

UNIVERSIDAD CARLOS III DE MADRID
ESCUELA POLITÉCNICA SUPERIOR



Summary, Introduction and Conclusions.

Author: **Grecia Isabel Vera Villajulca**

Tutor: **Iria Estévez Ayres**

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SUMMARY

This project represents a web application with educational purposes. This application blends the concepts of peer review and the educational competition in order to take advantage of the benefits offered by both approaches.

On the one hand, peer review can be used to consolidate theoretical and practical concepts of the subject.

On the other hand, the competition system represents a playful element.

To conclude, the aim is to motivate the students to study and go in depth in the subject.

1 TECHNOLOGIES

The application has been created with Java as a programming language, following the MVC (Model View Controller) model.

To start with, we choose Java because it is a language OO based classes designed to have as few dependencies as possible. It permits developers to write the program once and they can execute it in any device, which means that the code executed in one platform, does not have to be recompiled.

Secondly, MVC model is selected because it divides data and business logic from the user interface and the module manages the events and the communications.

Implementation created in a modular way, views showing update information (due to the model makes it automatically), domain model is not affected if the views are modified and the extensibility and maintenance that implement the application which use this model, are some of the advantages that the MVC model provides.

Thirdly, we choose MySQL as database because it is easy and safe to use with many users and fast reading. It is the most used in application web owing to the reading quantity and it presents better characteristics than others such as the speed, high performance and strength.

In addition, we choose Apache Tomcat as server because it works as an independent web server and is used like an autonomous web server in environments with high traffic level and high availability.

2 SYSTEM DESCRIPTION

To implement the application, the next classes have been used:

STUDENT

Information about the student is required to develop the implementation. The main characteristics are NIA, name and lastname to identify who is the student, the group of the student and competition to identify which competition is playing, login and password to access the application, and the phase where the student is.

TEACHER

Information about the teacher is required too. The main characteristics are login and password to access the application, name and lastname to identify the teacher in the application, the teacher group and competition to know which competition is playing, if he/she is an administrator of the application or not, and if he/she has complete his/her phase.

COMPETITION

Information about the competition is required to play the game. The main characteristics are the start and finish date of each phase, the number of the questions or reviews in each phase and the group where the competition is played.

GROUPS

Information about the group is required to know where the students, teachers and competitions belong. The main characteristic is the group number which is the name of the group. For example: 91, 92, 93....

QUESTIONS

Information about the questions are required to save the question created by the student or teacher. The main characteristics are the writer that is the student who created or changed the question, the group of the writer, the wording of the question with the 4 possible answers and the correct answer, the competition where the question was created and if it has been corrected or not and the mark obtained as a writer.

REVIEWS

Information about the reviews is required too. The main characteristics are the reviewer that is the student who review the question, the group of the reviewer, the competition where the review was created, the question reviewed, the comment and the possible improvement written and the marks obtained as a reviewer.

CORRECTIONS

Information about the correction is required. The main characteristics are the review corrected, the comment of the review, the corrector that is the student who correct the review and the mark obtained as a corrector.

3 GAME DINAMYC

As it is said above, this application is a competition game. Both teachers and students are part of this. The game has 4 phases related with the students and 1 phase related with the teachers, thus the game have 5 different phases. This phases are described below:

WRITER PHASE.

In this phase the principal actor is the student because he/she has to create the question. It is the first phase of the competition and it will start on the date selected by the teacher.

If the student want to play it, first the application must check the current date and if the competition starts in that date or before but with the next phase with an after date, the student will have access to the competition. If the start date is after, the student will not have access.

Once the student is in, a form will be shown in order to write the questions in it. The number of questions to be create is defined by the teacher and it appears as a brief description on the top of the page. This form has a section for the wording, 4 more sections for the 4 possible answers and a final section where the correct answer. When the student finishes to create the questions, he/she has to validate them in case he/she made a mistake and want to correct them or in case he/she is agree with the question and want to pass to the next phase. If the student want to correct them, he/she will have to write again the whole question (with the answers).

Once the questions are validate, the student will pass to the next phase, the reviewer phase.

REVIEWER PHASE

It is the second phase of the competition. It will start on the date selected by the teacher. The issue with the dates is the same explained above.

In this phase, the student has to review some random questions. The number of questions to review is fixed by the teacher when he/she creates the competition.

The random is programmed in a way that the application ensure the student, who is playing the reviewer phase, does not have to review a question which he/she created in the writer phase. Furthermore, it is programmed in a way that the questions without reviews are saved in a list where they will be selected randomly. With this solutions, we ensure that all the question are reviewed and all the students have reviews.

On the other hand, the student must to mark the questions keep in mind the difficulty and how they write the questions, if it is easy or not to understand.

Furthermore, the student have to write a brief comment of the question such as if it is hard to understand or it is bad written, and a possible improvement of the question such us if it could be more simple or write in a different way.

Once the questions are answered, marked and commented, the student will pass to the next phase.

CORRECTOR PHASE

It is the third phase of the competition. It will start on the date selected by the teacher. The issue with the dates is the same explained in the writer phase.

In this phase, students will received their first questions created in the writer phase together with the mark, comment and possible improvement of each review that these questions have in order to know if the questions are good or bad and if there is one bad, he/she could change this question. In case the student want to change it, the same form as the writer phase have to be fill. Once the question is validate, this will save in the database and the application will return to the corrector phase page.

On the other hand, the student must mark, comment and validate the reviews one by one. If the validation is ok, a message appeared reporting that the marks and comments have been validates.

Once all the questions are validated, the application will pass to the next phase, the teacher correction phase. But this phase is hidden and transparent to the students, so they will pass to the game phase.

TEACHER CORRECTION PHASE

It is the fourth phase of the competition. This phase is hidden and transparent to the students, as it has been mentioned above. In this phase, the principal actor is the teacher. It will start on the date selected by himself/herself. The issue with the dates is the same explained in the writer phase.

In this phase, the teacher must to validate the questions that will pass to the final phase. When the teacher access to the phase, all the students, who have completed the phase before and have created questions, will be listed. If the teacher selects one of them, all the questions that the student created will appear in a list. The list shows the wording of the first question, if this has been changed or not in the corrector phase, the wording of the question corrected in case the first question is corrected or the wording of the first question in case it has not been corrected, if this question has been correct or not by the teacher correction phase and the wording if it has been changed or not by the teacher. It will have 2 different ways of correction.

On the one hand, if the first question has not been changed in the corrector phase, this will be mark with its reviews.

On the other hand, if the first question has been changed in the corrector phase, the teacher must mark both questions, the first question created in the writer phase and the question changed in the corrector phase.

For the rest, the functionality is the same in both cases. If the teacher wants to change the question, the creation question form have to be fill, but first he/she must mark the questions and the reviews. Once the teacher has changed and validate the question, the application will return to the questions list where the new wording of the question changed by the teacher appears. If he/she decided not to correct it and validate it, there will not have changes in the questions list.

For both cases, a message informing that the marks have been saved with success will appear and the application will return to the questions list.

In this way, the questions validated by the teacher will pass to the final phase. If the teacher changed the question, the question created by the teacher will pass to the game phase. If the teacher did not change the question, the question created by the student will pass to the game phase.

Once the teacher has validatde all the questions, he/she will have the option to validate everything to finish the phase.

One the one hand, if there are students that the teacher has not corrected their questions, he/she will not finish the phase until he/she validates these students.

On the other hand, if all the students have been validated, the teacher will pass to the final phase.

Once the teacher has finished, the application will pass to the final phase.

GAME PHASE

It is the last phase of the competition. It will start on the date selected by the teacher. The issue with the dates is the same explained in the writer phase. In this phase, the

student has to play some random questions. The number of questions to play is fixed by the teacher.

Once the questions are answered, the student will pass to the end of phase and so to the end of the competition.

INTRODUCTION

Nowadays, Spanish Universities are following a continuous evaluation model due to the new study plan (Bologna Declaration). This model involves testing the students along the whole semester forcing them to conduct various assessments. In spite of this, involvement and learning are not increased in all cases. Sometimes, students leave this evaluation because they do not quite understand the concepts and they are not able to use them and in many cases, students try to memorize the concepts and algorithms without understanding them.

Several studies conclude that make a peer review encourage the attention of the students going in depth in the concepts since they can make constructive criticism about other works from other students, raising the motivation and learning depth in the students.

In addition, the application implements a competition system in the end. Students have to do their best if they want the victory.

To conclude, this project is implemented by a peer review system in order to encourage the development of the critical thought and evaluation skills of each student. The questions generated will be used in a competition in order to get high quality questions from students as well as having interest in the review part making more mandatory reviews.

1 SOCIO-ECONOMIC CONTEXT

The execution of the evaluation explained above, means limits resources. Scalability and sustainability have become critical and the crisis has reduced the university resources.

Spain, in comparison with other countries, has an educational organization more focused on the students than other countries.

Rationalizing the required resources is fundamental for improving the learning.

To conclude, methods are necessary to be satisfied the formative evaluation with a sustainable quality and to implement the summative evaluation in the correct way. For this reason, peer review appear as a method to encourage the learning skills required in an engineering.

2 OBJECTIVES

The principal objective of this project is the creation of an educational game based in peer review. This game claim that the students show interest for learning the subject and that the students develop a learning strategy.

The game will be used as an educational tool, of which will take advantage from its competitive character to stimulate its use for the student. In this way, the student can learn the theory as the same time he plays the game.

This objective is divided in other sub-objectives:

1. Study of web tools to program the application.
2. Study of the technologies used in order to develop the game.
3. Study of peer review systems to learn the advantages of this methodology.
4. Implementation of the system.
5. Testing the application to verify the correct functionality.
6. Study case in a certain subject. At the same moment of the writing of this report, this application is been used in a certain subject in order to validate if its use foment the interest and motivation of the students.

Furthermore, at the end of this project, the information will be analyzed with the purpose of value if the peer review really has got the expect targets.

3 REGULATORY CONTEXT

This project will use data from students. For this reason, this section will explain the regulatory context related with the data management presents in the application. This involve the use of LOPD (Ley Orgánica de Protección de Datos).

LOPD is a law whose objective is establish the necessary measures to guarantee the security that files must have.

The files represent the personal data, independent of the way it has been created, its organization and its access.

Furthermore, this law presents 3 security levels:

- Basic: files with personal data such as names, last name, address...
- Medium: files related with the commission of administrative or criminal offenses.
- High: files with ideology data, policy data, religion...

Once the description of the classification is finished, we can concluded that the level used in this application is the basic. The next step is register the file in the RGPD. Once the register is completed, the security document is accomplished.

4 REPORT STRUCTURE

This section include the information related with the realization of the project divided in chapters.

The information of each chapter will be described below:

- Introduction: in this chapter the main ideas and the objectives of the project are explained as well as the motivation in its realization.
- State of the art: this chapter will be analyzed the aspect which have influenced in order to select the work environment, programming language and the technologies used in this project.
- Design and implementation: in this chapter the requirement required by the application are explained in order to achieve the objectives.
- Requirements validation: in this chapter a demonstration of the application is accomplished in order to verify the requirements. We will use screenshots and an explanation in each case.
- Conclusions and future work: in this chapter the conclusions describe all the process developed in this application. Possible future developments are presented too.
- Planning and budget: the work tasks followed in the project are explained with a temporal estimation of each one. The budget describes the hours in each task and the cost of the material.

CONCLUSIONS AND FUTURE WORK

In this chapter, the conclusions obtained at the moment of developing the application and the possible future works are explained.

1 CONCLUSIONS

A dynamic web application has been created in which the main objective is to make a competition system and a peer review in order to help the students to raise their interest.

Different technologies have been studied in order to develop the application, and those with better efficiency and facilities to create the functionality required.

First of all, an extensive knowledge has been obtained about an application web based in a MVC model with Java as programming language. MySQL is selected as a database because it has better characteristics.

Secondly, the competition will help those students unmotivated. Usually, there are students who do not like the subject but if it is done as a game, they can show more interest.

Finally, the learning obtained in the development of this application, not only it has helped for consolidating new knowledges, but also it has helped to obtain news.

2 FUTURE WORK

Currently, this project is being evaluated in a subject of the University Carlos III. Inside of the short-term work we have the following items:

- Finish the experience
- Final testing in order to measure the learning gain.
- Analyze the experience data.
- Write a conference article.
- Furthermore, depending on the results, the application could be launched in order to verify if this method is effective.

In the technical side, there are possible improvements:

- Progressive question list. The teacher could list the question directly in order to correct faster.
- Better appearance. The information could have a better style (CSS).

- Questions list for reviews. List the question based in the reviews number. In this way the first question listed would be that one with less reviews and in case of having the same number, it will be selected random.
- Competition statistics. Graphics compares the questions played with the number of students who answer these well and who answer these bad in order to have a better visual effect.
- Student results. Representing graphically the results with the number of students that are in this threshold.
- Consult the dates of the realization phases. The teacher could consult the date when the student do the phase.
- Consult the students with failed questions. The students could consult who fail or who past the questions.
- Students ranking. Students could see the hits and fails of other students.
- English application. The user could choose the language which will use in all the game.
- Consult final results. The student could see all the marks given by other students.