

IMPROVEMENTS TO MOODLE

A Project Report

Submitted by

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in partial fulfilment for the award of the degree

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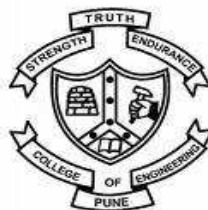
B.Tech

Information Technology

Under the guidance of

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Abstract

Moodle [1] is an open source course management system also known as learning management system or virtual learning environment. The focus of moodle is always on giving educators the best tools to manage and promote learning. Moodle acts as a communication tool used by students and teachers thus facilitating student-teacher interaction and student collaboration[9].

Although moodle has become very popular and effective, it still has a lot of scope for improvement. In this project, our aim is to add various features and enhance the current status of moodle. The goal is on improving the available functionality and making it more user friendly thus widely spreading its use. Our focus in this project is to come up with effective solutions to existing problems and new ideas to improve its usability.

Issues were taken from the moodle bug tracker [2] and our goal was on solving those issues. The different issues that we worked upon are "allow decimal grading, displaying late assignments in red colour, moving search box to front page, giving options for exactly n choices and single page to start/close dates". We have submitted patches for all of the above issues of which patches for "giving options for exactly n choices and single page to start/close dates" have received responses from the developers. Work is currently being carried on, on improving the patches based on suggestions given by the developers.

Currently, we are working on writing a question module which is a training module, designed for students.

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Chapter 1

Introduction

Moodle is an online learning management system providing 24/7 access to its facilities. Participants in moodle are students, teachers and administrators who make use of facilities provided by the moodle website. Courses can be further subdivided into course categories. For example, under a course maths, its categories can be algebra, geometry.

1.1 Modules

Moodle provides a variety of features like creating assignments, chatting, posting to forum, creating lessons, designing quizzes, conducting workshops etc.

1.1.1 Assignments

Students can submit assignments which are later reviewed by teachers who also provide their feedback and assign grades.

1.1.2 Glossary

Participants can create a list of definitions like a dictionary using the glossary. The glossary can be viewed and browsed in different formats by others like browse by alphabet, category, date and author. An auto linking feature is also provided.

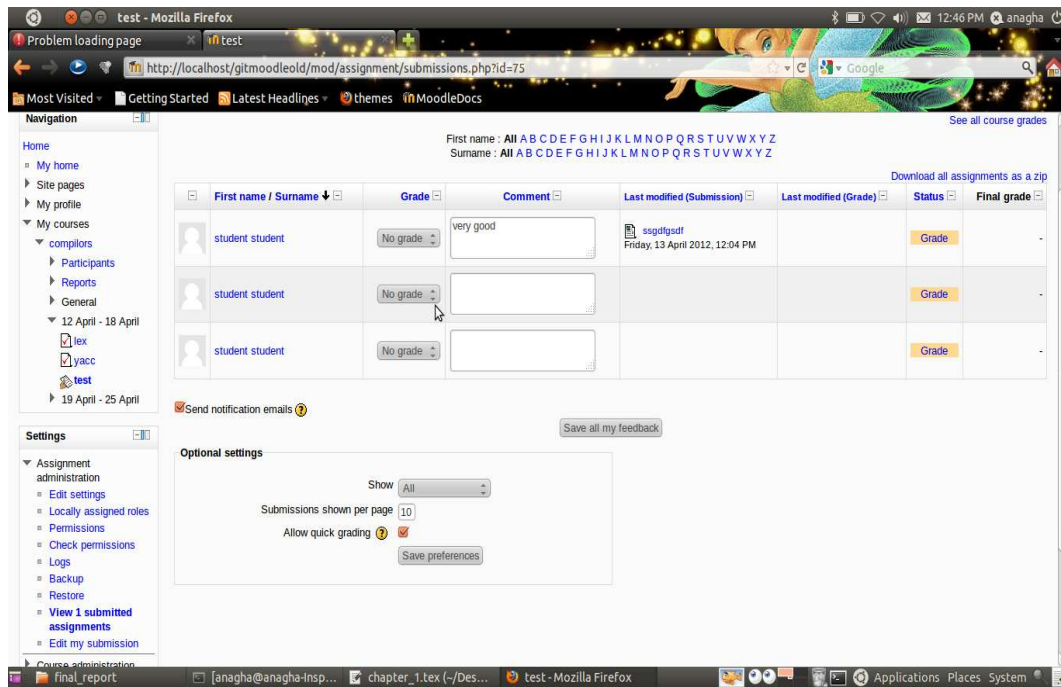


Figure 1.1: Assignments

1.1.3 Resource

Resources are basically a link within a course to a file or other material with additional information. For example in case of a python assignment, the resource can be a link to python documentation.

1.1.4 Chat

This module allows the participants to have real-time synchronous discussions on the web.

1.1.5 Quiz

The quiz features lets instructors design and implement quizzes consisting of a large variety of question types.

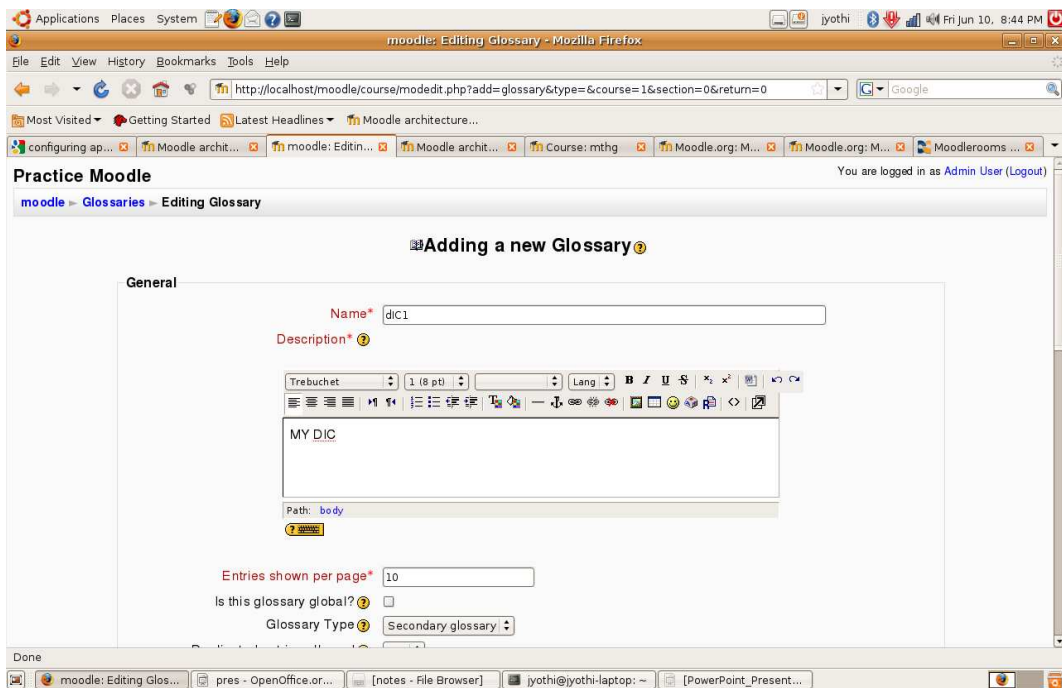


Figure 1.2: Glossary

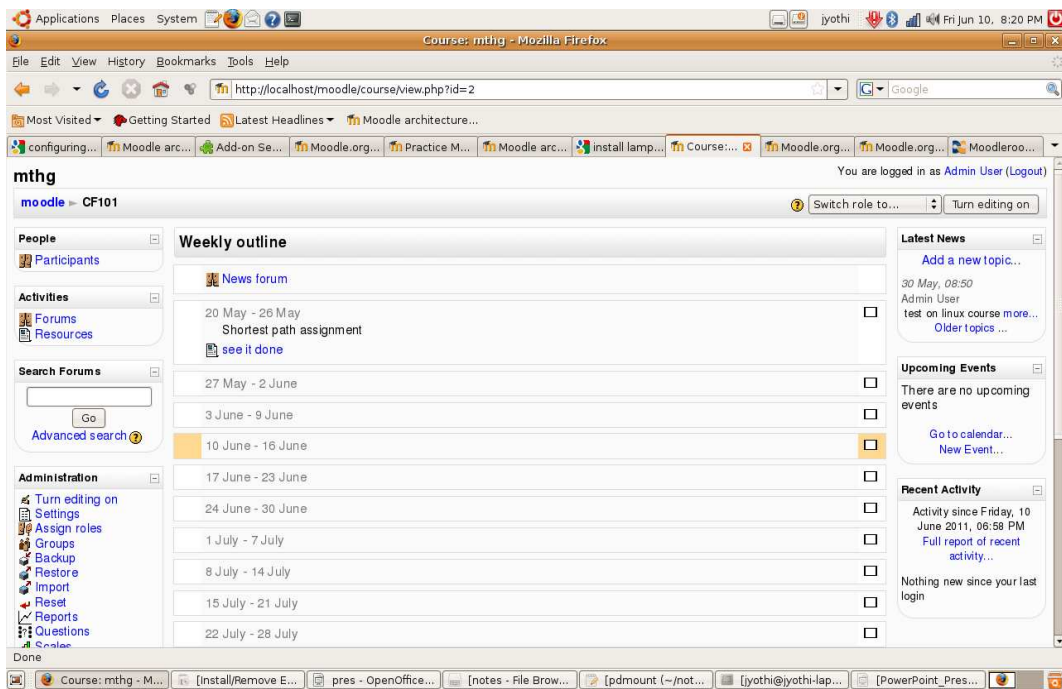


Figure 1.3: Resource

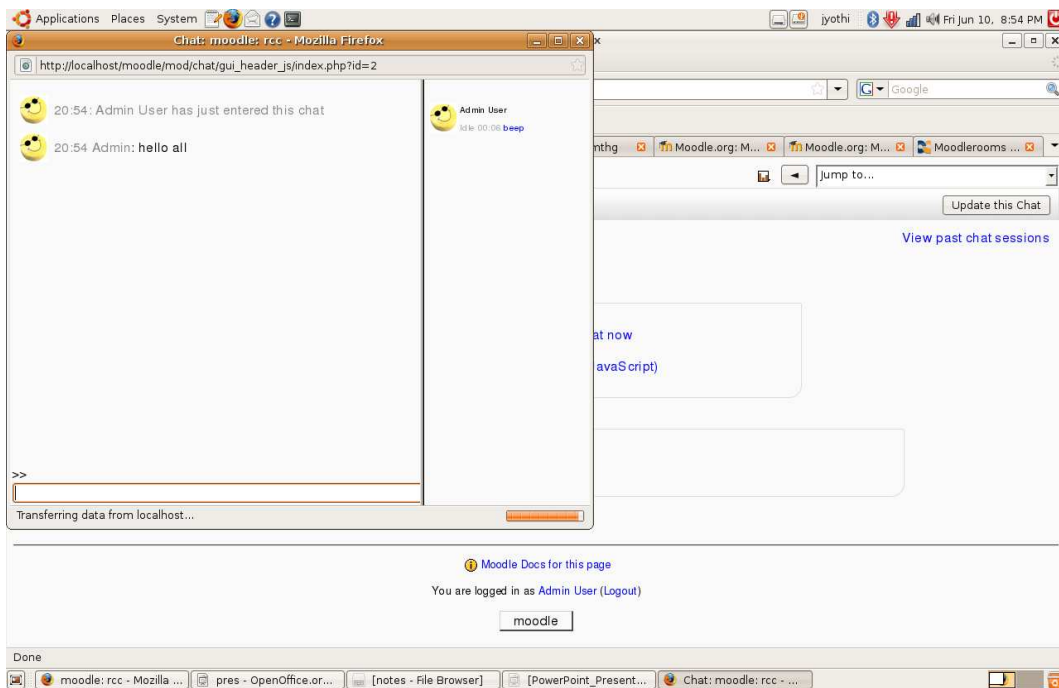


Figure 1.4: Chat

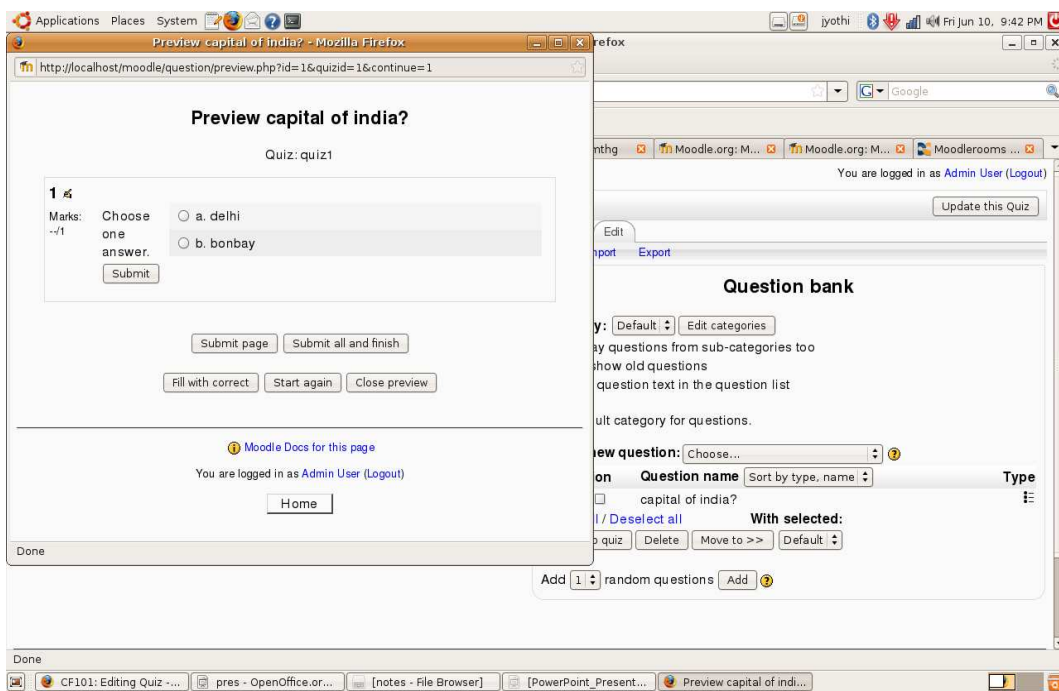


Figure 1.5: Quiz

1.2 Importance of moodle

Moodle enables more interaction between students and teachers and improves the overall learning experience. Many academic institutes use moodle as an alternative for hard copy submission as it is more efficient than the latter. Moodle enables online submission of assignments by students, lets teachers grade the students online and display their feedback as well. Hence it is more fast, saves time and thus is used widely in many universities. Advantages of using moodle include, automatically timed submission, faster than hard copy submission, free of cost solution for e-Learning, convenience of submission from student's side.

Our college COEP, being an active moodle user and moodle, a community project it would be helpful to our college and the community as a whole if we improve and solve some of their issues. This will help the users of moodle in the long run.

Chapter 2

Literature Study

In literature study, we operated moodle using various roles such as admin, teacher, student and understood its functionality. The database structure and schema of various tables were studied. We also observed moodle code organization and the way in which it is structured.

2.1 Moodle Architecture

Moodle follows a three tier client-server architecture in which the client is a web browser and server, the area where core moodle code resides. As shown in figure 6, client interacts with the server using http protocol. Server comprises LAMP which is an acronym for Linux (operating system), Apache HTTP Server, MySQL (database software) and PHP [7]. These are the principal components required to build a general purpose web server.

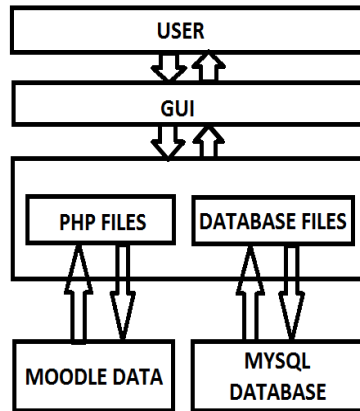


Figure 2.1: Moodle Code Structure

- **Apache:** Apache is a free and open source http web server.
- **MySQL:** MySQL is a relational database management system whose tables are manipulated by moodle in order to perform various operations.
- **PHP:** It is a general-purpose server-side scripting language used to produce dynamic web pages. Moodle code is written using PHP.

In order to run moodle in linux, LAMP server has to be installed. For Windows, WAMP server is used. For MAC, MAMP has to be installed.

2.1.1 Structure of moodle code

A user can access the moodle libraries through user interface. UI interacts with these libraries using PHP function calls. Moodle libraries include database and file libraries. The main library of moodle is in /lib folder which is common to and used by all modules. The implementation of the PHP functions is included in the moodle libraries. For

example, weplib.php is used to produce HTML output.

Moodle code is organized in various folders with each folder implementing a certain functionality. Examples of functionalities are messages, assignments, calendars etc. Each folder comprises of css files, php files and database files.

Every module has it's own lib.php file which is used specifically by that module. If functions are too many and implementation is vast then, lib.php is extended to local-lib.php.

Database related files are present in the db folder. DB has .xml files which explain the table schema.

UI is generally constructed using mod_form.php which is present in every module and block folder.

Javascripts are written in separate .js files which are called using global variable,

`$PAGE`

.

Chapter 3

Technology Setup

3.1 Software Setup

Apache server, PHP, Mysql was installed by LAMP server. PHP 5 and above is necessary for 2.+ versions of moodle to work. Moodle is installed by downloading the version from the website and running through the localhost. While installing moodle, it checks the environment compatibility and if any component is found unsuitable or missing, then installation according to desired requirement is necessary.

3.2 Learning experiments

3.2.1 Configuration of apache server [10]

: In order to configure an apache server, a new directory is to be created from where we want the web server to load. The configuration files are copied from the default directory to the new directory. Change the document root and directory path to point to the newly created site directory in the new configuration file. Disable the default site and Activate the new site. The server is then restarted.

3.3 Preparatory tasks

Preparatory tasks were performed in order to familiarize ourselves with the basics of moodle before moving onto the main tasks of the project. These tasks helped us in understanding its working within moodle.

3.3.1 Emails in moodle

When a new user creates an account, an email has to be sent to the user to confirm account creation. Sending emails are also required during other activities in moodle like messages etc. Postfix has to be used for this purpose. It is a free and open-source mail transfer agent (MTA) that routes and delivers electronic mail.

3.3.2 Php upload

A php code to upload files to the server has been written. Images and other data including files can be uploaded.

Chapter 4

Problem statement and design

These issues were taken from the moodle bug tracker and are common problems faced by the community. The status of all of these issues were unresolved. [3]

4.1 Move the search course box to the front page of course categories. [8]

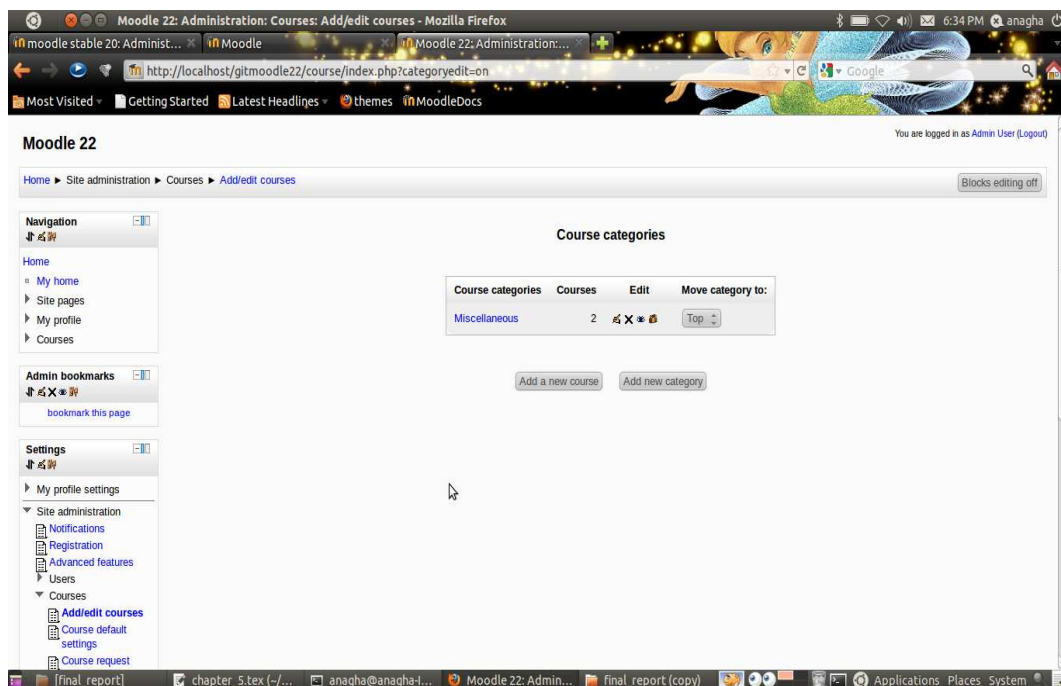


Figure 4.1: Before moving the search box to front page

4.1.1 Requirement Specification

The search facility was made available only after specifying the desired category name. This was not always possible as the user cannot remember the category name of every course. Moving the search box to the front page will eliminate the need of specifying the category. This procedure is efficient and saves time.

4.1.2 Design ideas for the solution

In order to solve this problem, the code of the file `/course/category.php` and `/course/index.php` has been changed. The function call responsible for creating the search box has been moved from `category.php` to `index.php`. A patch has been submitted for this issue.

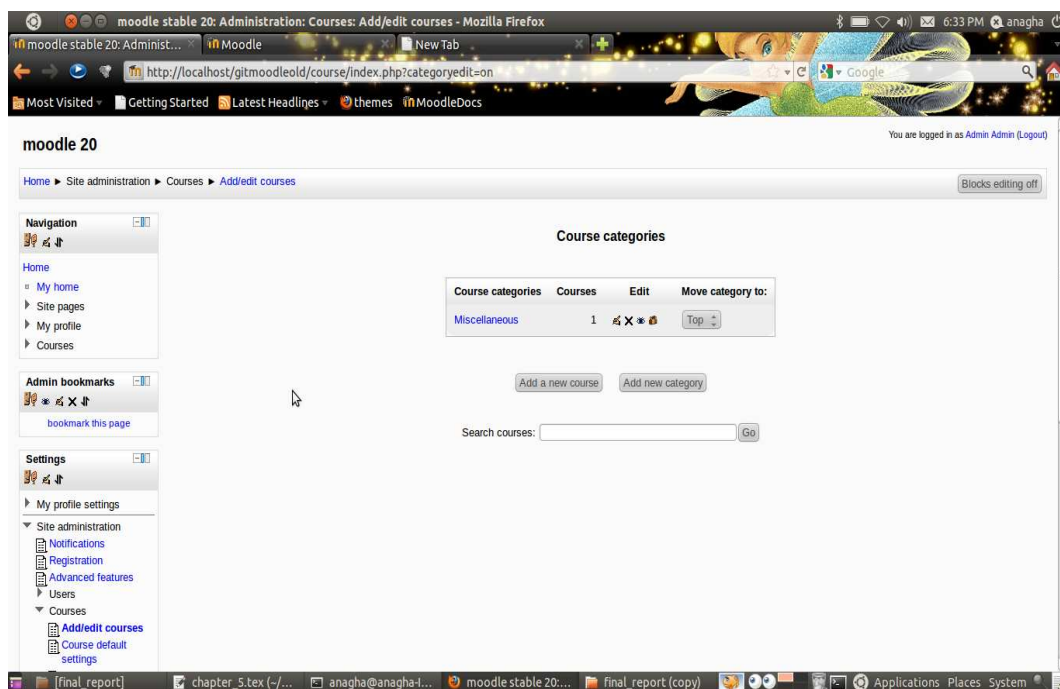


Figure 4.2: After moving the search box to front page

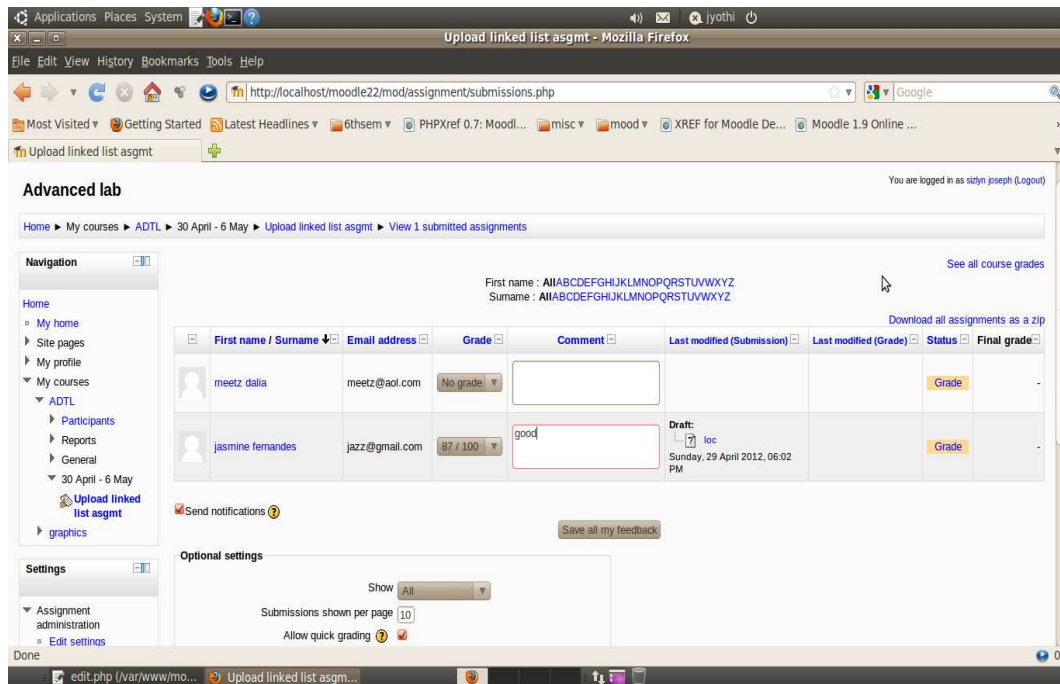


Figure 4.3: Before changing the colour of late assignments

4.2 To change the colour of students information who have submitted their assignments late. [7]

4.2.1 Requirement Specification

The submission details of each student were displayed to the teacher in the same colour irrespective of whether the student had submitted the assignment on time or late. So, the teacher could not identify if a student had submitted the assignment on time or not other than checking the time externally. This proved as an overhead to the teacher. Changes were made to the code in such a way that the information of a student who had submitted an assignment late was displayed in red colour. This change was visible to the teacher in the list of assignments submitted by all students. So, the teacher could identify who submitted a late assignment.

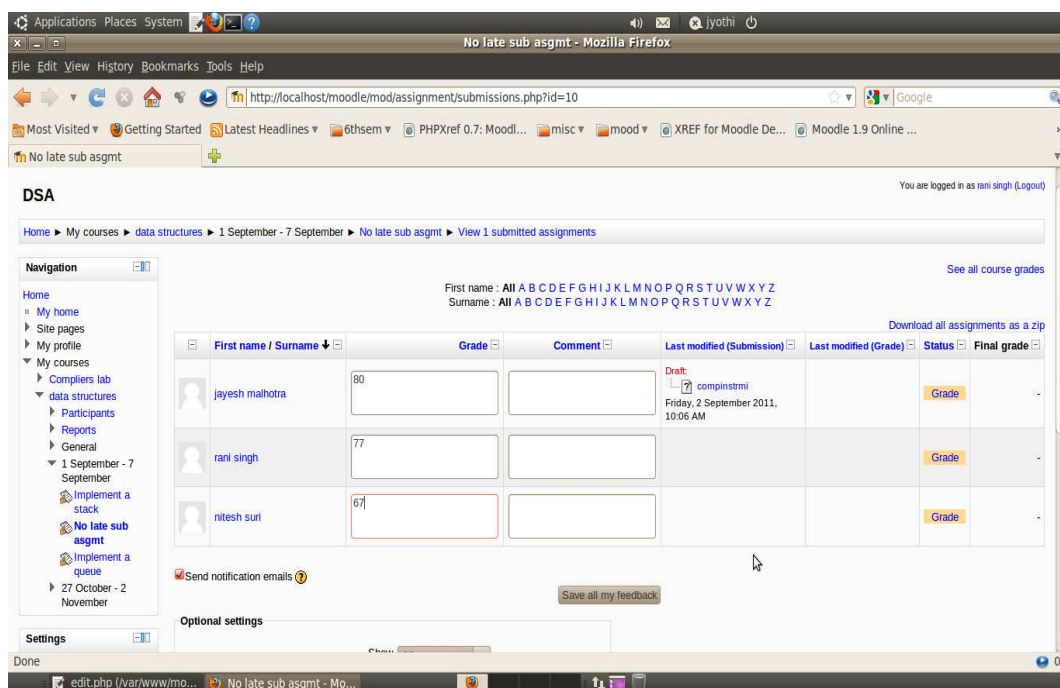
4.2.2 Design ideas for the solution

In order to solve this problem, the code of the file *assignment.class.php* has to be changed. This file is present in the *mod/assignment/type/upload* folder. Lines in the code are changed. These lines are given in the appendix.

Timemodified and **timedue** are predefined variables which are used to check the status of the time.

If the submission time of the assignment submitted by the student is less than the time when the assignment is due, then the normal colour of the details of the assignment visible to the teacher is retained.

Else, if the submission time is greater than the due time, then the teacher can identify that the student has made a late submission since the text colour of 'draft' is changed to red. A patch has been submitted for this issue.



The screenshot shows a Moodle submission page for a course titled 'DSA'. The page displays a table of submitted assignments. The table has columns for 'First name / Surname', 'Grade', 'Comment', 'Last modified (Submission)', 'Last modified (Grade)', 'Status', and 'Final grade'. Three students are listed: jayesh malhotra (Grade 80), rani singh (Grade 77), and nitesh suri (Grade 67). The submission for nitesh suri is marked as 'Draft' and is highlighted with a red border. The 'Last modified (Submission)' column for nitesh suri shows 'Draft: compinstmi Friday, 2 September 2011, 10:06 AM'. The page also includes a navigation menu on the left, a 'Send notification emails' checkbox, and a 'Save all my feedback' button.

First name / Surname	Grade	Comment	Last modified (Submission)	Last modified (Grade)	Status	Final grade
jayesh malhotra	80				Grade	
rani singh	77				Grade	
nitesh suri	67		Draft: compinstmi Friday, 2 September 2011, 10:06 AM		Grade	

Figure 4.4: After changing the colour of late assignments

4.3 To allow decimal values in assignment grading [5]

Allow floating point values while grading a student instead of just integers.

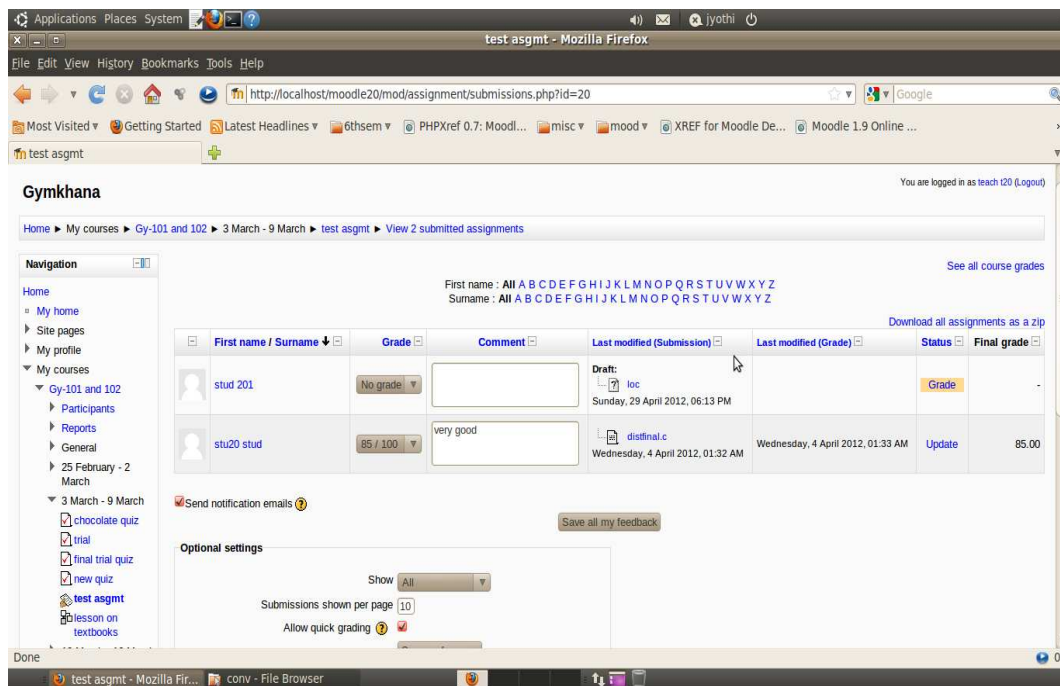


Figure 4.5: Before allowing the decimal grading

4.3.1 Requirement Specification

When a teacher grades a student on a submitted assignment, only integer values were present. If a teacher wishes to allocate floating values, then that provision was not available. So, a combo box can be provided that allows a user to enter a real number in addition to choosing an integer form the grades listed.

4.3.2 Design ideas for the solution

Changes have been made to the files */mod/assignment/lib.php*. For every assignment, a text field gets dynamically created using which the user can enter real numbers. In addition to this, the query, “alter table mdl_assignment_submissions modify grade decimal(5,2);” is fired to alter the column **grade** of the table mdl_assignment_submissions in

the database. A patch has been submitted for this issue.

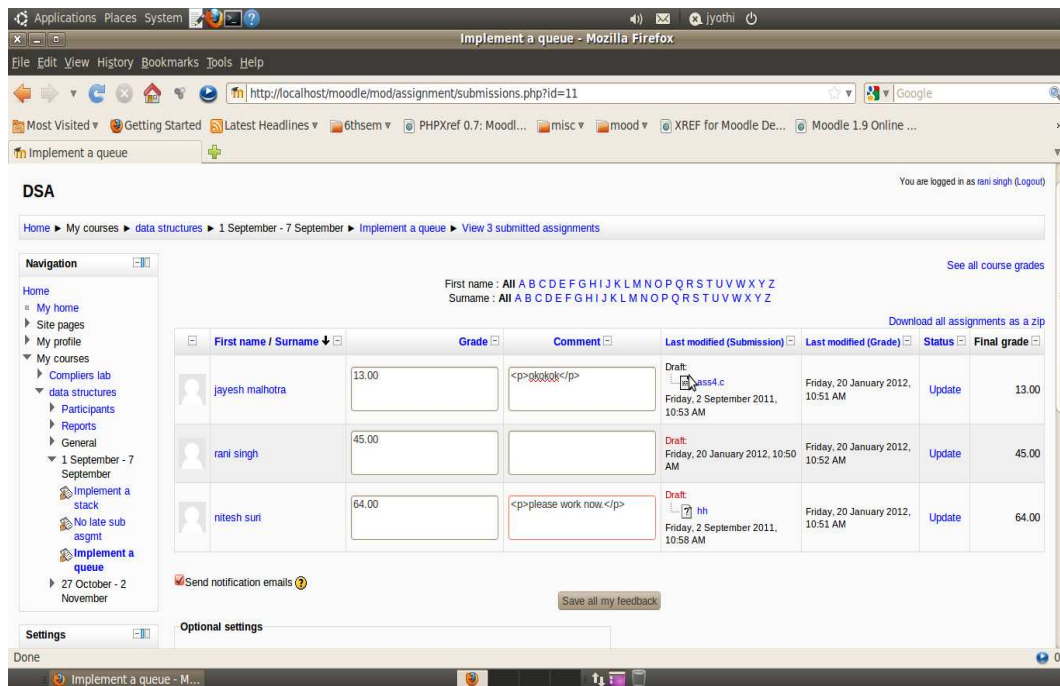


Figure 4.6: After allowing the decimal grading

4.4 Single page to set start/close dates for all quizzes. [8]

4.4.1 Requirement Specification

If a teacher wants to use the same courses for a new semester and wants to extend and change the start and end dates, no such provision for the same existed on a single page. Having a single page with all the activities and a date time selector will facilitate the requirement.

4.4.2 Design ideas for the solution

For this feature, three new files namely, *event1.php*, *event_form1.php*, *event_form2.php* have been created in /moodle/calendar folder. A patch has been submitted for this issue.

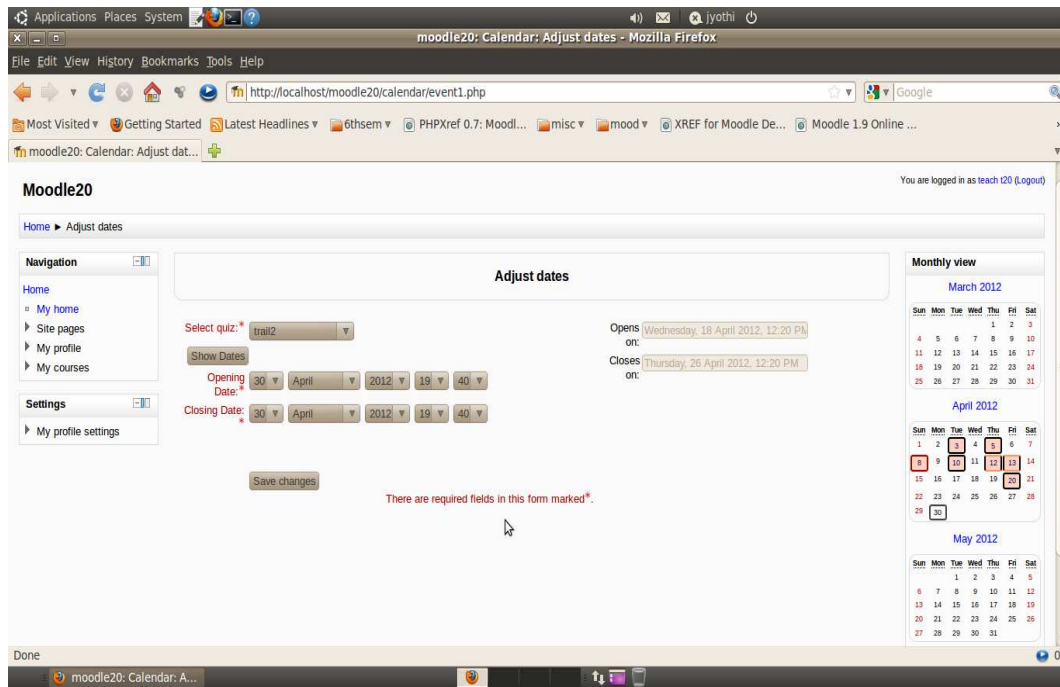


Figure 4.7: After setting a single page to start/close dates for all quizzes

4.5 Option for N choices instead of just 1(single) or *(multiple) in multichoice questions [6]

4.5.1 Requirement Specification

When a student answers a quiz question he can choose one choice or all choices. In the case of multiple choice, a student can choose all the options without any limit and is awarded full marks. This is unfair to a student who genuinely chooses 2 or 3 answers in a question requiring a student to select either 2 or 3 answers only. Hence a limit has to be forced to the number of answers a student can select.

4.5.2 Design ideas for the solution

Changes have been made to the files */question/type/multichoice/questiontype.php* and */question/type/multichoice/edit_multichoice_form.php*. Additional language strings have been added to */lang/en/qtype_multichoice.php*. A javascript, *check.js* dynamically checks

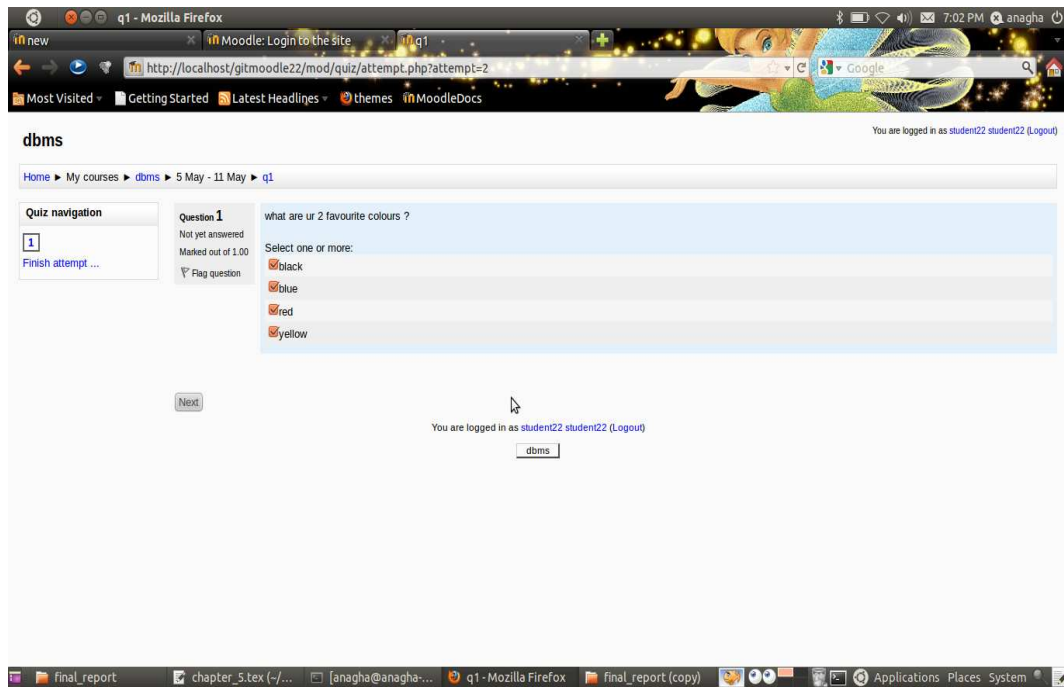


Figure 4.8: Before having option for 'n' answers only

if a student exceeds the limit specified and invokes an error accordingly. A new select menu is added to the front end with choices upto the number of non blank choices displayed on the editing form. Validation is also performed to ensure this. New field **newsingle** is added to the table question_multichoice corresponding to the new select menu in front end. A patch has been submitted for this issue and resubmitted another patch later again based on suggestions and after discussions with the developers.

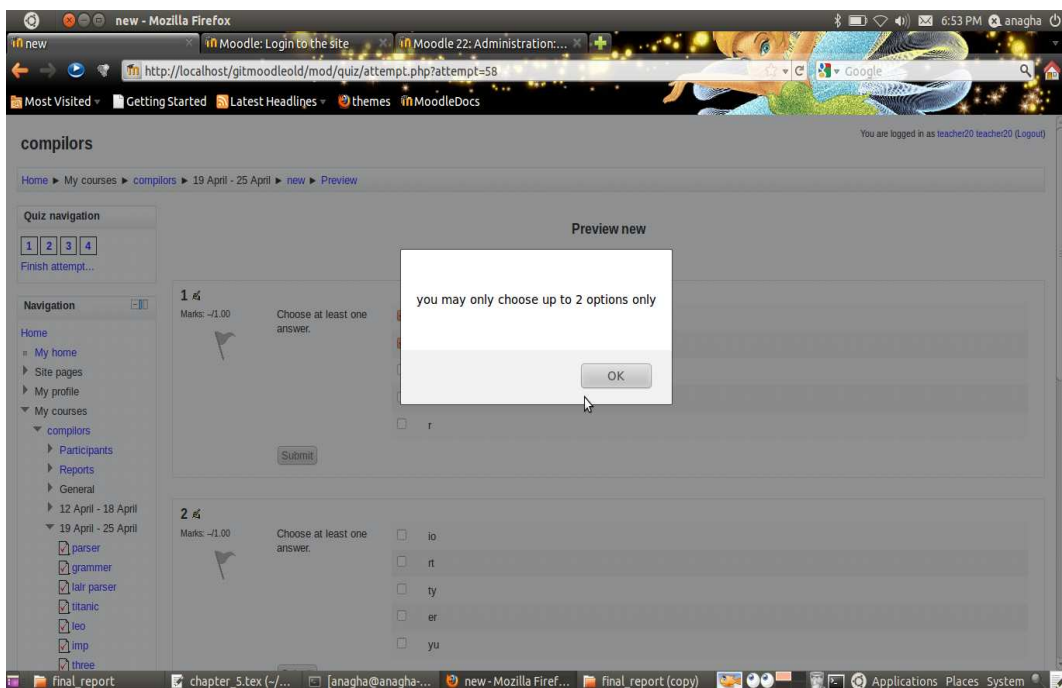


Figure 4.9: After having option for 'n' answers only

Chapter 5

Useful Improvements

Creating question practice module would be beneficial to the students of our college as it would give them an opportunity to test themselves and further improve it depending on the results of statistics.

5.1 Question practice module. [4]

5.1.1 Requirement Specification

This module is a teacher-controlled tool for building activities which students can attempt. Students can attempt a bank of questions and thereby improving their learning skill. The computer will then give them a certain feedback. Students can view and assess their performance on different courses depending on statistics generated.

Bibliography

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- [4] <http://tracker.moodle.org/browse/contrib-3175>.
- [5] <http://tracker.moodle.org/browse/mdl-20368>.
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- [7] <http://tracker.moodle.org/browse/mdl-29819>.
- [8] <http://tracker.moodle.org/browse/mdl-30824>.
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