Using Multimedia in Computer Based Learning (CBL)
A Case Study: Teaching Science to Student

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Abstract—Regarding to the fast growth of computer, internet, and virtual learning in our country (Iran) and need computer-based learning systems and multimedia tools as an essential part of such education, designing and implementing such systems would help teach different field such as science. This paper describes the basic principle of multimedia. At the end, with a description of learning science to the infant students, the method of this system will be explained

Keywords—Multimedia tools, computer based learning, science, student.

I. INTRODUCTION

EDUCATION is needed in every aspect of human life. The development and exchange speed is so high in the communication world that every individual and society attempts to adapt itself. The education nowadays has passed over its traditional methods and is moving towards the virtual and electronic learning. In this kind of education, the educational activities are taken via electronic tools.

In this learning method, which is based on applying Educational CDs, the educational quality is very important. That is because the people who are exposed to this system are experiencing a new method instead of the traditional ways and they are expecting the same feedback. This method has brought up opportunities for those who are not able to take advantage of the traditional method.

II. MULTIMEDIA DEFINITION

A definition of Digital Multimedia is: "Digital multimedia is any combination of two or more media, represented in a digital form, sufficiently well integrated to be presented via a single interface, or manipulated by a single computer program". [1]

Different media used to represent events. Media is represented digitally, as structured collections of bits, manipulated by programs, stored on disks and other storage devices and transmitted over networks. Shared digital representation means different media can be combined as what come to be known as multimedia. Combination of media is not new; established forms mix media routinely.

Integration of media is natural - sense perception. The separation of media may be artificial and may often seem unsatisfactory. Technical obstacles have traditionally been the cause of the separation of natural media representation.

III. MULTIMEDIA APPLICATIONS

Multimedia has a broad variety of applications, from entertainment to education and business. Feature which distinguishes preceding forms of integrated media from digital multimedia is that bits (text, sound, images, etc) are treated as data by computer programs. These programs control the order in which media are presented in response to user input i.e. digital multimedia can be interactive.

IV. MULTIMEDIA DELIVERY

Applications of multimedia require a means of delivery to distribute this material from the producer to the user. [1]

A. Online Delivery

Network is employed to send information from computer to computer often employing a server to provide centralized storage. Network may be a LAN in a single organization or more often the public Internet.

Database integration via Web is distinctive feature of online delivery.

B. Offline Delivery

Removable secondary storage required with significant storage capacity and data transfer performance. Online delivery is seen as future for multimedia but technological problems remain.

C. Hybrid Online/Offline Delivery

Current trend in DVD (Digital Versatile Disk) mirrors CDROM factors leading to different applications of multimedia, in particular widespread use in home movie industry.

V. MULTIMEDIA PRODUCTION

Multimedia applications need software for preparation of individual media elements and integration into finished production. Multimedia authoring systems (or tools) permit the different media elements to be assembled in space and time and add interactive behavior to them.

User actions and commands must be interpreted in non-trivial ways to translate the mode of working which is natural to a designer to execute direct manipulation of the media elements.

Examples of systems concerned in multimedia authoring include Macromedia Director and Adobe Photoshop. The

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philosophy behind the role played by each of these is an interesting one which is significant in the development of modern multimedia applications.

VI. INTERACTIVITY

There are many precedents for the combination of media, but the addition of interactivity is a novel contribution of digital multimedia. Interactivity is often cited as the feature which distinguishes digital multimedia from other forms of joint media. [3]

Basic control offered is limited within parameters recognized by the multimedia producer since interaction takes place within a finite system as defined by the controlling computer program. Number of choices accessible doesn't necessarily improve a multimedia application or production.

Interactivity fixed in a rich environment provided by a multimedia enhanced program can however create new 'user experiences' eg. Some types of multimedia games. Interactivity is a novel contribution that computing devices make to multimedia but at times a more controlled experience may be required or more appropriate. [6]

VII. USER INTERFACES

User interface elements which are predictably used in modern computing environments:[1]

- Menus
- dialogue boxes
- buttons
- etc

An important objective is to create common 'look and feel' to aid users with experiences of similar applications. Multimedia, incorporating time based elements (video, sound, animation) has added to the standard range of user interface elements eg. playback controls and timelines for authoring.

Some multimedia applications and productions intentionally employ unconventional user interface techniques for effect.

VIII. USING MULTIMEDIA ELEMENTS

The choice of media is determined by the

- lesson content,
- objectives,
- audience and
- place of delivery.

Although text and graphics are usually used in CBL, the use of animation, sound and video must be carefully considered.

IX. THE REASONS FOR APPLYING MULTIMEDIA TOOLS IN COMPUTER BASED LEARNING [2, 3, 4]

A. Using Animation Feature

One of the tools used in CBL software, is animation. The reasons are as follows:

- Movement help learning;
- Animation, would make the learning environment enjoyable;
- In case there is no need for details, animation is applicable;

- It is possible to simulate some of the tasks in the laboratory without going into the actual laboratory;
- In times that carrying out some of the tests require a huge amount of money, animation is applicable.

B. Using Sound Feature

Sound is also another one of the tools in computer-based teaching.

- Some of the viewers are illiterate, such as pre-school children;
- By adding the sound feature, it is possible to emphasize more on words, special sentences, or use vocal inflections;
- It is also good for teaching language.

C. Using Video Feature

The video feature is effective in these factors:

- Details or facts are required in some teaching methods, such as Teaching Surgery;
- Due to the danger of carrying out some tests or taking place of some events, it is sufficient to show the movie;
- In some teaching methods, there is a need for teaching by using body movement

X. CBL DESIGN TEAM

A computer based learning system has a design team which includes: [2, 3]

- Educational Systems Analyst
- Subject Matter Expert
- Computer Programmer
- Graphic Designer

A. Educational Systems Analyst

This is the team leader, with a background in

- teaching / training,
- educational technology and
- Software engineering.

The role is similar to that of computing systems analyst in traditional software projects.

B. Subject Matter Expert

These are the teachers or practitioners in the industrial or commercial environment. These persons have

- academic,
- technical, or
- commercial knowledge and expertise that others need to acquire.

C. Computer Programmer

These people are not subject or educational experts. The programmer's task is programming:

- implementing the design,
- navigation strategies,
- models behind the simulation etc.

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D. Graphic Designer

These people will advise on graphics, and any other artistic input required in the system e.g.

- video;
- audio;
- animation.

XI. INTRODUCING THE COMPUTER BASED LEARNING PACKEGES OF SCIENCE [5, 7, 8, 9]

Our system can assist the learning of basic science. This package offers structured reinforcement of previously learned concepts. It includes worked examples with questions, answer, and feedback.

Our simulations generally, have a graphic content to ensure the environment is as realistic as possible.

The learners interact with this world and make relevant decisions or solve problems based on their experiences as they encounter new situation.

The intention is for the learner to use a cognitive tool such as an expert system shell or an authoring system to structure their knowledge so that another person may view and understand it, this enhances the learner's understanding of the subject area.

System that improves worker productivity by providing on the job access to integrated information, advice and learning experiences.

In this system there are no expected learning outcomes and as such they also represent a supportive environment for an existing teaching / learning strategy.
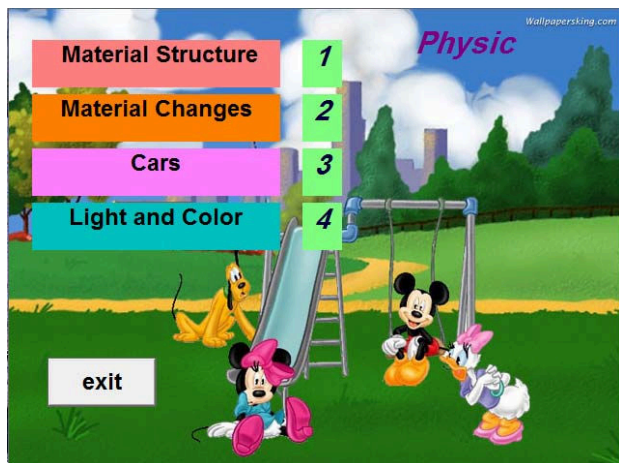

Fig. 1 First page of system

This prototype has four sections:

- Material structure
- Material exchanges
- Cars
- Light and color

At the first page, learner can choose one of these sections and follow the other pages. (Fig. 1)

The video files in this project are being created by using the Camtasia Studio. This software has the capability for both recording video from the display screen and recording the sound via microphone, simultaneously. It also benefits from the ability for editing the sound and video, which would help adding images or sound clips to the beginning or end of the clip, as well as adding effects.
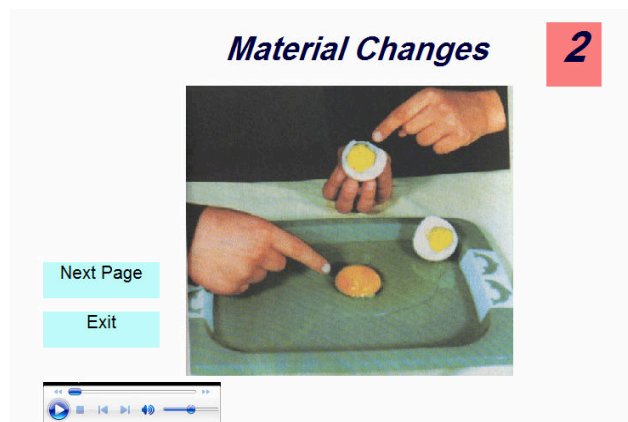

Fig. 2 The second chapter

The produced file is an SWF extension file which is applicable in web, and also has the ability to be saved as AVI, WMV, MOV, GIF, … . Furthermore the software is also able to put forward Quiz.
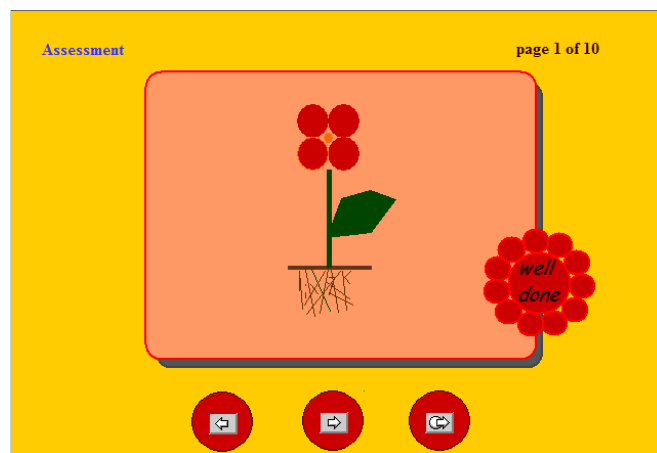

Fig. 3 Assessment pages

In this project, in order to create menus, buttons, and animated images, Swish MX is being used and all of the above mentioned features are put together using Visual Basic, and the necessary codes are also produced to make the appropriate connections between the different features.

XII. CONCLUSION

Today, many of the technologies for designing and implementing the computer-based learning software are available. Although these technologies are different in designing, but the end result which is designing the system with user-friendly and user-interactive environment in its best possible way is similar. It is good to remember that we are

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always able to apply an integration of these technologies in order to design an attractive and effective environment for any educational purposes. Due to the high number of multimedia tools, it is possible to create an environment in which the users are not feeling bored, and have the best outcome of their learning software package.

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