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The Technology of Designing of the Electronic Textbook "Electronic Appliques of Geometric Figures" by Means of Adobe Flash

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Annotation
Almost everyone knows that we can create websites, vector images, animation, cartoons, interactive videos, games with the help to Adobe Flash. We pay less attention to Adobe Flash as a powerful tool for creating the electronic educational reserves. The author refutes this opinion and gives the example of didactic game "Applique of Geometric Figures" for the teaching of Mathematics at the Primary school. You can create this game on one's own in the programmer Adobe Flash without help of programmers. The description of game and its technology of creation are presented in the article. The necessary programmer codes for proper functioning of electronic textbook are described in the article too.
This article is designed for users who have elementary ideas about the programmer Adobe Flash or want to create the didactic games in this programmer.
Those teachers who want to begin the creation of didactic game programs in Adobe Flash have the opportunity to start their work and creation of electronic educational reserves in this programmer too.

Keywords *Adobe Flash, Action Script, elementary mathematics, geometry, geometric construction set, geometric figures.*

Introduction

Today, the computer technology can be considered the new way of knowledge transfer which corresponds to the more quality training content and development of the child, it allows him to study with interest, to find source of information, educates the independence and responsibility during the getting of knowledge, develops the discipline of intellectual activity. The real cooperation of teacher and pupil is possible when training is not forced but with interest. Tasks in interesting form allow the clever pupils to open and activate their opportunities and the pupils who are unsure in their knowledge allow to develop initiative, wit and thinking. Consequently, the use of multimedia technology opens promising direction of development of modern computer technology of training [1].

Realization the new need of pupils compels teachers to change the position to information technology and to find the ways of their effective use in professional activity [2].

The teacher must create such conditions that will provide the child's success in educational work, the feeling of joy on the way from ignorance to knowledge, from inability to ability. The teacher's task is to organize the educational process so the child feels pleasure from the learning process [3].

Practice shows that modern teachers using actively information and communication technologies in their professional activities, as a rule, does not remain aloof from creation of individual electronic learning tools.

Despite of the fact that the main bulk of these tools are created by groups of professional developers, the authors of these reserves will be still remaining school teachers, who will create their own means of teaching subjects [4].

ISSN 1512-1801

Therefore, the development of new advanced electronic learning means, particularly for learning math at primary school, on the basis of modern computer technologies based on existing pedagogical experience and achievements of psychological and pedagogical sciences is especially relevant in our time. From the decision of this problem depends on how fully and effectively will be used possibilities of the computer in teaching the junior pupils. We should consider patterns of age development and individual characteristics of children for effective teaching of mathematics in primary school with the use of electronic educational resources. Electronic educational resources for junior pupils are developed in a playful form, the theoretical material is given in a minimum volume in the accompany illustrations. This allows the child to learn the material quickly and with interest, and also to master the elements of the interface, expanding their knowledge in working with computer [5].

Preparing for the lesson, the teacher usually uses educational programms that are created by professionals. But teacher must spend a lot of time in search of programms that could meet the needs of a particular lesson, the specific class. Many teachers who have been working with pupils of primary school for many years have produced their own style which is peculiar only to this teacher. Many electronic educational programms are designed for mainstream users [6]. For this reason teachers of primary school begin to develop their own electronic resources. Most teachers can create electronic educational resources in Microsoft Office PowerPoint taking into account psychological features of pupils of elementary grades. The love of junior pupils to the computer encourages them to create their own educational resources. But significantly fewer teachers can work in Adobe Flash.

The System Possibilities of Adobe Flash to Create Electronic Educational Resources for Primary Schools.

The programmers consider that create websites, vector graphics and animation in this programme. And teachers know that it is also a powerful tool for creating electronic learning resources. The interactive spreadsheets and presentation, educational computer model, didactic computer games and tasks to promote logical and algorithmic thinking are created in this programme. We can create tasks for the control of knowledge of students using Adobe Flash.

Flash is a rich environment for developing e-learning resources. We can develop the design lay out, select and customize a colour palette, add a colourful animation in the electronic pages with programm's help.

The attractiveness of the environment that is built-in graphical tools provides many options for design of software and a fairly powerful built-in programming language Action Script provides an implementation of effective management software [7].

Own programming language Action Script is the main property of Flash. Using this language, you can control any element of the software product and change its properties. The teacher has more opportunities to create interesting and quality electronic resource using the programming language Action Script [8].

The teacher must learn how to work in Adobe Flash if he wants to create quality e-learning resources and use them repeatedly at different lessons.

In order to create good e-books, not necessarily fluent in a programming language Action Script. You must know the commands (scripts) to use frames, buttons and pictures. No object operates in itself it must receive a command (script).

The Electronic Textbook "Electronic Appliques of Geometric Figures"

1. The objective of the electronic resource

The textbook is created for better learning about geometric shapes. Besides, this software product contributes the development of logical thinking and engineering skills of junior pupils, because this is a lot in common with the artistic perception of the world in the geometric material, since a significant place belongs to the creative thinking in geometry. The thinking of junior pupils is visual-effective and visual-figurative. Geometrical material is learnt by child during the execution of various design tasks, geometric generalization is a result of solving constructive tasks. [9]

ISSN 1512-1801

Tasks are solved more productively if they are offered in an interesting, entertaining form. Puzzles or geometric designers are known since time immemorial. The essence of the game is to recreate the plane of the silhouettes of the objects in the sample. Geometrical games have developmental, educational and enlightening influence. They develop spatial imagination, design thinking, combinatorial abilities, ingenuity, resourcefulness, and also creative imagination and sensory faculties.

2. The description of the electronic resource

The electronic educational textbook "Electronic Applique of Geometric Figures" consists of the titular electronic page, electronic pages of «Instruction», «Author», and «References (Fig. 1). The programme also consists of 5 tasks, which belong to the first level of complexity and another of five tasks the second level of complexity**.**

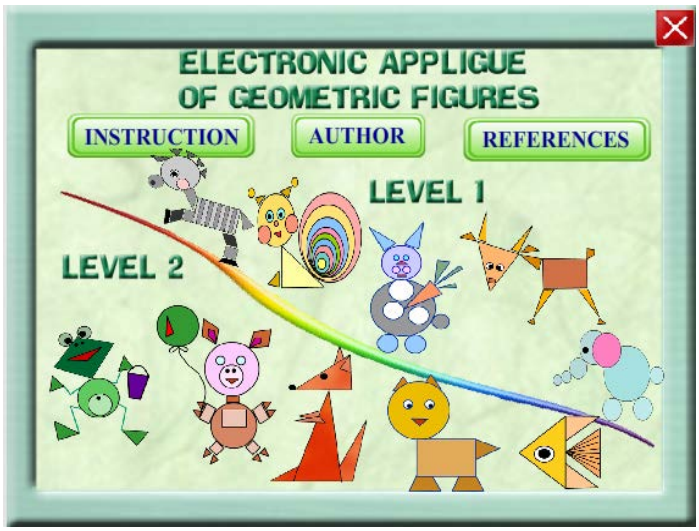

Fig. 1. Start electronic page of didactic game "Electronic Applique of Geometric Figures"

The user can move to suitable electronic pages and receive information about tasks and learn who has worked at creation of the electronic reserve and obtain information about resources which have been used during creation of this programme by clicking on the button with the name «Instruction», «Author» and «References» (fig. 1). For pupils of primary classes you need to learn the rule: before you begin any didactic game, you should read the instruction. The author communicates with schoolchild on this electronic page. The pupil must read the game's rules attentively and to comply with their rules doing the tasks.

The pupil can move to doing the tasks of the first level of complexity (fig. 3) clicking on the images, which are located on the title electronic page (fig. 1) and consist of geometrical figures (fig. 2).

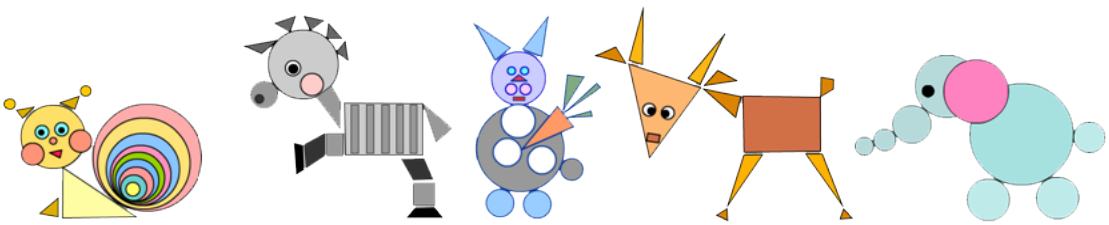

Fig. 2. Image buttons with which you can navigate to the tasks of the first level of difficulty

The pupil moves to the task which he wants to perform choosing one of the tasks are located above a wavy line (fig. 3).

ISSN 1512-1801

You don’t need to rotate the geometric figures in the tasks of the first level of complexity you should transfer them to the field which is located on the left of the vertical line. The sample can be obtained, by clicking on the blue question mark button in the upper left part of the task. If the pupil wants to train his memory, he must click on the sample by the left mouse button and it becomes invisible, you see only blue button (fig. 3, fig. 4). Besides, you can use the button "Cleaning" and start to do the job first. This is the image of erase on the picture.

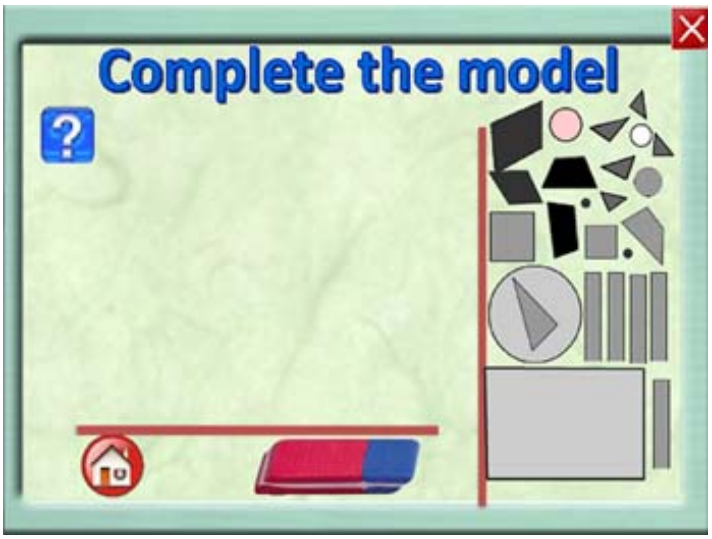

Fig. 3. The picture of task on the first level of difficulty, when you start.

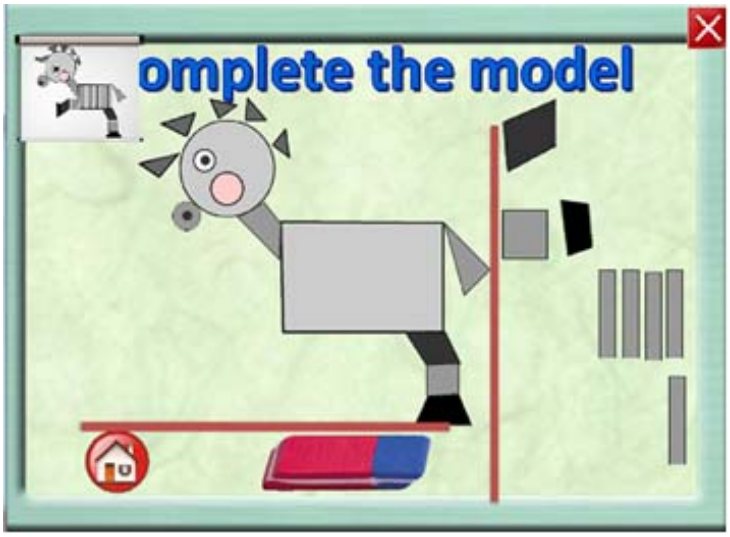

Fig. 4. . The picture of task on the first level of difficulty during the process of work.

When a younger pupil performs the task, he need to click on the button with a picture of a house, which is pictured in the lower left corner of the electronic page (fig. 4).
The transition to the title electronic page and choosing the next task are executed by this button (fig. 1).
On the title of electronic page the pupil can click on one of the buttons above a wavy line (fig. 2) and move on to the next task, which is referred to the first level of complexity.
If a junior pupil chooses one of the buttons which is located under the wavy line (fig. 1, fig. 5), he can move to perform tasks on the second level of complexity.

ISSN 1512-1801

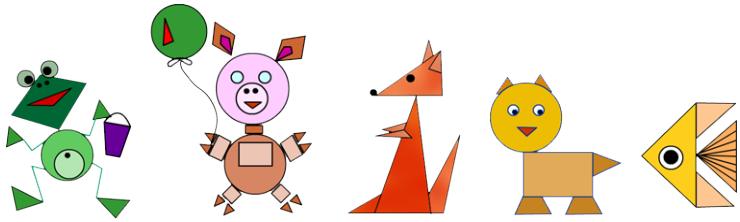

Fig. 5. You can navigate to the tasks on the second level of complexity by using these buttons.

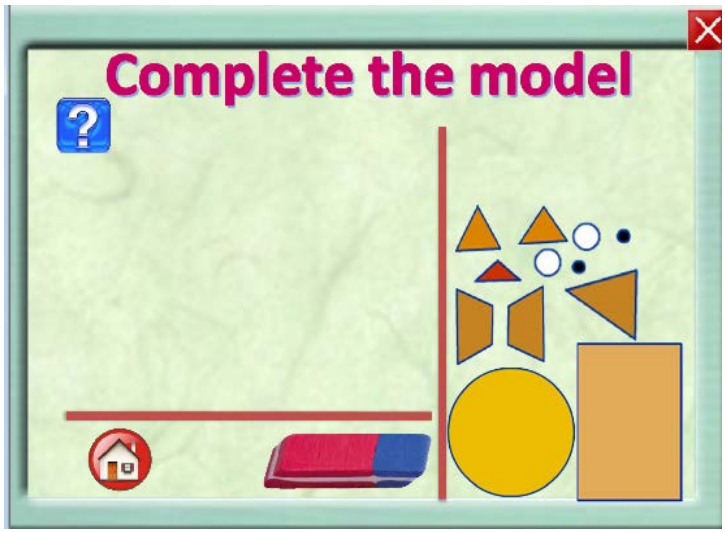

Fig. 6. The picture task of the second level of complexity before starting work.

The geometric figures are not located so as on the sample in the tasks that belongs to the second level of complexity (fig.6, fig.7). The pupil should click the several times by the left mouse button on the necessary geometric figure and drag it to the place appointed for it as shown on the sample.

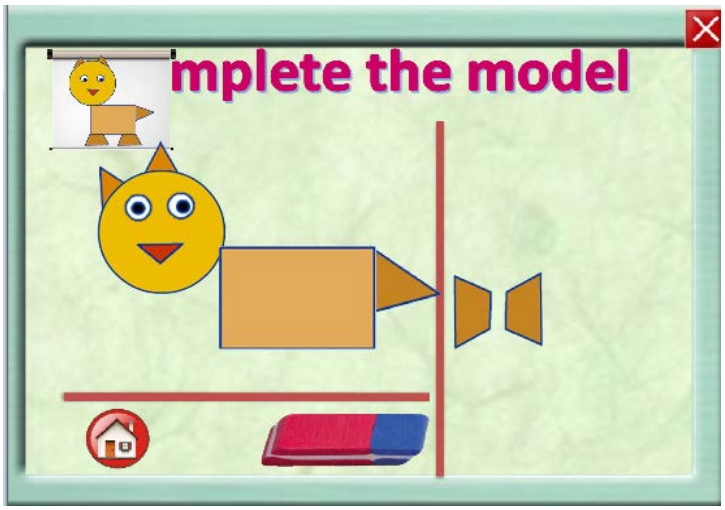

Fig. 7. Example the task on the second level of complexity in the work's process.

The pupils have the opportunity to compose an image according to the pattern on the left side and to consider what geometric shapes compose this image and count the number of these figures.

This game develops the child's memory, attention, imagination, intellect and imagination – everything that constitutes the wealth of human personality.

The pupils learn with the intellectual and creative games, they gain a range of skills that provide the transition from executive to reproducing activities: the ability to observe and analyze the elementary sample questions of the teacher.

The technology of creation of electronic resource

ISSN 1512-1801

1. Preparation of graphic images.

You should consider game design and to prepare the images in any graphic editors or in the environment of Adobe Flash which does not concede the best image editors for creating vector graphic images. The author should remember that the image must have a transparent background.

2. Introducing educational content.

You must create 24 shots. There are title shot, «Instruction», «Author», «References» and 20 shots. You need 10 shots (fig. 8), because there are only 10 images.

But you need to do two of the same shots in order the button “Clean” works. The pupil moves to a new shot – double when he clicks on the button with image of eraser.

So, clicking on the "Cleaning", the user does not notice that works on a different electronic page when he clicks on the "Cleaning». You should note that you can move to the start of the game from each shot (fig. 8).

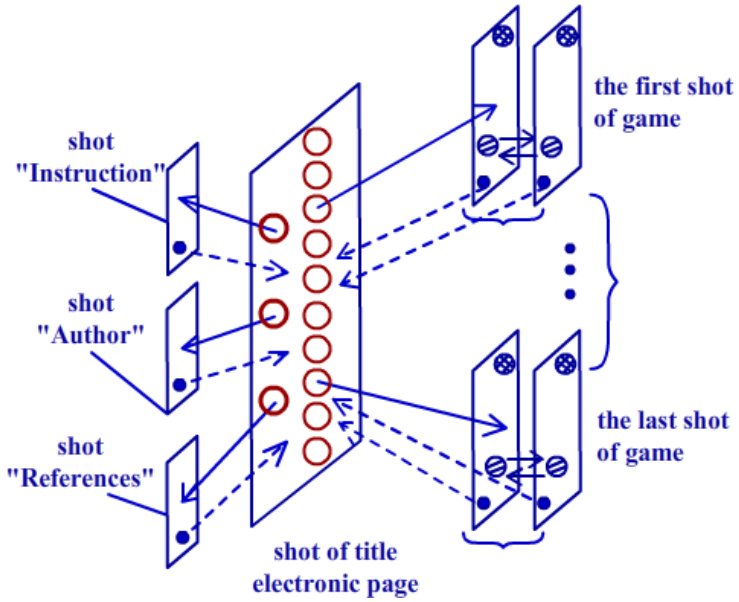

Fig. 8. A schematic image of an electronic educational resource "Electronic applications of geometric shapes"

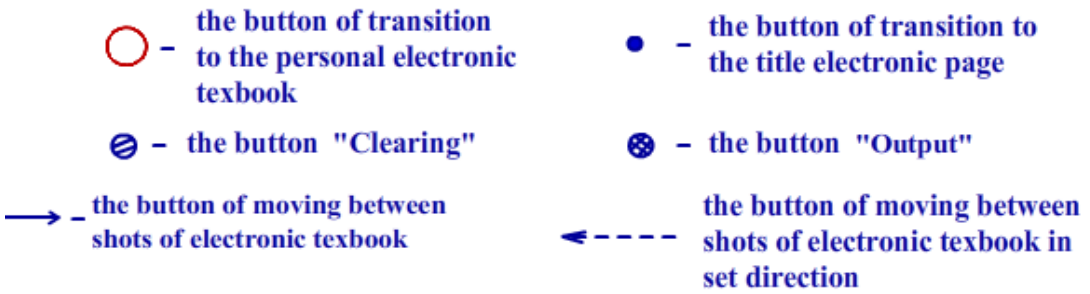

Fig. 9. The buttons of navigation of electronic learning resource "Electronic applications of geometric shapes".

If shots are created then you should fill them with the required information such as headers, buttons, labels, shapes, expected image. The shots-twins must be absolutely identical.

1. Support of the work of didactic games.

When you need to provide the buttons by means of a built-in programming language Action Script the game will “revive”.

The programming language Action Script 2.0 is used in this electronic textbook.

Firstly, you must give the name to each frame.

ISSN 1512-1801

In the first frame, you must enter the stop command. You should select the frame and in the field of Actions record the script:
stop ();

On the title page of the electronic image that you want to create, you should turn on the buttons. You must select each image in turn and click F8 and in the dialogue box that appears you must choose Button. The same command must be applied to images on which we rely as on the buttons. You must record the script and in the field of Actions for each button:

```
on (release) {
  gotoAndStop ("…")
}
```

All commands for buttons are the same. You must change only names in quotes. This is a name of shot.
The name of the frame you need to write instead of three dots in quotes. The programme should not exist frames with the same name.
Caution: do not confuse the frame and the button. You enter for the frame only the command stop ();. All the other commands are entered for the buttons. But you needn't to allocate the whole frame, but only the button.

The geometrical shapes can be only moved in the tasks of the first level of complexity. In order that a geometric figure can be moved (figure will not be rotated), you must highlight it, press F8 and select Button. After that you must press F8 again and select Movie Clip. Every time you need to confirm your choice by pressing OK.

After that, it should highlight the selected button and in the field Actions to enter the script:

```
on (press) {
startDrag ("",false);
}
on (release) {
stopDrag ();
}
```

In tasks on the second level of complexity geometric shapes can be moved and rotated. You can move and rotate a geometrical figure at the same time, in order you must highlight it, press F8 and select Button. After that you must again press F8 and select Movie Clip. Every time you need to confirm your choice by pressing OK.
After that, it should highlight the selected button and in the field Actions to enter the script:

```
onClipEvent(load) {
  doubleclick_timer=0;
}
onClipEvent(enterFrame) {
   doubleclick_timer++;
   onPress=function() {
      if(doubleclick_timer<10) {
         this._rotation+=90;
         this._x=_parent._xmouse;
         this._y=_parent._ymouse;
      }else{
         doubleclick_timer=0;
```

ISSN 1512-1801

```
        startDrag(this)
      }
   }
   onRelease=onReleaseOutside=function ( ) {
      stopDrag();
   }
}
```

This command must be entered for each geometric shape separately. This also applies to frame – twins.

In order the button "Exit game" works, which is located in the upper right corner, you must enter the script:

```
on (release) {
fscommand ("quit");
}
```

To work with the blue button with a question mark (fig. 3, fig. 6), and with the image that has appeared, disappeared again, you need to enter codes, but we will not remember about them in this article because this is a topic for another. Enough to post the sample of image to be created and the pupil will be able to work.

Those teachers, who have not worked in the programme Adobe Flash but want to create their own similar games, can create a game to use only one frame. You must work according to the following algorithm:

1. To open the Adobe Flash.
2. To divide the stage (the slide in Microsoft Office PowerPoint) in three parts. You can hold the simple vertical lines (Fig. 6).
3. To write the task “To make on the model”.
4. To draw the image of the geometric figures. You must see it that the figures do not cross.
5. To copy this images and put it in the right part of stage analogous to figure 6.
6. The first image, that we drew, need to select and decrease and put in the left part of the stage. It will be a model.
7. To select one of the geometric shapes, press F8 and select Button. Then again press F8 and choose Movie Clip. Whenever you need to confirm your choice by clicking OK.
8. After this you must select the chosen button and enter the code to the field Actions:

```
on (press) {
startDrag ("",false);
}
on (release) {
stopDrag ();
}
```

9. You should use points 7 and 8 to all geometric shapes that make up this image.
10. To press Control/Test Movie and check whether all geometric shapes can be moved.
11. To choose File/Publish Settings… in the file menu and choose Flash (.swf) and Windows Projector (.exe) in the dialogue window that has been appeared. After this you should press Publish in the lower part of the dialogue window and press OK.

This is only one task. You can create similar tasks that have separate files using this way. Of course, uncomfortable each time to open them, but for a beginner it is enough, because he doesn’t need to create new frames and record the transition between them and introduce it.

ISSN 1512-1801

Conclusion

This article is an example of a single programme which is created by the Adobe Flash. But if the teacher wants to create his own electronic educational resources he must learn to work in an environment of Adobe Flash. To create a game, for students of higher educational institutions or primary school teachers, who have not idea about Adobe Flash, need to spend two or three classes if they want to create this game. During this time they can work in the programme Adobe Flash and understand the principle of this programme. Certainly, not all teachers want to create their own electronic educational resources, but computer technologies progress rapidly and are becoming more accessible to the simple user. The teachers know which games pupils of primary school like more. Besides a lot of interesting and necessary material which is in the academic literature on paper, are ignored by the developers. The creative teacher begins to think about didactic game which he can create at once when he sees interesting material.

The teacher develops and stays always modern, interesting and useful for children by creation the copyright electronic resources. The use of modern electronic educational resources improves quality of education and training. It also raises cognitive interest junior pupils and improves the learning process, promotes the development of creative abilities and interest of pupils.

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