DESIGN OF OPEN COURSE MATERIAL FOR INTERACTIVE CONTENT: SAMPLE OF LIBRE OFFICE

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Abstract. Rapid development in Information Technologies (IT) and widespread use of Internet have encouraged valuable innovations in training life. As a result, communication and computer-aided teaching have taken an important place in formal and distance education, and also in hybrid education. Recently, several universities in all over the world presented the developed course material as an open course material for computer-aided teaching. Content of the course material combined with presentation, text and video files is presented for open access. Among training methods, computer-aided training has promoted synchronous learning, online-offline training, trial-and-error learning and self-learning. In general, the open course material is presented in different formats of text, post script and audio-video. The Libre Office software as an open source code constitutes an interactive software simulation in this study. Moreover, the prepared material was published over the Internet. The material produced is designed for self-learning. Outcomes of the learning process were observed in different study departments during special sessions.

Keywords: Open Course, E-Learning, SCORM, Interactive Simulation Software.

Introduction

Today, the use of technologies provides many facilities in educational area. When it is expressed as learning in electronic environment, e-learning is used in many educational institutions all over the world (Fallon et al. 2003). E-learning content includes not only book transfer via the web, but also student motivation, attention, and visual material. Preparation of visual material is also very important in terms of being easy to use all skills and systems (Zemsky et al. 2004). E-learning uses the Learning Management System (LMS) for presentation of educational material, removal of feedback and evaluation report. There is a large number of software for preparation of e-learning content package in a quick and efficient way for distance education. E-learning packages on Sharable Content Object Reference Model (SCORM) format are produced using this software (Bailey 2005).

A Massive Open Online Course (MOOC) is an online course taken by unlimited participants as open access platform on the web. Most of the researchers believe that MOOC substantially changes education (Brooks 2012, Friedman 2013). MOOCs has been spread all over the world in the recent years. MOOCs courses could be taken online by any student having a computer and Internet connection. Massachusetts Institute of Technology (MIT), Harvard University and Stanford University are the pioneer providers of MOOCs. Coursera offered more than 1793 courses from 138 universities in 2016 (Coursera 2016). MOOCs are available for students and instructors mostly in a form of videos, PDFs. In this study, students can learn on their own, unlike other MOOCs developed. When the course is self-directed and independent, students are more successful in their learning (Artino 2008; Knowles 1975; Silén and Uhlin 2008). Activities are performed in the course prepared for work as well as success of students in the course is observed.

In this study, the Libre Office software constitutes an interactive software simulation. Moreover, the prepared material is published over the Internet. The material produced is designed for self-learning. Outcomes of the learning process were observed in different study departments during special sessions. Organization of sections is presented as follows: self-learning hierarchy of students is provided in the proposed method. Application of the proposed method is provided in Section 3. In the final section, learning outcomes are laid out.

Proposed Method

In this study, E-learning content is prepared in order to support self-learning of students. Development of the content is realized in the following five steps:

1. Definition of problem;
2. Preparation of scenario;
3. Development of application;
4. Error Checking;
5. Creation of SCORM Package.
These steps are also specified in Figure 1.

![Figure 1. The development stages of e-learning content](image)

**Definition of Problem**

The interactive applications used in computer-literacy-linked training software should be provided consistently, depending on a specific problem; moreover, the prerequisites with the various parameters should be determined. Definition of a problem is the process of determination of all the details related to achievement of the desired behavior of students. For instance, all stages of the problem definition where a page is divided into two columns in the Libre Office shown in Figure 2 could be examined. However, the writing stage of the text is not a part of the problem definition. Preparation of the text should be provided as a precondition. In the process of division of a page into two columns, the width of the columns and the line dividing the columns are the parameters which should be determined in order to specify their condition. Moreover, order of the applications or the application methods (to make this from any menu or shortcut keys from keyboard/mouse etc.) should be detailed in the stage of the problem definition.

In this study, when it concerns interactive applications, the following topics are presented to students in the stage of the problem definition:

- Definition of target output.
- Definition of prerequisites for the output.
- Definition of parameters during realization of the output.
- Definition of procedure / method during realization of the output.
Preparation of Scenario

The process of a scenario preparation is aimed at concordant preparation of all the participants which are to take part in the interactive application. Each scenario is designed as a template so that most of the processes related to the sections may occur in each interactive application. There is no need for the information under each section in the designed template. For example, dubbing may not be included in each interactive application or there may not be expository text on the screen as a tooltip text. In this case, the section names are included but the content of each section could be left empty. Scenarios are designed as based on the scene. There are a lot of scenes in one scenario and a lot of screen shots even though the layer could be in each scene. The sample process of the scenario is shown in Figure 3. While any interactive applications are prepared, the following sections are defined with the related information:

- **Learning Output:** Details of the desired behavior to assist the developer to understand the desired job in the scene are provided in this section.
- **Dubbing:** The text to be dubbed should be numbered and also given as basic sentences in order to establish the simple management.
- **Interaction / Flow:** Each process to be realized in the scene should be detailed as items. Screen transitions must be realized as the new layers. The number of the flow indicated inside the square brackets (e.g. [3]) should be used in between the dubbing texts in order to synchronize the screen transition with the dub. Thus, it could be determined which one of the interaction / flow is to be realized in between the execution of the audio text.
- **Content / Screen Text:** Any long explanation texts shown on the screen in the specific case or time and also the information about the content or usage of special visualizations are shown in this section.
- **Visual Objects:** The file information on special visual objects to assist the developer is presented in this section.
- **Check Note:** Any notes indicating conformity of the scenario by the team leader and the developer are provided in this section.
Development of application
Procedure of the application is realized on specially designed virtual machines. These virtual machines provide an opportunity for the developers to work on the same operating system in different time and place. Therefore, all shared assignments are integrated and continuously developed on the virtual machines. In this study, Articulate Storyline 2 Program has been used to produce the interactive applications. While the scenarios are realized, some revisions could occur because of the working medium or developing procedures. These revisions should be performed quickly by means of any effective project management systems in the developing stages. The Redmine Project Management system has been used in this study.

Error Checking
As the interactive applications are developed, errors could occur in most of the development stages. These errors could occur because of the scenario, developer, development or running medium. The scenario-induced error is solved by the developer during the developing stage. Also, the developer and running medium related errors are solved by the developer at the end of the development by means of the scenario referenced test. Any other errors which were not detected during these stages are determined by the user in the testing stage. In the testing stage, some extra applications including common tests are done in order to test reliability and limits of the applications. Therefore, any errors and bugs occurred because of the development and/ or technological mediums could be detected. The test result collected in any stage of the development should be reported in the project management system in order to avoid any design errors in the future.
Creation of SCORM Package

In this study, SCORM version 1.2 Learning-content Management System (LMS) has been used for reporting and following standards. In the application, the user is expected to follow all steps of the process in order to achieve the desired behavior. That is why reporting of the all the examined screens is realized. Moreover, LMS status reporting is determined as "Complete / Incomplete". The SCORM file with these adjustments could be easily included into any LMS as grade type "Learning Object". Articulate Storyline 2 Program is used for automatic production of the SCORM packages. Then the SCORM packages are loaded into Moodle LMS to serve for the use of students.

Application Results

"Usage of Basic Information Technologies" Course which is coordinated by the Department of Informatics at the University of Kocaeli is used as a sample course in this study. The lecture notes of the course were presented to students via Moodle LMS during the fall semester in 2015 - 2016. In total, fifty three SCORM content packages have been developed in the open course of the Libre Office software. For instance, "customizing the toolbar", "dividing a page into two columns" and "determination of auto recovery time" are the sample contents of these SCORM packages.

Students who successfully complete the SCORM package are given one point. As a result, follow-up rate of the content packages is obtained. The data obtained from e-learning content packages applied by the students in different four departments is observed. The total number of students and SCORM content packages performed by students in four different departments are specified in Figure 4.

Figure 4. The SCORM content packages performed in different departments

Name of department, number of students and student ratio which applied SCORM packages are provided in Table 1. As shown in Table 1, students from Aircraft Electrical and Electronics Department accomplished the SCORM packages by ratio of 91,66 % at maximum rate. On the other hand, students from Advertising Department accomplished it by ratio of 65,21 % at minimum rate.

<table>
<thead>
<tr>
<th>Name of Department</th>
<th>Number of Students</th>
<th>SCORM Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft Electrical and Electronics</td>
<td>36</td>
<td>91,66 %</td>
</tr>
<tr>
<td>Radio, Television and Cinema</td>
<td>46</td>
<td>69,42 %</td>
</tr>
<tr>
<td>Visual Communication Design</td>
<td>44</td>
<td>79,54 %</td>
</tr>
<tr>
<td>Department of Advertising</td>
<td>121</td>
<td>65,21 %</td>
</tr>
</tbody>
</table>
Students shown in Table 1, entered the laboratory exam on the Moodle system. Afterwards, they had to pass the final exam of the course. In Table 2, average notes of the laboratory and final exams of the students were given according to different departments.

**Table 2. Ratio of Laboratory and Final Exam**

<table>
<thead>
<tr>
<th>Department</th>
<th>Average of Lab Exam</th>
<th>Average of Final Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft Electrical and Electronics</td>
<td>68.88%</td>
<td>78.82%</td>
</tr>
<tr>
<td>Radio, Television and Cinema</td>
<td>58.11%</td>
<td>69.53%</td>
</tr>
<tr>
<td>Visual Communication Design</td>
<td>63.42%</td>
<td>72.12%</td>
</tr>
<tr>
<td>Department of Advertising</td>
<td>52.93%</td>
<td>63.35%</td>
</tr>
</tbody>
</table>

As the results of laboratory and final exam were assessed, a high rate of success in laboratory and final exam in which students performed the SCORM content packages was observed, as shown in Figure 5.

**Figure 5. Average SCORM Content Packages in Laboratory and Final Exams of the Departments**

**Conclusion**

The course of "Usage of Basic Information Technology" was presented to students on Moodle system as a closed group. SCORM packages were made by students from four departments on the Moodle system during their semester. Students from Aircraft Electrical and Electronics Department accomplished the SCORM packages by ratio of 91.66% at maximum rate. On the other hand, students from Advertising Department accomplished it by ratio of 65.21% at minimum rate. For the same departments, the success rates with regard to laboratory and final exams are 68.88%, 78.82% and 52.93%, 63.35%, respectively. Students who completed SCORM packages were assessed according to their success grades in laboratory and final exams according to their departments. As a result, students who followed interactive e-learning content and whose participation rate was high have been observed to be more successful. The prepared material is also published on http://acikders.kocaeli.edu.tr URL address over the Internet as an open access. Consequently, the learning environment has been developed for the users to meet their self-interactive learning needs.
References

**ATVIRO KURSO MEDŽIAGOS INTERAKTYVIAM TURINIUI MODELIS: LIBRE OFISO PAVYZDYS**

Santrauka


Pagrindiniai žodžiai: atviras kursas, e. mokymasis, SCORM, interaktyvi imitavimo programinė įranga.

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