THE USE OF WEB TECHNOLOGIES AND TOOLS IN DEVELOPING AN INTERACTIVE INTERNET PROGRAMMING ONLINE TUTORIAL (IIPOT)

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Abstract: This paper will discuss the use of various web technologies and tools in developing an interactive online tutorial for Internet Programming course at Universiti Tun Abdul Razak. This interactive online tutorial consists of Course preview, Courseware (includes Quiz and Glossary), Assignment, Q & A, e-mail ,forum and On-line Tutorial (OLT). Web programming languages has been used in the courseware development such as JavaScript for Quiz and Practices module, Active Server Pages with web database for Assignment module, HTML and DHTML for notes, and XML for forum. Collaboration tool such as CENTRA Symposium is used for On-Line Tutorial (OLT) session where lecturers and students can communicate with each other through the text chat or using audio set, and at the same time can browse the slides given on the screen whiteboard. Animated Pedagogical Agent such as Microsoft Agents has been used as one of the tools to assist students during their learning phase. This combination of asynchronous and synchronous communications together with the integration of web programming languages and tools helps the students to study at their own pace. As a result, students can do the exercises and learn better in flexible and interactive ways.

Keywords: Web technology, Interactive, Courseware, Online, Integration

INTRODUCTION

Internet has become one of the popular demands in our life. WWW enhanced the ability to train and educate people online. The information is transmitted to students and integrated with tools helps in increasing student's level of involvement in the training experience. E-learning gives opportunities for students learn to in a flexible way. Web can give more opportunities for interactive exercises. It engages students in the learning process through an interactive, dynamic environment involving the student, online materials and an instructor. Web advantages include providing hyperlinks to other resources in the world, give up to date information, multi platform, allow students to study at their own paced and can reach people with difference geographical area. However there are some disadvantages of web that should be considered because an instructor need time to learn new tools and the restriction of the technology for example bandwidth [1]

This paper will discuss the use of Web technologies in developing an interactive online tutorial for Internet Programming subject. The tutorial consists of Course preview, Courseware (includes Quiz and Glossary), Assignment, Q & A, e-mail, forum ,crossword puzzle and On-line Tutorial (OLT). Course preview module will consist of course objective, schedule and lesson plan. Courseware module will consists of Notes, exercise, forum and main menu. Assignment module allows students to download the questions and submit their answers. Quiz module will let the students do the quiz as required. Glossary will show the definition and terms related to the subject.

MATERIALS AND METHODS

Web technologies make web pages more dynamic and interactive. The advantages of web technologies are GUI, Point and Click, World Wide Web, Multi-platform, easy to publish information, learn and use. Example of web technologies and tools used in this tutorial are HyperText Markup Language (HTML), Dynamic Hypertext Markup Language (DHTML),JavaScript, Active Server Pages (ASP), Java Applets, eXtensible Markup Language (XML), Animated Pedagogical agent (APA), Centra Symposium and Camstudio.

HyperText Markup Language (HTML)

Hypertext markup language is used to create hypertext documents that provides structuring and layout control to manage the appearance and the linkage mechanisms of the corresponding Web page. HTML can consist of frame, table,links, lists, image map and form. HTML is significant for two reasons, the language is sufficiently general to allow it to be used with a variety of browsers and computers , and it allows people to create web pages without a background in computer programming

Dynamic Hypertext Markup Language (DHTML)

Dynamic HTML is a term used by some vendors to describe the combination of HTML, style sheets and scripts that allows documents to be animated. The advantages of DHTML are can create interactivity to relatively simple Web pages and server independent.

JavaScript

JavaScript is a client-side scripting languages that is embedded in Web pages and interpreted as the page is loaded. It can discover a lot of information about the HTML document it is in, and manipulate a variety of HTML elements It is easier to learn than JAVA and provide any type of interactivity where security or data collection are not crucial, especially when browser used by targeted users is known. JavaScript is very browser dependent which contributes the disadvantages. It cannot send data back to the server without help from CGIs and or Java. It is also not secure - code and data can generally viewed easily by the user.

Java Applets

An applet is a program designed to be executed from within another application. [2] Using applets instructors can focus on concepts, modeling and problem solving. There are some advantages of applet such as :
- Applets are portable, independent of environment and browser. It is accessible on the client-side and faster than programs running on remote servers.
- Java is safe, Applet environment is secure
- Applets loaded when needed, no need to install or manage them.

Active Server Pages (ASP)

ASP (Active Server Pages) is a language for creating interactive web sites that was created by Microsoft. It was designed to be easier to use, faster to develop in, and to perform better than Perl/CGI. The are some advantages of ASP such as [3]
- Server-side scripts are compatible with all browsers, because all the processing takes place in the server.
- Source code cannot be seen by the client because it is executed on the server and only the output result is transmitted to the browser.
- Ability to directly access server-side databases and other information sources.

eXtensible Markup Language (XML)

XML stands for the *eXtensible Markup Language*. XML is used to identify key elements within a document, store information for later retrieval, exchange data between programs and much more. XML is a standard that was developed by the World Wide Web Consortium in 1996 as an open standard so everyone could use it. Advantages of XML are allows to define all sorts of tags with all sorts of rules, such as tags representing business rules or tags representing data description or data relationships. However, XML has a disadvantage such as the lack of adequate processing applications [4].

Animated Pedagogical Agent (APA)

Animated pedagogical agents are animated characters that can interact with learners in computer-based environments, in order to stimulate and encourage learning. They improve the effectiveness of education and training applications, and can also be employed in many other interactive applications to

assist novice users. APA can interact with the application using more natural communication techniques. The control accepts both mouse and keyboard interactions, speaks and support speech recognition [5]

Centra Symposium

The Centra symposium [6] interface collaborate voice, video, data and graphics in a structured group-learning environment. The real-time interactivity features in Centra allows the multi-use, interactive white boards that can be saved for later review and text chat. It can import content directly to the agenda in real-time, rich multimedia content and provide collaborative hands-on training using real-time application sharing with mark-up tool.

CamStudio

CamStudio is a simple, straightforward program to record screen activity to AVI or SWF format. It is an ideal tool for developing videos to demonstrate features of a new software, for creating movies used in user training or any other task that requires the capture of desktop activity [7]

RESULTS AND DISCUSSIONS

This paper will discuss the use of web technologies in developing an Interactive Internet Programming Online Tutorial for Splash screen effect,frame, code tester, crossword puzzle, Forum, Assignment submission tool, Microsoft agent and collaboration tool such as Centra Symposium.

Splash screen effect

DHTML technology such as DirectAnimation Path Control is used to define paths that the targeted elements follow. Figure 1 shows the Polyline paths for several separate objects that create a splash screen effect . A separate object tag is added for each object that is wished to control.
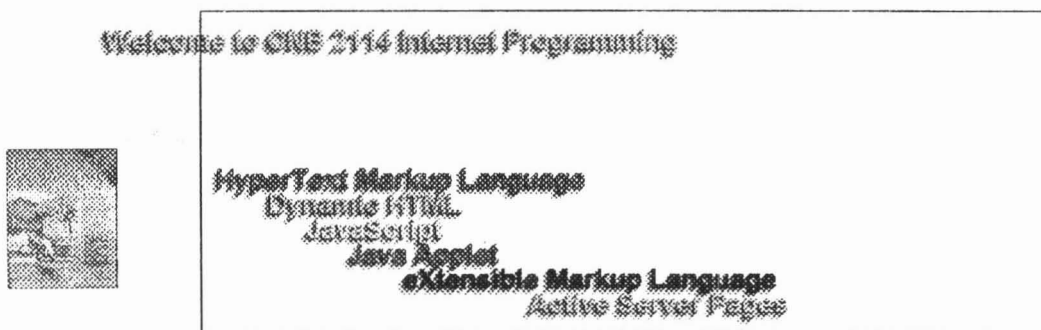

Figure 1: Splash Screen Effect

Frame and code tester

HTML frames enable Web authors to display multiple HTML documents in multiple views rendered by the browser on its one window. Each frame displays a web page. Javascript is used to create the source code tester and Quiz in the Practice module. Figure 2 shows the code tester which allows user to write their HTML, DHTML, VBScript or JavaScript code and click the test button to check the output.
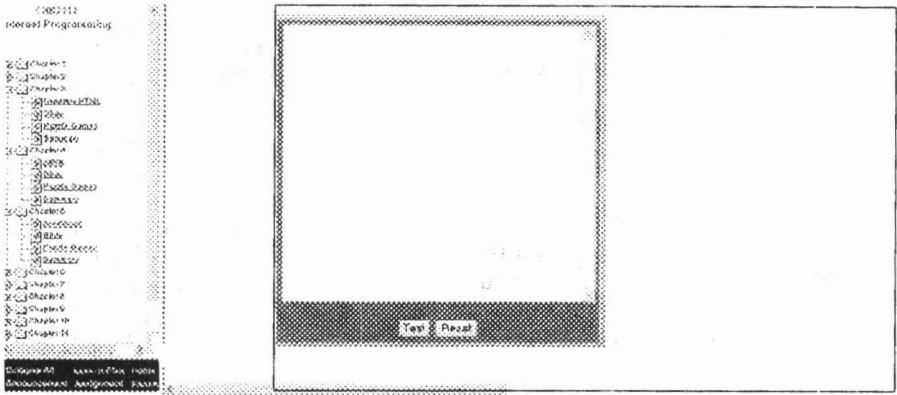
Figure 2: Code tester

Online Tutorial (OLT)

Centra Symposium is the collaboration tool used for Online Tutorial Module. Students can interact with the lecturers and their friends, use the microphones and write the text chat. They also can download the slides given by the lecturers. Figure 3 shows the example of Online Tutorial Module.
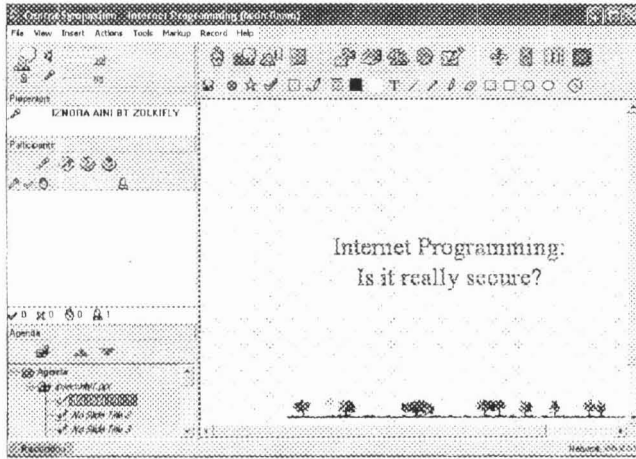

Figure 3: Online tutorial

Microsoft agent [8]

Microsoft Agent control with Genie as the agent character will be the Help-Agent in the tutorial mode. The Genie will give explanation of some terms in interactive way. Figure 4 shows the example of using an Agent.
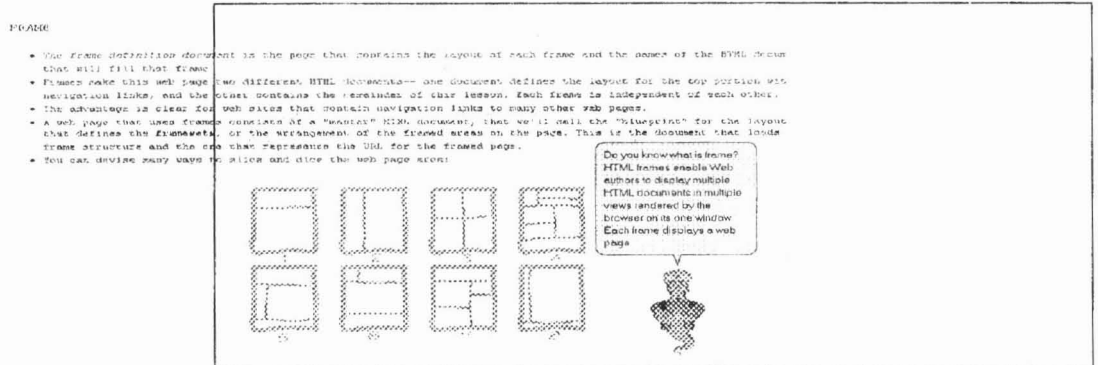

Figure 4: Frame tutorial with Agent

Guestbook

Camstudio is used to show on how to set the virtual directory in IIS. Then it demonstrates the steps on how to fill in the guestbook. The guestbook has been developed using ASP with Microsoft Access as the database.

Forum

The forum has been developed using XML and ASP. Figure 5 shows the use of XML and how the xsl file is called to format the display. and output:

Example of code and output:

```
<?xml version="1.0"?>
<?xml:stylesheet type = "text/xsl" href = "formatting.xsl"?>
<forum filename="forumASP.xml">
    <name>ASP Forum</name>
    <message timestamp="3/22/2004 4:12:57 PM EST">
        <user>Malcom X</user>
        <title>Asp and Database</title>
        <text> What is web database?</text>
        </message></forum>
```


ASP Forum

Asp and Database

by *Malcom X* at 3/22/2004 4:12:57 PM EST Delete

How to relate ASP and database?

Post a Message
Return to Main Page

Figure 5: Forum

Crossword Puzzle

Crossword puzzle has been developed using Java Applet. It will call the class with datafile value filename.ccj to show the output. (9) Figure 6 shows the example of code and the output.

```
<APPLET      CODE="Grid.class"      ARCHIVE="ccjava.zip"      NAME="CCXWORD"
WIDTH=550 HEIGHT=276>
<PARAM NAME="DATAFILE" VALUE="9cnb2114.ccj">
You need Java enabled to view the crossword applet.
</APPLET>
<FONT FACE="Times New Roman" SIZE=3>
```
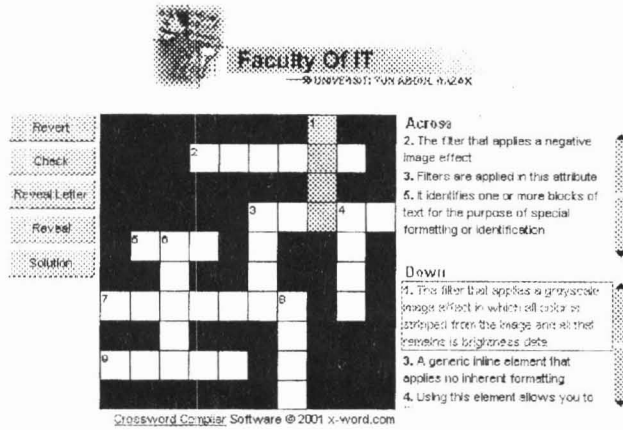
Figure 6: Crossword Puzzle

Assignment submission tool and Q&A module

Active Server Pages with MS Access as a database is used to create the Assignment submission tool and Q&A module. Figure 7 shows the example of code to connect the QA.mdb database in Q&A module.

```
<%
 dbfile=Server.MapPath("QA.mdb")
 Set OBJdbConnection=Server.CreateObject("ADODB.Connection")
 OBJdbConnection.Open "driver={Microsoft Access Driver (*.mdb)};dbq="&dbfile
 Set rs = Server.CreateObject("ADODB.Recordset")
 sql= "SELECT * FROM Question"
 rs.Open sql, OBJdbConnection, 3, 3
 rs.PageSize = 5' Number of rows per page
 PageSize=rs.PageSize
%>
```

Figure 7: Code example to connect the database

CONCLUSION

The use of various web technologies and tools can create an interactive and interesting tutorial. Interactive elements such as code tester, animation using DHTML and Agent character, crossword puzzle and collaborative tools will help students to gain better understanding and knowledge. The combination of asynchronous and synchronous communications together with the integration of web programming languages and tools helps the students to study at their own paced. As the results, students can always do the exercises and learn better in flexible and interactive ways.

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