of a primary school teachers in the field of designing electronic educational resources

Nearly all parents know how sometimes it is difficult to make one's schoolchild sit down and study. But the child will never object to working with pleasure with the help of his/her personal computer. And it also helps the teachers better assess their pupils' level of knowledge and abilities and induces them to seek for some new, non-traditional methods and forms of teaching (Rybalko, 2011).

The awareness of some fresh needs of their pupils makes the teachers change their attitude to the informational technologies and look for some ways of their effective use in their professional activities [9].

A teacher is supposed to create such favorable conditions of work that would give an opportunity to secure his pupils a good progress in their studies as well as a feeling of gladness on their advancement from ignorance to knowledge and from unskillfulness to skill. The task of the teacher is to arrange the studies in such a way that his pupils could get satisfaction from the very process of studies [5].

Engaging the informational-communication technologies will give the teacher an opportunity to arrange different forms of teaching and cognitive activity at his lessons as well as to make his pupils' self-dependent work more active and purposeful. An important factor for raising our education on a qualitatively higher level is not only providing educational establishments with computer equipment but also working out and introduction of high-quality pedagogical software.

Teaching practice shows that an up-today school-teacher, while actively using various modern informational and telecommunicate technologies in his professional activities, as a rule, is prone to creating his own original electronic means of teaching. Thus, in spite of the fact that the bulk of such means is worked out by whole bodies of professional devisers, some school teachers will remain authors creating their own means of teaching some particular academic subjects [4].

So, elaboration of new, perfected electronic means of teaching , specifically for teaching mathematics in the elementary school, on the basis of modern computer technologies with due regard for the available pedagogical experience and the achievements of the psychological and pedagogical sciences is especially topical at the present time. How completely and effectively the potentialities of our computers in our teaching junior school children will be used depends upon solving this task [11].

While preparing for a lesson a teacher usually uses syllabuses of instruction which are worked out by pro-

fessionals. But seeking for the syllabuses that could meet the requirements of a specific lesson, a concrete group of pupils also takes much time. Many school teachers during their work with the pupils of junior forms acquire considerable experience. In the many years course of their teaching work teachers develop their own personal style of teaching peculiar only to them, while many electronic syllabuses are intended for a mass user [9]. That is why many school teachers begin to work out their own electronic resources. The majority of our teachers are capable of creating electronic teaching resources in the electronic program Microsoft Office Power Point with due regard to the psychological peculiarities of the pupils of the junior forms. The junior forms pupils' love of computers stimulates the teachers and students of higher educational establishments to creating their own teaching resources. But a much lesser number of teachers know how to work with the electronic program Adobe Flash.

Creation of the electronic means «Geometrical Designer» by the the electronic system Adobe Flash

One of the chief trends in working out the multimedia produce is using flash technologies. With the help of them full-fledged multimedia produce can be worked out [8].

Programming experts hold it that certain sites, vectorial pictures and animation are regularly created in the system Adobe Flash (Duminsh & Zaytseva, 2012). And teachers know it to be also a powerful program for creating electronic educational resources. Interactive tables and visual aids, teaching electronic patterns, didactic computer games and tasks conducive to forming logical and algorithmically thinking can be built up in the program. Using the Adobe Flash one can make up assignments for controlling one's pupils' knowledge level (Pushkaryova & Rybalko, 2015). Flash is a rich medium for working out electronic educational resource. Its attractiveness lies in the fact that the installed graphic means give a wide opportunity for working out the design of a program means, and the installed sufficiently powerful programming language Action Script secures an effective operating the electronic product [1].

The main trump card of the Flash is its own programming language Action Script. With its help one can control any element of the programmed product and alternate its_characteristics. As a result of using the Action Script a teacher has a much ampler opportunity for creating an interesting and high-quality electronic resource [7].

If a school teacher wants to independently create effective electronic educational resources in order to use them at his lessons it will become necessary for him to learn to work in the program Adobe Flash. For being able to create good electronic manuals it is not absolutely necessary for him to know to perfection the programming language Action Script. It will suffice to know that no object can work exclusively on its own but is supposed to get an command (script). So, if a teacher has at his disposal a good methodological manual with a step-by-step description of building a didactical game he will be able on his own to model didactical games for his pupils of junior forms. Knowing what particular orders (scripts) he is to employ to the buttons, stills, clips the teacher will be able to create different programming means of teaching his pupils.

It should be borne in mind that all electronic educational resources should meet the principal didactical requirements which presuppose the following principles: scientific character of teaching, clarity, problem-containing, use of some visual aids, self-dependence, stirring to greater activity, systematic character, consistency, durability of knowledge, unity of educational and educative functions of teaching, possibilities of using of his choice the tempo of teaching, variability and interactivity of teaching, correction of actions, developing the intellectual potential of his pupils [6].

Let us introduce to you the teaching manual "Geometrical Constructor" worked out by the author of this article. It is made with the purpose of better learning the school material on geometrical figures. Besides, this electronic product is conducive to the development of logic thinking and engineering skills of junior schoolchildren, as geometrical material has much in common with artistic perception of the world because a considerable space in geometry belongs to image-bearing thinking. The thinking of junior children is graphic-active and graphic image-bearing. Geometrical material is learnt by a child in the course of his solving various problems on electronic designing, while geometrical generalization appears in the form of the result of his solving a designing task [10].

With a much better result those problems are solved which are presented in an interesting game-like form. Puzzle-games or geometrical designers are known since the ancient times. The essence of the game lies in presenting the silhouettes of some material objects on an area, according to a model. The stimulating a creative initiative, educative and teaching influence of electronic geometrical game programs is many-sided. They develop children's spatial imagination, thinking of a designer, abilities for combining, quickness of wit, inventiveness as well as creative imagination and sensorial abilities. Electronic syllabuses of instruction for junior schoolchildren are supposed, first and foremost, to have a developing nature, to be close to the interests of a child, to be conducive to his/her aspirations for experimenting, to his/her creative activity. Achieving these goals is next to impossible without taking into consideration the peculiarities of children's activities, their game interests [5].

The teacher may use his electronic material at his lessons of geometry, while his pupils will have an additional opportunity to study at a convenient for them time and in an individual tempo. It will be conducive to the intensification both of the teacher's and his pupils' work. The subject-matter of the electronic manual is intelligible to junior forms children.

The electronic manual can be installed into any model of the computer: the ordinary personal computer, notebook, netbook or map-case. The electronic teaching manual «Geometrical Designer» consists of a title electronic page, electronic pages **Instruction**, **Authors**, **References** (fig. 1). It also includes 5 tasks of

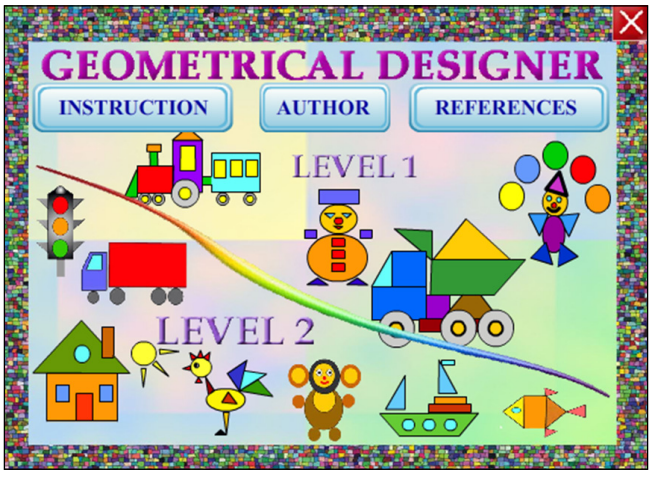

Fig.1. The title electronic page of the didactic game «Geometrical Designer»

the first level of difficulty and 5 tasks of the second level of difficulty (fig. 1).

After pressing the buttons **Instruction**, **Author**, and **References** (fig. 1) the user will be able to pass over to the corresponding electronic pages and obtain information concerning solving the problems and to find out who had taken part in working out the electronic resource and to obtain some information about the resources used while making up this program. For the pupils of junior forms it necessary to keep in memory the following unbreakable rule: before beginning to play any didactical game it is necessary to get acquainted with the directions to it. On this very electronic page the designer of the game communicates with the schoolchild. The pupil should attentively read the rules of the game and strictly stick to the rules while doing the suggested tasks.

After pressing on the pictures which are situated on the title electronic page (fig. 1) and consist of geometrical figures (fig. 2) the schoolchild will be able to pass over to doing the tasks of the first level of complicacy (fig. 3).

After choosing one of the tasks placed over the wavy line the pupil passes over to doing one of the tasks which he is to do. (fig. 3). In the tasks of the first level of complicacy one is not supposed to revolve the geometrical figures: they are to be carried over into the area situated to the left of the vertical line. One can obtain a model by pressing the **blue** button with the interrogation mark which is situated in the left top part of the task. But if a pupil wants to train his memory he is expected to press the left part of the mouse on the model, and it will become invisible, only the blue button will appear (fig. 3, fig. 4). Besides, one can make use of the button **Delete** (the picture of an eraser) and start doing the task from the beginning.

When a junior schoolchild is through with his task it is necessary for him to press the button with the view of a hut which is presented on the left lower part of the electronic page (fig. 4). With help of this button he goes over to the title electronic page in order to choose a subsequent task (fig. 1).

On the title electronic page the pupil may press one of the buttons placed over the wavy line (fig. 2) and go on to doing a subsequent task which belongs to the first degree of complicacy. But if the junior pupil will choose one of the buttons placed under the wavy line (fig. 1, fig. 5), he will be able to go on to doing the tasks of the second degree of complicacy.

In the tasks of the second degree of complicacy part of the geometrical figures is placed in a different from the model order (fig. 6, fig. 7). On having selected the necessary for him geometrical figure, the pupil is to press the left button of the mouse several times in order to place the selected geometrical figure in the way presented on the model and to pull it to the allotted for it place.

In all cases the pupils have an opportunity to build a picture according to the model placed on the left side and to find out of what geometrical figures the given picture consists and to count the number of the figures.

The game develops the child's memory, attention, imagination, intellect and fantasy, — all that constitutes the values of a personality. The pupils get acquainted with some intellectually creative games, that engender a number of skills and habits which secure transition from reproductive to self-dependent work: the ability to be observant, power of analyzing some samples of their teacher's questions. Tasks of such type give an opportunity to the able pupils to reveal and to develop their potentialities to activity, while for the pupils with lack of self-confidence — to encourage their imitativeness, to develop their quickness of wit.

Conclusion

In this article has been presented only one sample of an electronic program worked out with the help of the means of the Adobe Flash. So, if a teacher wants to create electronic educational resources he is expected to learn to work in the medium of the Adobe Flash. In order to work out such a game the students of higher pedagogical educational establishments or teachers of the junior forms,

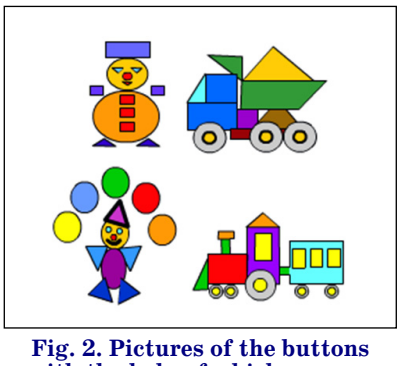

Fig. 2. Pictures of the buttons with the help of which one can pass over to doing the tasks of the first level of complicacy

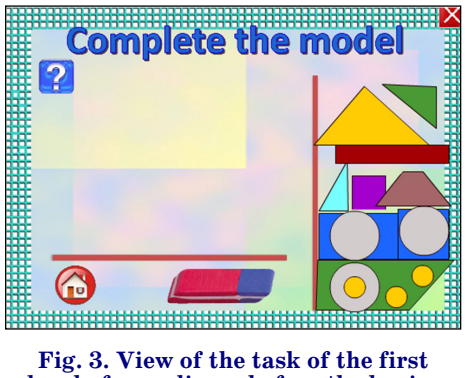

Fig. 3. View of the task of the first level of complicacy before the beginning of the work

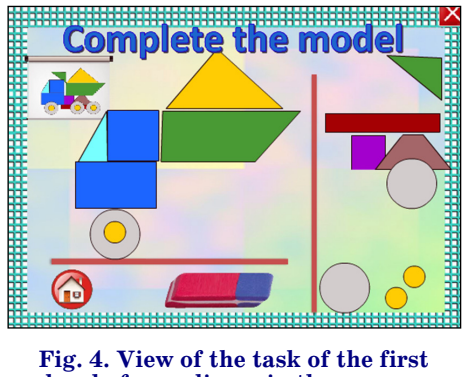

Fig. 4. View of the task of the first level of complicacy in the process of work

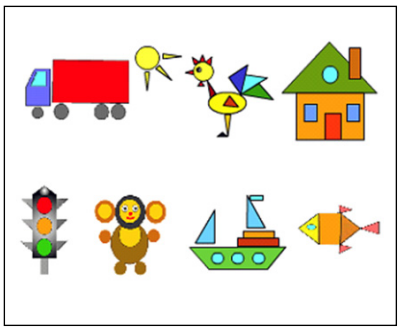

Fig.5. Views of the buttons for doing tasks of the second degree of complicacy

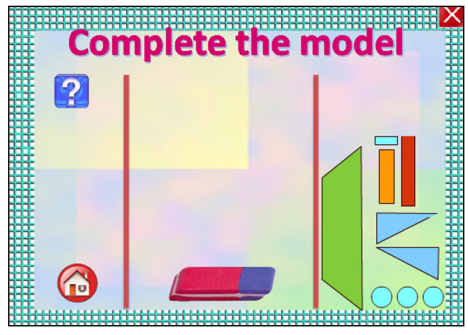

Fig. 6. The view of the task of the second degree of complicacy before the beginning of one's work

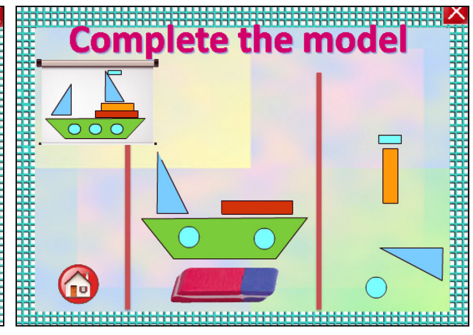

Fig. 7. A sample of a task of the second degree of complexity in the process of work

who have no idea of the Adobe Flash should have two or three training lessons, and then they will grasp the principle of its work and will be able to work in the program Adobe Flash. Not all our teachers are willing to create electronic educational resources, but computer technologies are quickly advancing and become more accessible for an ordinary user. Our teachers know what kind of games their pupils of junior forms are fond of, and besides, a lot of interesting and necessary material which exists in the educational literature on paper remain beyond the scope of attention of designers of electronic programs. But a creative teacher, on seeing some interesting for him material at once takes to thinking about what kind of didactical game he can work out.

Creating self-dependent electronic resources is conducive to the teacher's progress because they give him a vast opportunity to be always an up — to- date, necessary and interesting personality for his school children. And the use of modern electronic educational resources gives an opportunity not only for improving the quality of education and upbringing but also to heighten the inquisitiveness of junior schoolchildren, to improve the studies, will be conducive to the development of creative abilities and personal interest of the pupils in their studies.

* * *

Рибалко О. О. Створення електронного навчального посібника «Геометричний конструктор» з використанням Adobe Flash

Анотація. Відомо, що використовуючи програму Adobe Flash можна створювати сайти, векторні зображення, анімацію, мультфільми, інтерактивні ролики, ігри. Менше на Adobe Flash звертають увагу як на потужний засіб для створення електронних освітніх ресурсів. Автор спростовує цю думку і наводить приклад дидактичної гри «Геометричний конструктор», призначеної для навчання математики в початковій школі. Дану гру можна створити самостійно, без допомоги програмістів у програмі Adobe Flash з використанням власної мови програмування Action Script. Для того щоб створювати хороші електронні посібники, не обов`язково досконало знати мову програмування Action Script. Достатньо знати деякі команди і скрипти, які слід вводити до кадрів, кнопок, кліпів.

Ключові слова: Adobe Flash, Action Script, початкова математика, геометрія, геометричний конструктор, геометричні фігури.

* * *

Рыбалко О. А. Создание электронного средства обучения «Геометрический конструктор» с помощью Adobe Flash

Аннотация. Известно, что используя программу Adobe Flash можно создавать сайты, векторные изображения, анимации, мультфильмы, интерактивные ролики, игры. Меньше на Adobe Flash обращают внимание как на мощное средство для создания электронных образовательных ресурсов. Автор опровергает это мнение и приводит пример дидактичной игры «Геометрический конструктор», предназначенной для обучения математике в начальной школе. Данную игру можно создать самостоятельно, без помощи программистов, в программе Adobe Flash с использованием внутреннего языка программирования Action Script. Для того чтобы создавать хорошие электронные пособия, не обязательно в совершенстве знать язык программирования Action Script. Достаточно знать команды (скрипты), которые следует вводить к кадрам, кнопкам, клипам.

Ключевые слова: Adobe Flash, Action Script, начальная математика, геометрия, геометрический конструктор, геометрические фигуры.

References

1. *Arshidinov M. M.* The development and use of the Kazakh language in the lessons of electronic educational resources using Adobe Flash /Arshidinov M. M., D. D. Tananova и B. A. Urmashev// ceedings of the scientific-technical society «Kahak». — 2014. — №44 (1). — P. 91–93.
2. *Duminsh A. A.* Computer games in learning and technology development / Duminsh A. A., I. V. Zayceva //Educational Technology & Society. — 2012. — №3(15). — P. 534–544
3. *Kostrova O. N.* Training project as a means of forming geometrical representations. Primary school. — 2012. — №7. P.71–74.
4. *4. Lapinskii V. V.* Designing e-learning considering the problems of learning management / V. V. *Lapinskii* // Problems of modern textbook: collection of scientific papers. — 2011. — №11. P. 751–759.
5. *Lavrentieva G. P.* (2012). Psychological pedagogical aspects of ict application in primary school / G. P. Lavrentieva // Information Technologies and Learning Tools. — 2012. — №29 (3). Available from: http://journal.iitta.gov.ua/index.php/itlt/ article/view/675#.VeqGTEPg21s.
6. *Lytvynova S. G.* To question of quality examination of electronic educational resources / S. G. Lytvynova// Information Technologies and Learning Tools. — 2013. — №34 (2). — Available from: http://journal.iitta.gov.ua/index.php/itlt/article/view/812#.VeqFn0Pg21t.
7. *Moock K.* Action Script 3.0 for Flash. Piter. 2009. P, 987.
8. *Olefirenko N. V.* Modern tools for creating educational electronic resources / N. V. Olefirenko // Computer in school and family. — 2012. — №6. — P.36–42.
9. *Olefirenko N. V.* The problem of training primary school's teachers to design electronic educational resources/ N. V. Olefirenko// Educational Technology & Society. — 2014. — №17 (1). — Available from: http://ifets.ieee.org/russian/periodical/ V_171_2014EE.html.
10. *Pushkaryova T. A.* Electronic content: application features and new opportunities knowledge of the world/ Pushkaryova T. A. // Computer in school and family. — 2011. — №4. — P. 7–10.
11. *Pushkaryova T. A.* Playing computer programs on math lessons / T. O. Pushkaryova, O. O. Rybalko // Primary school. — 2013. — №2. P. 9–13.
12. *Rybalko O. A.* Create a task using the text fields in the program Adobe Flash CS3 Professional / O. A. Rybalko // Computer in school and family. — 2011. — №2. — P. 25–29.