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Book 5

Mathematics, Informatics and Physics

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DEVELOPING A SOFTWARE PLATFORM FOR DISTANCE LEARNING IN AUDIO-VIDEO PRODUCING

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Abstract: *The paper describes the developed web-based application for distance learning in Audio-video Producing course at the University of Ruse. The application includes lecture material, self-assessment tests, terms dictionary and a lot of visual examples. It belongs to Macromedia Flash products. Compared to the conventional method of teaching this application provides advantages in the teaching process related to the better understanding of the material taught, as the included interactive activities boost the interest and motivation of the learners.*

Keywords: *Informatics, Computer science, Computer-based Learning, HTML documents, Internet.*

INTRODUCTION

The development of computer technologies, telecommunications and the Internet gives to mankind new possibilities for gaining knowledge and learners are no more restricted by barriers of space and time to receive information.

Distant learning becomes more popular throughout America and Europe and the natural bearers of progress are the universities, which strive for expanding their audience. Global net allows effective interaction among students and teachers even when they are a great distance away from each other. The Internet allows an exchange of various learning materials: text, graphics, software, audio, video, etc.

The success and quality of education depend not so much on the amount of studied materials, as on the effective organization of the process of acquiring knowledge and methods of knowledge presentation. Nowadays, the teaching courses developed by multimedia technologies, are spread through the Internet, on CD or DVD and are mainly used for self study. This approach, which may be called an individual one, leads to improvement of results and time reduction of the learning and gives possibilities to access qualitative multimedia contents.

Computer learning courses make possible the introduction of new methods, styles and approaches on giving information to learners. The high effectiveness of mastering a subject in a definite direction is prompted by the possibility of introducing animation, video, speech and communication, which users may profit. This, according to scientific research, contributes to better learning and assimilation of acquired knowledge.

PROGRAM DEVELOPMENT

General tendencies of introduction of new technologies in all fields can also be observed in education. The possibility of creating interactive learning contributes to the easier, faster and more pleasant apprehension of the learning material.

This project contributes to facilitating the training of ‘Audio-video producing’ subject, based on the following key targets [1, 3, 5]:

- Submission of varied lecture material, containing graphics and pictures, facilitating the process of acquiring knowledge;
- Tests for self-evaluation of the acquired knowledge, conformed to the subject learning material and exercises;

- Terms dictionary, giving fast access to the explanation of definite and specific terms;
- Visualization of great number of examples of different screens, effects and transitions, used in video installation.

The developed software is on the basis of Macromedia Flash [2] and the organization of the application follows the structure shown on Fig. 1. A basic module Main.fla, containing a smart user interface, as well as relevant navigation elements is set up. The main issues, which are themes of the present article, are separated in separate scenes as follows: Lecture material – scene 'Theory'; self-study tests – scene 'Tests'; terms dictionary – scene 'Terms'; visualization of different approaches in the process of video installation – scene 'Examples'. Part of the material, used in different scenes does not appear during the initial loading. When users select anything from the system, the relevant module appears on the screen. For example, choosing the lecture material /'Theory' scene/ users can find that the different lessons are in separate files – Lesson1.fla, Lesson2.fla… The tests are distributed by analogy. In the terms dictionary there is a parallel between a definite letter and its number in the Bulgarian alphabet. This is set for easier future processing of the files. The examples are distributed in four directories with intuitive names. The files in each directory follow a numbering with initial index '1', for there is possibility for them to be processed with one function. MusicMenu.fla module is not necessary and that is why it is external and can be accessed from each scene.

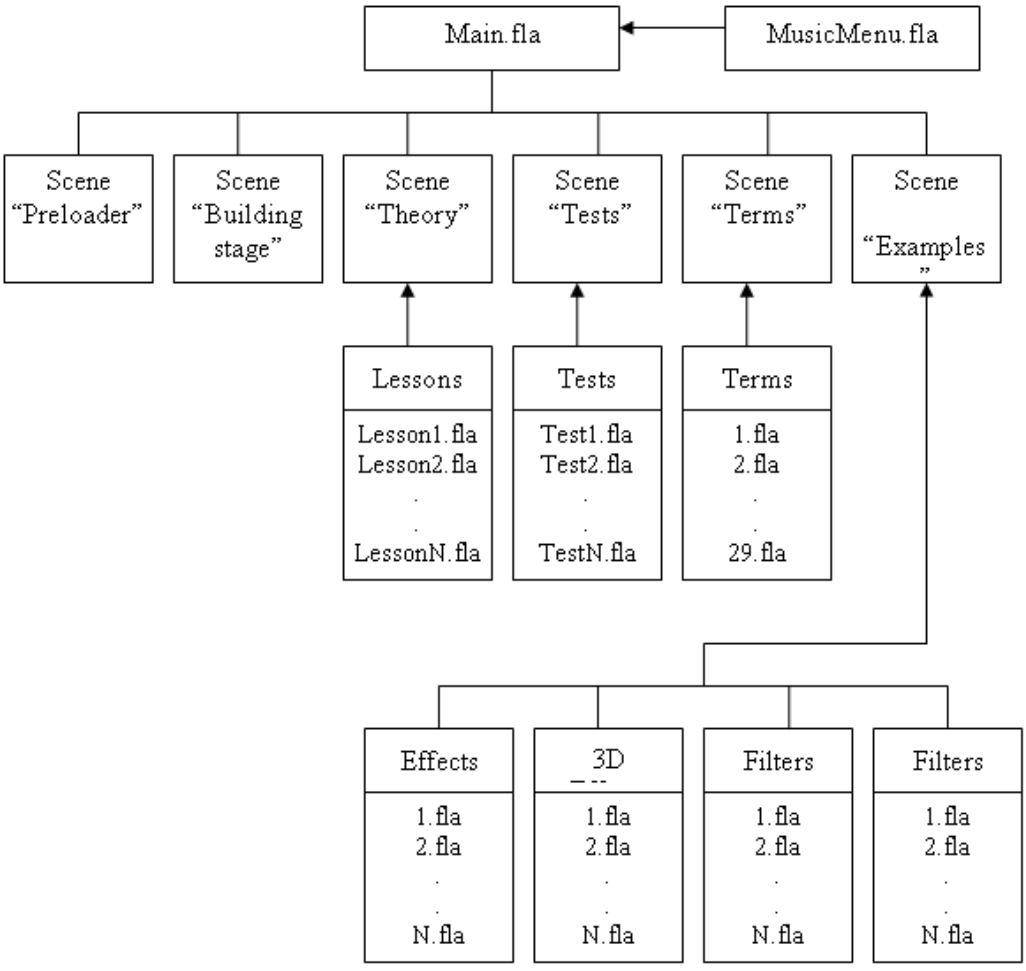

Fig. 1. Web application organization

"Preloader" scene

When graphics, sound and contents are added to Flash movie, the file may become too large. Even after optimization an additional software product is necessary so that all the components can be loaded before users access them. For that reason a module for preliminary loading /preloader/ is created. It is an animation, which reproduces itself till the moment of movie complete downloading.

The scene contains one key frame with action stop() forbidding the moving of time-diagram, before this is additionally indicated. The scene contains one element – movie clip installation, named preloader, which includes the elements used to show the progress of downloading. The time-diagram of this movie clip consists of four layers, named according to their content. The layer Actions contains a key frame with the action stop(). The text field info is for dynamic visualization of the percentage of the already downloaded frames. The layer Amount contains animation representing the progress bar that consists of 100 frames – each frame corresponds to each percent. With the help of ActionScript the time-diagram will move to the relevant frame number. Thus the bar will 'fill up' when the file is loaded. The script added to the preloader installation is as follows:

```
onClipEvent(enterFrame) {
framesLoaded = (Math.ceil (( _root.getBytesLoaded() / _root.getBytesTotal()) * 100));
gotoAndStop (framesLoaded);
  info.text = "loaded" + framesLoaded + " %";
  if (framesLoaded >= 99) {
        _root.gotoAndPlay (2);
  } // if
} // onClipEvent
```

The script is implemented by the help of Frame event, which means that it will react immediately to the current state of the download. The percentage of the loaded bites is determined on the second line and the result is summed up as an integer number with the help of Math.call function. The result is attributed to the variable framesLoaded. The third action is used to send the current movie of the relevant frame on the base of the framesLoaded value. The next line is used to set what is visualized in the text field info. A range is formed and the framesLoaded unites with written strings. The last part of the script contains a conventional construction, used to set the end of the indicator's work.

"Building Stage" Scene

This scene contains 18 layers – one layer for each of the components. This is necessary because each of them is animated in a different way in a different period of time. The three possible methods to create animation in Flash [4] are used: through change of the form by median phases /Shape/ for building the main window; through setting of key frames /Motion/ for introduction of many objects in the scene; and through ActionScript for animation of decorative squares in the right edge of the scene. The introduction sound is imported in the layer Sound. The layer Buttons is masked for more effective appearance on the scene and contains buttons for future navigation. These buttons are grouped by the time of implementation of the animation and they do not perform any actions.

"Theory" Scene

That scene contains a layer on which the relevant elements are situated. The layer currText contains the dynamic field currentScene, where the text changes according to the current scene /in that case 'THEORY' is written out/. The button 'Themes', the installation Item and the button Back are situated in the layer Menu.

The instance Item consists of two elements: a dynamic text field itemName, which subsequently assumes the name of the corresponding lesson and a button with the following ActionScript:

```
on (release) {
pathTeoria = "Lessons/";
fileNameTeoria = "Lesson";
ID_Teoria = ID;
itemClicked (fileNameTeoria, pathTeoria, ID_Teoria);
removeMenu(buttonNamesTeoria,itemTeoria);
}
```

The variables pathTeoria and fileNameTeoria may not be set. This is done for an easier change in the application structure. ID possesses some value set during formation of lessons' list by the function dropdownMenu. When clicking on the last two lines the functions itemClicked and removeMenu appear respectively i.e. when the user chooses a lesson, it is processed by itemClicked, and the removeMenu removes the list.

A falling list appears on the scene through doubling the movie clip item when clicking 'Themes'.

"Tests" Scene

This scene contains elements similar to those of the previous scene. The difference is that there is a choice of tests here.

"Terms" Scene

The elements are similar to the previous ones. There is a slight change in the function responsible for the initiation of the optional menu.

The difference is in the positioning of the elements. This is due to the fact that the letters are written in two lines. The conventional construction IF assures the fulfillment of the first line /16 symbols/. The passing on the second line requires reduction of the position by X.

"Examples" Scene

In this scene the newly introduced objects are components Flash Ul and especially the component ComboBox, which is suitable when a falling list with possibilities to turn is necessary to be created. There are four instances of the Ul component ComboBox in the layer ComboBox – comboEfekti, combo3D, comboFiltri, comboPrehodi, responsible respectively for the different homonymous examples. All parameters of a definite component are given in the definition of the component Component Definition. They are considered with the set tasks in the current scene, namely the parameter Labels of comboEfekti /which is an array in principle/ contains the elements: Ball Action, Bubbles, Color Offset, Flo Motion, Kaleida etc.; the parameter Labels of combo3D contains elements: Bands, Blocks, Earth, Image Rotate I etc.; the parameter Labels of comboFiltri contains elements: Dry Brush, Find Edges, Glass, Poster etc.; the parameter Labels of

comboPrehodi contains elements: Additive Disolve, Band Slide, Band Wipe etc. The four instances of the parameter RowCount are given the value five. This means that when reproducing the falling list five elements of each instance will visualize. Opposite each element there is a button which starts the movie clip, corresponding to the chosen content. This realizes in the following way:

```
on (release) {
  pathToFiles = "Primeri/Efekti/";
  choice ("comboEfekti", pathToFiles);
}
```

The given ActionScript is for the 'Play' button, corresponding to the instance comboEfekti**.** The variable pathToFiles gives a path to the relevant effects. After that the function Choice is chosen. It processes that choice. The remained buttons possess analogical script. The difference is only in set strings for they indicate the path and the parameters which are used to select the function.

The function Choice is defined in the first frame of the layer Actions.

```
_global.choice = function (currentCombo, currentPath) {
  selectedItem =
eval(currentCombo).getSelectedIndex();
if (selectedItem != 0) {
  path = currentPath + selectedItem + ".swf";
        }
        loadMovieNum(path,2);
} // choice
```

The currently selected element from the relevant ComboBox is written in the selected Item variable. The method eval() restores the value of the variable written in the brackets in Flash MX. As in this case the value of the variable is a name of an instance, an appeal to the relevant instance /comboEfekti, combo3D, comboFiltri, comboPrehodi/ is made. The method getSelectedIndex() returns the index of the selected element. The conventional construction IF verifies whether the choise is different from zero, since file loading is not necessary in this case. The variable path is given a string. It indicates the path to the file, responding to the user's choice. The method loadMovieNum(), as it was mentioned earlier, loads a movie clip with an indicated path at level two.

Test1.fla Module

It contains two frames and five layers: Bkgrnd – for the background, Butons – all buttons are placed here, Text – contains all test questions, Condition – dynamic text field Condition and Actions – for setting the source code to the movie clip. The test is placed in the first frame. The control results can be found in the second frame.

Radio buttons are grouped in five groups /ans_1, ans_2, ans_3, ans_4, ans_5/, corresponding to the questions number. UI component RadioButton possesses the characteristic of group belonging - Group Name. It determines that one and only button can be selected from a corresponding group. Each button that possesses Change Handler

characteristics has been set the function Change Handler. This function is responsible for writing down the users' answers.

The values of correctAnswers array are the correct answers of the test. They can be changed during the process of creation of new tests. The function validateAnswers does not allow any passing to frame two if the five questions are not answered. This can be accomplished through a check-up whether the array questionsAnswered contains empty spaces. If there are such, a warning message appears in the text field 'condition'. If there are answers to all questions, the method gotoAndStop() is triggered. It indicates the passing to the frame two of the main time-diagram.

The function setAnswer writes down the users' answers in the array questionsAnswered. The method getValue() restores the value, appropriated to the Data field of the corresponding button and it is written in the variable strAns. IntQuest is responsible for the number of the element /current answer/ in the array setAnswer. Its value is formed by addressing to the group of the relevant button, in which name the number of the question is indicated. Since the name of the group is a string, the number is derived through the help of the String object method – substr(). The initial position and the length of the string that must be derived are set. From the obtained value a unity is deducted for the numbering of the elements in the array, starting from zero. The answer strAns is written down on the corresponding place initQuest in the array, in the last line of the function.

The function initQuest is used for initialization. It checks whether the array with true answers is not empty. The array questionsAnswered is created with length equal to the length of the array correctAnswers.

In the two lines before the last one of the code of that frame initQuest is selected and the move onward the time-diagram is banned via the method stop(). The move to frame two is possible through pressing the button 'Check', which calls the function validateAnswers, which implementation was explained before.

CONCLUSION

The developed software platform includes the basic items necessary for teaching in Audio-video producing, i.e. lecture material, self-evaluation tests, terms dictionary, and a lot of visualized examples. The learning advantages of the developed application compared to the conventional refer to the better acquisition of the material taught, as the included interactions with the user stimulate the interest and the motivation of the learners. During the producing process the user applies a wide range of filters, effects and transitions, the visual approach being the best way of understanding. In addition, a demo video or themes animation are provided for the lessons, being practice-oriented, explaining the operation principles of the video and audio devices. The Tests section can be enhanced with the inclusion of additional tests on the lecture material. The Terms base can be also enlarged with the introduction of term index for the English meaning and abbreviations.

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ПРОГРАМНО ОСИГУРЯВАНЕ ЗА ДИСТАНЦИОННО ОБУЧЕНИЕ ПО АУДИО-ВИДЕО ПРОДУЦИРАНЕ

Георги Кръстев

Русенски университет "Ангел Кънчев"

Резюме: *Документът описва разработено уеб-базирано приложение за дистанционно обучение по Аудио-видео продуциране. Курсът е разработен за нуждите на Русенския университет. Приложението включва лекционен материал, тестове за самооценка, речник с термини и много визуални примери. Той принадлежи към продуктите на Macromedia Flash. В сравнение с конвенционалния метод на преподаване, това приложение дава предимства в процеса на обучение, свързани с по-доброто разбиране на преподавания материал, като са включени интерактивни дейности, повишаване на интереса и мотивацията на обучаемите.*

Ключови думи: *Информатика, Компютърни науки, компютърно базирано обучение, HTML документ, интернет.*

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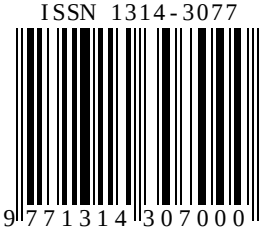
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