

Available online at www.sciencedirect.com

ScienceDirect

Procedia
Social and Behavioral Sciences

Procedia - Social and Behavioral Sciences 141 (2014) 1357 – 1362

WCLTA 2013

A Sample Application of Web Based Examination System for Distance and Formal Education

Burcu Yılmaz Kaya ^a*, Gökhan Kaya ^b, Metin Dağdeviren ^c^a Industrial Engineering Department, Faculty of Engineering, Gazi University, Maltepe, 06570, Ankara, Turkey^b Computer Engineering Department, Faculty of Engineering, Gazi University, Maltepe, 06570, Ankara, Turkey^c Industrial Engineering Department, Faculty of Engineering, Gazi University, Maltepe, 06570, Ankara, Turkey

Abstract

Preparing tests is a difficult to handle and a time consuming process for teachers, in which they have to prepare both fair and consistent ones for each class. Besides this, even if the teacher can prepare a sufficient exam, it is difficult prevent students from cheating, and if the teacher cannot prevent them to do this injustice occurs again. In this point of view, the purpose of this study is to develop a system for both distance and formal education types, which composes unique quizzes or midterm exams or final exams for each student simultaneously and instantly. Through this, it will be easy as clicking a button to develop sufficient exams and to corporate equity between the students, who will have to answer the unique questions of the exams on their own. These tests include the same amount of questions, and difficulty level of all of the questions is similar for each type of test. This system is developed signed with C# .net 4.5 Framework, in two platforms; web and Windows form. SQL Server Express 2008 is used as database in our application. A real world application of this trustable examination system is carried out and the operation of the system is explained via this presentation, at the end of the study.

© 2014 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/3.0/>).

Selection and peer-review under responsibility of the Organizing Committee of WCLTA 2013.

Keywords: Distance and formal education, Web based examination; Web based evaluation, College student education, Educational informatics;

1. Introduction

Teachers spend their time for the processes of preparation and evaluation of the exams, while they can do their own academic studies and works in this time, especially in university education. Furthermore, transferring the scores of the exams to an information system or at least to any kind of computer environment is another time consuming process on its own. Besides, all this actions include inaccuracy risks because of the humanitarian error factors,

* Corresponding author: Burcu Yılmaz Kaya. Tel.: +90-312-5823803
E-mail address: burcuyilmaz@gazi.edu.tr

because these actions are being carried out manually in the present paper-based system.

In addition to these, paper-based student evaluations suffer from low response rates, inefficient data acquisition and analysis, and difficulty obtaining input from multiple evaluators [1]. For such reasons, a web based examination system that will increase the reliability of the process and results, and minimise the workforce and time is designed and developed in this study.

It can be seen that most of the studies done in the related area (web based education systems) aimed to transfer the formal educational systems on to web, instead of analysing the web based examination systems for both online and formal education. In the recent literature; Schell and Lind [1] developed a web-based 360-degree evaluation model, not an exact examination system, for evaluating the performance of third-year surgery clerkship students of Florida University, improving evaluation response rates, and including multiple evaluators' input. Yu et al. [2] designed and implemented a web-based homework project controlling and evaluation system for Computer Programming students. Lee et al. [3] described a web-based standardized patient (SP) teaching module using detailed SP and faculty commentary to teach communication skills. This web based teaching module is designed to be able to increase the scores of the students in the clinical performance examinations (CPX). Yang et al. [4] designed a teaching and learning platform for network teaching (an online learning environment), which realizes easy communication and interaction between teachers and students.

2. Purpose and Organisation of the Study

In this study, a web based examination system is designed for an Engineering Faculty in Turkey. System is designed on web, that there it can be used for both formal and distance education. The purpose of this study is to develop a reliable and resource saver, user friendly examination system, that thanks to it, teachers can save time and workforce, and prevent cheating, and students can speedily have responses of the examination and learn their scores. That which means, the proposed system is advantageous for both sides the users.

The system works briefly like this; all students, teachers, lessons and exams are defined by the administrator at first. Teachers enter the exam questions, answers and number of the students who have the same course, and determine the examination times, while students have only to have the examinations. System constitutes the test by itself and ranking of all the questions and even the alternative answers will be different in these tests, hence there will be a different exam for each of the students having the same test. System designers' target is to prevent the cheating, while making the system to constitute different tests according to the student number. Examination ends in two cases, first the student clicks to end the examination of his/her own accord before the finishing time, or second examination time run out, and in both of the cases, in the end of the exam student can see his/her score point in the screen immediately. Teachers also can reach the results and they can easily export them to an Excel sheet by clicking a button.

3. Methods and System Design

The presented system is designed as an object oriented system. There are three kind of users in the designed system; administrator, teacher and student. To provide the best explanation of the system design, the system is described with Use Case Diagrams, which is a Unified Modelling Language (UML) diagram, for all of the users (actors) of the system. Use Case UML Diagrams model user-system interaction, and model this in the last user's point of view, hence they are called "objective oriented". This kind of UML diagrams describe what the user of the system can do, do not describe how. A Use Case UML Diagram includes at least a scenario name, an actor, and a main scenario brief with its consecutive steps. The Use Case UML Diagrams of our proposed system are shown in the following figures (Figs 1-3) for each actor.

Scenario Steps:

1. Teacher wants to view his/her personal info.
2. System gives his/her personal info.
3. Teacher wants to view lists.
4. System gives the entity list types.
5. Teacher views the students/lessons list.
6. System shows the students/lessons list.
7. Teacher wants to create an exam.
8. System gives to adding or editing options.
9. Teacher adds a question / an answer / an examination time (ET) / the number of the students (NS).
10. System records the information.
11. Teacher edits a question / an answer / an examination time / the number of the students.
12. System records the information.
13. Teacher wants to print out the created exam.
14. System makes the exam printed out.
15. Teacher wants to view the results.
16. System gives the result types.
17. Teacher wants to view the results of an exam / of a single student.
18. System gives the results of an exam / of a single student.

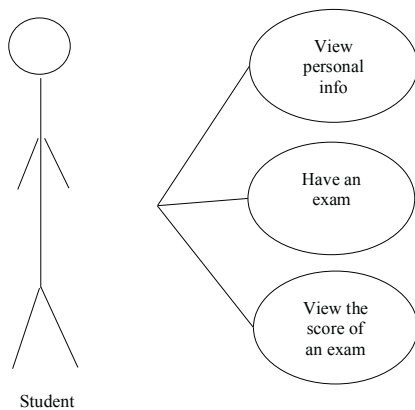


Fig. 3. The Use Case UML diagram for the “Student” actor

User scenario name: Student uses the system

Actor: Student

Scenario Steps:

1. Student wants to view his/her personal info.
2. System gives his/her personal info.
3. Student has an exam.
4. System records the information.
5. Student wants to view the score of an exam.
6. System gives the score of an exam.

The pseudo code of the authorization/authentication for the developed web based examination system login is as follows;

btnLogIn_Click

```
User.UserName ← GetUserName()
```

```

User.Password ← GetPassword.Hash()
AuthenticateUser()
If User. IsAuthenticated then
    If User.Role == Roles.Administrator then
        Navigate(Administrator/Home/teacherID)
    else if User.Role == Roles.Teacher
        Navigate(Teacher /Home)
    else if User.Role == Roles.Student
        Navigate(Student/Home/StudentID)
    end If
Add UserId To Session()
end If

```

The psuedo codes of creating a new question operation for creating a new exam, and creating a new exam operation of the developed web based examination system are as fallows;

```

Question.Category ← Select Lesson/Subject
Question.Content ← GetContent()
Question.Answers ← GetAnswers()
Question.AcurateAnswer ← GetAnswer
btnSaveQuestion_click
SafeToDatabase(Question)

CountOfQuestions ← 0
Exam.CategoryList.Add ← Selected Lesson/Subject
CountOfQuestions += Selected Lesson/Subject.QuestionCount
Exam.TotalQuestionCount ← GetSelectedQuestionCount()
Exam.Name ← GetNameOfExam
Exam.Time ← GetExamTime
btnSaveExam_click
SafeToDatabase(Exam)

```

The psuedo codes of the operations of having and ending an exam, so viewing the score point are as fallows;

```

OnPreInit Of Exam Page
CheckAuthorization()
QuestionList ← CreateNewExam(GetExamRules(GetexamQuestions(ExamName)))
AnswerList ← new list in Client Side which holds the answers of Student
For i = 0, i < QuestionList.Count, i++
    View ← Add DetailsOfQuestion()
    AddToMultiView(View)
End For

Click_EndExam || isTimeUp
SendQuestionListAndAnswerListToServer
PointOfOneQuestion ← Calculate()
totalPoint ← 0
Foreach Question in QuestionList
    If Question.Answer == AnswerOfStudent
        TotalPoint += PointOfOneQuestion
    End If
End For

```

```
End If
End Foreach
Updatedatabase(Exam, TotalPoint, Student)
Navigate(Student/home/studentID)
```

4. Findings and Results

A teacher, who is using our existing paper-based evaluation system for a selective course in an engineering faculty, has to spend 2 hours 35 minutes to prepare an exam test with 35 questions, and if he/she has to prepare different exam tests for each student, it will be increased to 5 hours and 45 minutes for a class of 30 students. Presented system does this work by clicking a button, and teachers have to enter the entities about the examination for once, so, if the future semesters are considered too, our system is a considerably resource saving tool. From the students' side; the response time of the teachers for the evaluation of the exams could reach 3 days to 2 weeks' time to time, according to different types of courses in our existing paper-based evaluation system. But in the web based system presented in this study, they can immediately learn their scores at the end of the examination, notwithstanding the course type.

5. Conclusions and Recommendations

In this study, an examination system which can give trustable results in a very short time is developed by computer programming techniques. The only thing that we can criticize the presented web based system is that, it is not able to test the expressive capabilities of the students in verbal courses; however, this situation is a common and ventured drawback for test examination evaluation method.

An answer can be searched for how much we could prevent cheating among the students with the presented web based examination system, in instance, by doing comparative analysis between the results of constituted student groups who have their exams with paper-based and web-based testing systems, for the future researches.

References

- Schell, S. R., & Lind, D. S. (2003). An Internet-based tool for evaluating third-year medical student performance. *American Journal of Surgery*, 185, (3), 211-215.
- Yu, G., Hong, L., & Sheng, L. (2010). A Web-Based Examination and Evaluation System for Computer Programming. 2010 International Conference on Management and Service Science, MASS 2010 , art. no. 5578482.
- Lee, C. A., Chang, A., Chou, C. L., Boscardin, C., & Hauer, K. E. (2011). Standardized patient-narrated web-based learning modules improve students' communication skills on a high-stakes clinical skills examination. *Journal of General Internal Medicine*, 26 (11), 1374-1377.
- Yang, S. J., Deng, X. Y., & Wang, M. Y. (2012). Construction of modern education technology web-based course platform based on .NET. ICCSE 2012 - Proceedings of 2012 7th International Conference on Computer Science and Education , art. no. 6295393, 1702-1705.