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# Development of NBM Home Tuition Management System

**Nur Hamizah Mohammad Mustafa<sup>1</sup>, Nazri Mohd Nawi<sup>1\*</sup>**

<sup>1</sup>Fakulti Sains Komputer dan Teknologi Maklumat,  
Universiti Tun Hussein Onn Malaysia, Parit Raja, Batu Pahat, 86400, MALAYSIA

\*Corresponding Author Designation

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**Abstract:** NBM Home Tuition is an education centre that manages its operations manually because it lacks a proper learning management system (LMS). NBM Home Tuition confronts a few issues due to the lack of a system, such as pupils being uninformed of the upcoming works and complex management process. The system developed will assist students in keeping track of their tasks and produce a good learning environment for them. In the testing phase, the system has been found to fulfill the end-users' requirements which are to simplify the submitting, assigning, and grading tasks for both the teachers and students and support the management process for admin. The project used a prototyping model to develop the system. The system is found to be lacking the feature to support the communication process between the end-users. Finally, several enhancements can be made such as implementing a payment gateway and countdown timer feature.

**Keywords:** Learning Management System, NBM Home Tuition, Prototyping

## 1. Introduction

Private tutoring, often known as supplemental education, is a structured set of educational activities that take place outside of the classroom or at other educational institutions. NBM Home Tuition is an education center that provides private tutoring services based in Johor Bahru that offers tutoring for various subjects such as English, Mathematics, Physics, and Economy. As the home tuition is currently operating online due to the pandemic, the tasks given to students are also assigned online. Currently, the process of assigning homework and managing the schedule of the tasks given is handled manually. The teacher manages the process and will assign the homework by WhatsApp. The students will need to check on the group chat to view the task given. The homework will then be submitted by uploading it as jpg, pdf, or Docx documents in the application. Next, the teachers will need to check the private messages sent by students to download and grade the documents. The document downloaded will be stored on the teachers' devices such as smartphones and laptops. Following that, Microsoft Excel is utilized to check if all the students have already submitted their work. Thus, there is a need to build a learning management system for NBM Home Tuition to ease the task of assigning homework to the students. The system build also will help to standardize the flow of submitting homework and assigning tasks and will provide better communication between the teachers and the students [1].

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\*Corresponding author: [nazri@uthm.edu.my](mailto:nazri@uthm.edu.my)

Students and teachers at NBM Home Tuition will face numerous issues because of the manually handled process. Students will be unaware of the assignments provided by the teachers and will be unable to keep track of the work allotted to them because homework is assigned manually. Most often, students get confused and frazzled with having to keep up and plan for their many classes, assignments, test dates, and so forth. This is because the teachers will send text messages to a group chat to assign assignments to the students [2]. The task instructions will most likely be hidden by other text messages after that. This will become a problem for latecomers, who will have to navigate through the group's conversations to find the teacher's chat messages. Next, because the manner of submitting the work is unstructured, the works submitted by the students are not guaranteed strict security protection. There have been several instances where the teacher has misplaced the downloaded document, and the material has also been corrupted during the download process. As a result, the student will have to resend the works, which will take more time and effort on their behalf.

Finally, the grading method for teachers will become more disorderly and complex as they will be required to create an Excel spreadsheet to track down the list of students who have already submitted the work to be graded [3]. This will take a tremendous amount of time and work. Because this is a time-consuming process, it will undoubtedly influence students' learning experiences, as teachers will take a longer time to grade their homework, and courses may fall behind the subject's deadline in some cases. Due to the arisen problem, there is a need to build learning management system for NBM Home Tuition using a web-based approach. The main research objectives of the project are to design NBM Home Tuition Management System using an object-oriented approach, to develop the system using a web-based approach and to test the developed system using functional testing and unit testing.

The tuition management system developed will have three end-users which are the administrator, teachers, and students. The system will consist of several modules to ensure that the system is working following the requirements given. First is the login module for all the end-users that will be used to access the system by filling up the login credentials such as username and password which will be provided by the admins. The login credentials will be provided by the system administrator and will act as the validation to access the system. The second module is the registration module for the admin, where they could register the new students and teachers into the database. Next, the task management module is a module that is responsible for managing the acts of submitting and grading tasks for teachers and students. The students can submit the homework by attaching the documents and clicking the submit button. The fourth module is the payment and reporting module which will be handled by the admin. In this module, students will be able to attach a payment receipt as proof of the payment of the classes registered for each month. After that, the fifth module is the assigned homework for the teachers and students, where the teachers can assign tasks to the students. Lastly is the announcement module, where the module will provide a platform for the teachers and admins to post announcements that can be viewed by the students.

At the end of the project, a web-based tuition management system is established to assist students in keeping track of their classes, assignments, and payment records. Furthermore, the system will assist NBM Home Tuition teachers in assigning assignments to their students in a methodical manner and making the grading process easier for them. Students will be able to see a list of classes they are enrolled in and a list of homework assignments. They are also able to submit their homework through the system conveniently. The system created will be beneficial to instructors' classroom environments, as it will assist them in efficiently organizing their teaching materials and employing a well-ordered grading procedure. Lastly, the system will assist the administrator in the payment and reporting process where the process will be simplified, and the system will automatically generate a report for each month for the admins.

The paper will cover six sections which the first section will describe the introduction of the project where the problem statement, objective, scope and expected outcome are stated. In Section 2, the section

includes the related work to the project while section 3 will cover the methodology part of the project. Next, section 4 which is the system analysis and design section will contain the requirement analysis, Use Case Diagram, UML Class Diagram of the project. The fifth section will cover the implementation and testing phase of the project which functional testing results and user acceptance testing results will be presented. Lastly, the sixth section will cover the conclusion part of the project.

## **2. Related Work**

### **2.1 Learning Management System**

With the current Covid-19 endemic situation that halted the physical learning process around the world, which when at its peak, around 91% of learning institutions close their physical services to contain the spread of the virus. Since that, the involvement, and the importance of the learning management system (LMS) has been drastically increased to cater to the additional communication and learning barriers between the teachers and the students. According to Brooks' study, a learning management system (LMS) is one of the most significant instructional technologies for students' academic success [4]. LMS is a software system that aids in the management of educational courses for students, particularly through assisting teachers and learners with course administration [5]. According to Morgan, LMS provides a variety of tools for classroom learning and instruction, including content arrangement and presentation, communication tools, student assessment, and other functions [6]. Bailey described the general characteristics of LMS in education, which consists of lessons that are included in a defined curriculum and offered based on the learning progress of each student [7].

LMS is the top pick for learning professionals as LMS provides a variety of beneficial factors. By using the cloud based LMS, all the learning material will be stored on the remote server [1]. This reduces the probability of losing the learning materials while also cutting the cost of buying hard drives to store the learning materials. Next, instructors can simply track their students' progress and ensure that they are fulfilling their performance goals. The instructors may see whether or not the students have submitted their work and this will make the instructors' job easier because the system will automatically update the status of the students' work [8]. Lastly, LMS can reduce the learning and development costs as they provide a paperless learning environment for the institutions. As the learning materials are stored online, the need to print the materials will be eradicated.

### **2.2 Web Based System**

A web-based system is a program that can be accessed over the HTTP protocol. The word "web-based" usually refers to software that runs in a web browser. However, it can also be used to describe apps with only a small portion of the solution stored on the client's PC. A web-based system's host server could be a local server or one accessible through the internet. Because of its benefits, web-based technology is preferred for developing a learning management system. For starters, employing web technologies will save development costs because a web-based system runs in a web browser, indicating that the program may be accessed on a variety of devices. There will be no need to test the apps on different operating systems, which will reduce development costs and time.

Next, a web-based system offers its consumers a high level of accessibility. Users can access a web-based system if they have access to the internet, a web browser, and their login credentials [9]. Because the data of the system is maintained in one central area, web-based systems promote easy data sharing and collaboration for users, making it easier to integrate web-based systems into the learning environment rather than separate desktop apps. In addition, a web-based system is easy to install and maintain for the users as it is not necessary to import and update the system from an app store such as Google Play. Finally, a web-based system ensures centralized and strict security. Information Technology (IT) professionals oversee the web system's security. This will prevent sensitive data from being stored on many local client PCs, reducing the risk of data leaks.

The web-based system does have its disadvantages such as internet dependence. To run a web-based system, an internet connection is needed and without the internet connection, the system cannot

be accessed. This will make the system is inaccessible for people in rural areas as 4G and Wi-Fi internet are not available in that areas.

### 2.3 System Comparison

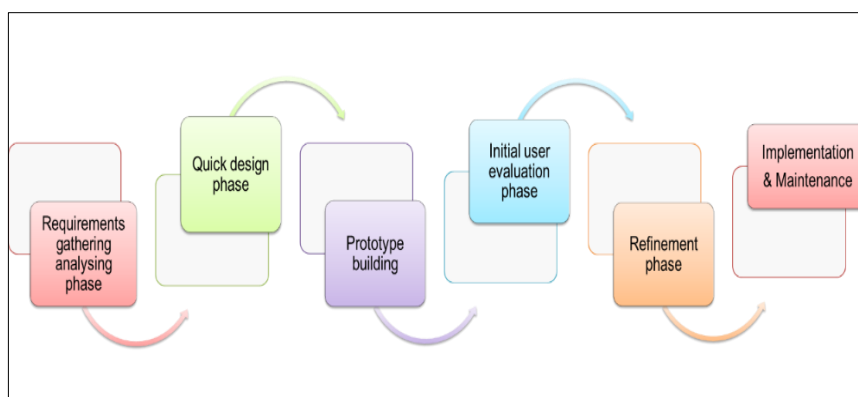
Several existing systems can be compared when creating the proposed system. Two selected existing systems that are used for the comparison are SPeCTRUM and Google Classroom. The comparison results are shown in Table 1.

**Table 1: Comparison of the Existing System**

| System              | SPeCTRUM | Google Classroom | Proposed System |
|---------------------|----------|------------------|-----------------|
| Account Creation    | √        | √                | √               |
| Payment feature     | X        | X                | √               |
| Post Feature        | √        | √                | √               |
| Announcement Filter | X        | X                | √               |
| Calendar            | √        | √                | √               |
| Class Registration  | √        | √                | √               |
| Assigning Works     | √        | √                | √               |
| Works Submission    | √        | √                | √               |

### 3. Methodology

In developing the NBM Home Tuition Management System, a prototyping model is used. This is a software development model in which the prototype is built, tested, and reworked until an acceptable prototype is achieved [10]. This model also provides an iterative, trial, and method in developing the system. The prototyping model was chosen because the system created has a lot of interaction with the end-users which suits the characteristics of the model as the end-users are actively involved in the development. The number of inaccuracies in the specifications is reduced because of the customer's reaction to the prototype as there is less chance of misinterpretation, information distortion, or miscommunication and misunderstandings in determining software product needs [11]. The prototyping model is recommended to be used if there is a need for a user interface in the system and the requirements are not constant. There are six System Development Life Cycle (SDLC) phases involved in the development of the system as shown in Figure 1 below.



**Figure 1: Phases of Prototyping Model**

The first phase is the requirement gathering phase followed by the rapid design phase. The third phase requires the team to develop the prototype of the system. The building phase will be followed by

a user evaluation, in which the user will assess the prototype that has been created. Following the user evaluation phase, the team will go on to the prototype refining phase, during which the prototype will be altered in response to the user feedback. Until the user is satisfied with the prototype, the fourth and fifth phases will be repeated in a cycle. Finally, the final system will be fully constructed and launched during the implementation and maintenance phase.

### 3.1 System Development Workflow

Table 2 shows the system development workflow of the project where each prototyping phase has its own tasks and output that need to produce during the entire project development.

**Table 2: System Development Workflow**

| Phase                                    | Task   | Output   |
|--|--|--|
| Requirements Gathering Analysis          | 1. Create a requirement elicitation and analysis for the NBM Home Tuition Management System Module.  | A Software Requirement Document consists of requirement elicitation.                       |
|  | 2. Analyze the software aspects for the NBM Home Tuition Management System Module.   |  |
| Quick Design                             | 1. Create a high-level design document (HLDD) document for the project.  | A document that consists of the module's high-level and low-level designs for the project. |
|  | 2. Create a low-level design document (LLDD) for NBM Home Tuition Management System Module.  |  |
| Build Prototype                          | a Developing the prototype of the NBM Home Tuition Management System Module.   | Prototype of the NBM Home Tuition Management System Module.                                |
| Initial User Evaluation                  | Perform user evaluation to observe one user at a time and evaluate easily he/she can navigate the system while trying to perform the task. | A full report of user evaluation to refine the prototype.                                  |
| Refining Prototype                       | Refining the prototype of the NBM Home Tuition Student's Homework Planner System Module based on user evaluation.                          | Prototype of the NBM Home Tuition Management System Module.                                |
| Implementing and Maintaining the Product | 1. Perform functional testing in the accepted module to evaluate the compliance of the module.   | Full system test report on NBM Home Tuition Management System.                             |
|  | 2. Perform user acceptance testing using alpha and beta testing.   |  |
|  | 3. Launch the system and monitor the system.   |  |

### 3.2 Functional Testing

The project used functional testing to test all the modules and functions of the system. This is to ensure that all functions are executed the same as defined earlier. The testing procedures are done to identify errors that arise during the implementation of the system. The following parts discuss the test plans designed for functional testing.

Table 3 shows the test cases for the login module. All active students, admins, and teachers can log in to the system using their username and password.

**Table 3: Test Case for Login Module**

| Test Cases   | Expected Output  | Output |
|--|--|--------|
| T1-1 Enter the correct username and password in the right login interface.                                     | Login is successful. The system will display a successful message and end-users prompt to their dashboard.                             | Pass   |
| T1-2 Enter the wrong username or password in the right login interface.  | Pop up message “Login Failed. Please Check your Username and Password”   | Pass   |
| T1-3 Enter correct username and password but wrong login interface.  | Pop up message “Login Failed. Please Check your Username and Password”   | Pass   |
| T1-4 The student with ‘Inactive’ status enters the correct username and password in the right login interface. | Pop up message “Login Failed. Please Check your username, Password, and Student Status. Please contact admin to activate your account” | Pass   |

The announcement module can be accessed by all the end-users. This module allows the admin and teachers to add announcements to the system Table 4 shows the test cases for the announcement module.

**Table 4: Test Case for Announcement Module**

| Test Cases                                | Expected Output   | Output |
|---|---|--------|
| T2-1 Click on the ‘Post’ button.          | Announcement posted in the registered class under the teacher.      | Pass   |
| T2-2 Students click on the ‘Read’ button. | The number indicator of the announcement sidebar will be decreased. | Pass   |
| T2-3 Announcement posted.                 | The number indicator on the sidebar increased.                      | Pass   |

The registration module only can be accessed by the NBM Home Tuition administrator. This module allows the admin to register classes, subjects, and user accounts. In addition, the module also allows the admin to register active students and teachers into classes. The module also admin to perform edit, delete, and search to the data registered. Table 5 shows the test cases for the registration module.

**Table 5: Test Case for Registration Module**

|      | Test Cases  | Expected Output  | Output |
|------|---|--|--------|
| T3-1 | Fill in all the needed registration information.                                    | Registration success and table updated.                          | Pass   |
| T3-2 | Delete registered data from the table.  | Deletion success and table updated.                              | Pass   |
| T3-3 | Edit registered data from the table.  | Edit success and data updated.                                   | Pass   |
| T3-4 | Search data from the table.   | Display matched data.  | Pass   |
| T3-5 | Leave certain fields blank or with no data in them.                                 | Pop-out a message with the message "Please fill out this field." | Pass   |
| T3-6 | Admin click the trash can icon after selecting the data in the table to be deleted. | Pop-out window message with the message "Do you want to delete?" | Pass   |
| T3-7 | Admin registers active students and teachers into the class.                        | Students and teachers will be registered in the class.           | Pass   |
| T3-8 | Register duplicate data.  | Pop-out window message with the message "Data already exists."   | Pass   |
| T3-9 | Register inactive students into classes.  | Registration unsuccessful.                                       | Pass   |

The assigned task module can be accessed by the teachers and students. The teachers will be able to create tasks in the registered class. During the creating process, the teacher will need to fill in the task details such as the due date of the tasks, tasks' descriptions, and title of the tasks. Table 6 shows the test cases for the assigned task module.

**Table 6: Test Case for Assigned Task Module**

|      | Test Cases  | Expected Output  | Output |
|------|---|--|--------|
| T4-1 | Teachers upload documents into the system.          | Document uploaded and added into the database.                   | Pass   |
| T4-2 | Create tasks in the system.                         | Task created and the student was notified of the added tasks.    | Pass   |
| T4-3 | Click on the download button.                       | Document downloaded.   | Pass   |
| T4-4 | Search data from the table.                         | Display matched data.  | Pass   |
| T4-5 | Leave certain fields blank or with no data in them. | Pop-out a message with the message "Please fill out this field." | Pass   |
| T4-6 | Click on the 'x' button.                            | Data deleted.  | Pass   |
| T4-7 | Search by incorrect data.                           | Message 'No matching records found' displayed.                   | Pass   |

The payment and reporting module can be accessed by the students and admins. This module allows the admin to manage the payment and reporting process every month. Table 7 shows the test cases for the payment and reporting module.

**Table 7: Test Case for Payment and Reporting Module**

| Test Cases   | Expected Output   | Output |
|--|---|--------|
| T4-1 Admin click on the 'Reject' button.               | Payment status changed to 'Rejected' and the 'Pay Again' button appeared for students. Students will be notified. | Pass   |
| T4-2 Admin click on the 'Approve' button.              | Payment status changed to 'Approved'  | Pass   |
| T4-3 Click on the download button.                     | Document downloaded.  | Pass   |
| T4-4 Click on the 'Report' button.                     | A payment report will be generated.   | Pass   |
| T4-5 Admin click on the 'Unpaid' button.               | A list of unpaid students will be displayed.  | Pass   |
| T4-6 Admin click on the 'Alert Unpaid Student' button. | Students will be notified to pay their tuition fees.  | Pass   |

The task management module can be accessed by the teachers and students. This module allows the students to submit the tasks assigned to them. Table 8 shows the test cases for the task management module.

**Table 8: Test Case for Task Management Module**

| Test Cases  | Expected Output   | Output |
|---|---|--------|
| T6-1 The teacher clicks on the 'Alert Student' button.          | The student will be notified to submit their overdue tasks.               | Pass   |
| T6-2 The teacher clicks on the 'Submitted' button.              | A list of students that have submitted their works will be displayed.     | Pass   |
| T6-3 Click on the download button.                              | Document downloaded.  | Pass   |
| T6-4 The teacher clicks on the 'Not Submitted' button.          | A list of students that have not submitted their works will be displayed. | Pass   |
| T6-5 The teacher adds remarks to the submitted student's works. | The task status will change from 'Not Graded' to 'Graded'.                | Pass   |
| T6-6 The students submit the task.                              | The status of the task changed from 'Not Submitted' to 'Submitted'        | Pass   |
| T6-7 Click on the 'x' button.                                   | Data will be deleted.   | Pass   |

## 4. Results and Design

### 4.1 Use Case Diagram

The fundamental form of system requirements for an undeveloped software program is a UML use case diagram. Figure 2 shows the use case diagram of the proposed system.



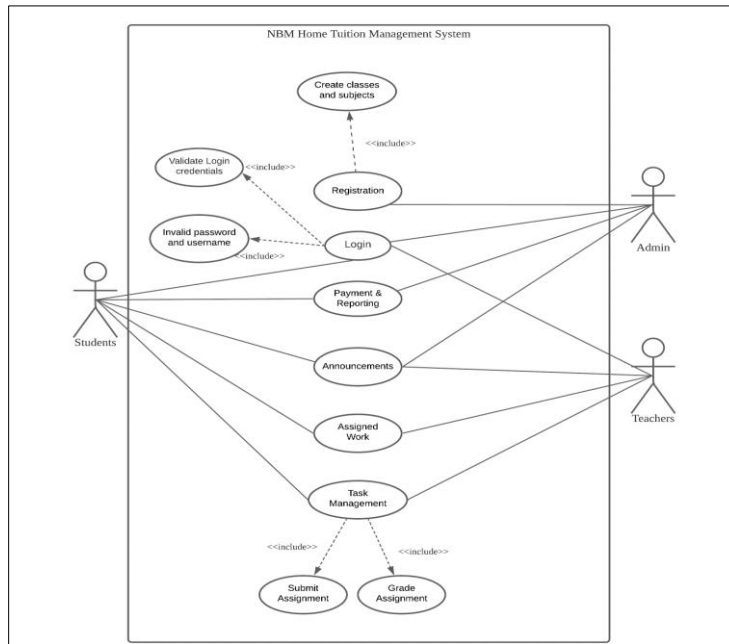


Figure 2: Use Case Diagram

#### 4.2 UML Class Diagram

The UML Class diagram is a graphical notation used to construct and visualize object-oriented systems. Figure 3 shows the Class Diagram of the proposed system.

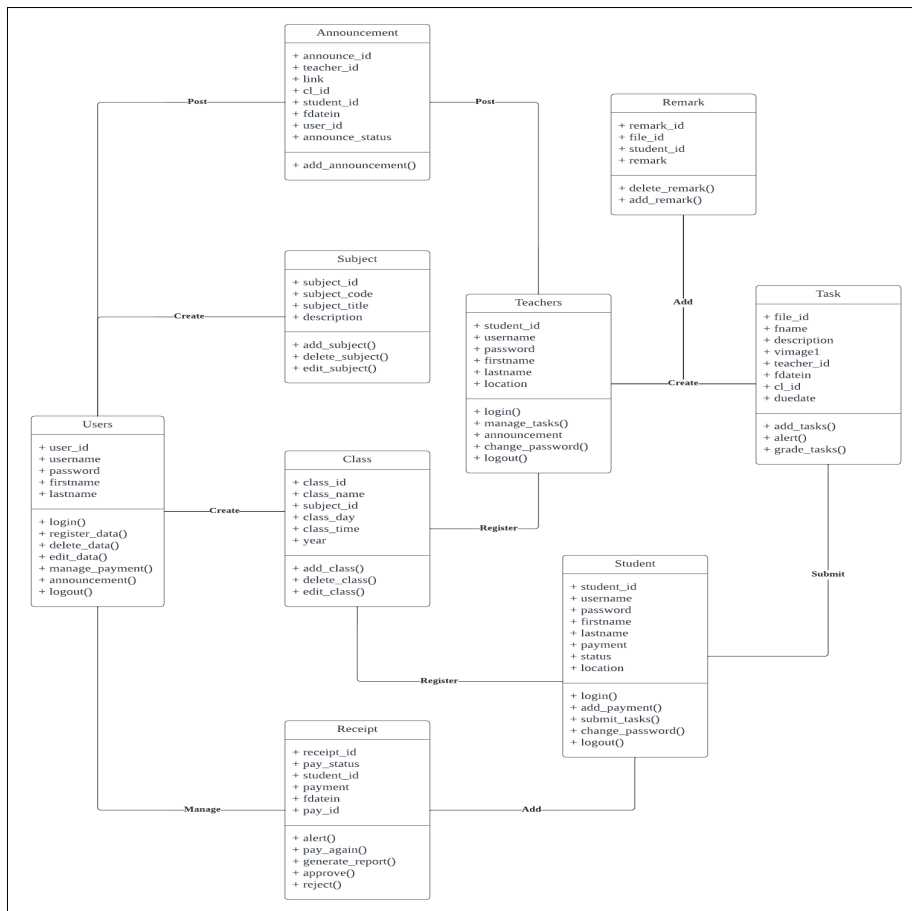
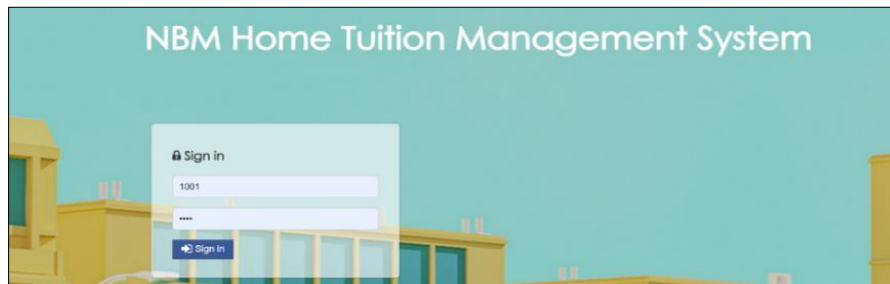


Figure 3: UML Class Diagram

### 4.3 System Implementation

#### i. Login Module

The login module allows the end-users to fill in the login credential which will be verified by the system as shown in Figure 4. The system will display a pop-out message if the login credentials did not match the login credentials stored in the MySQL database and if the login credentials are correct, users will be directed to their homepage. Figure 5 shows the coding of the login module for the system.



**Figure 4: Login Module Interface**

```

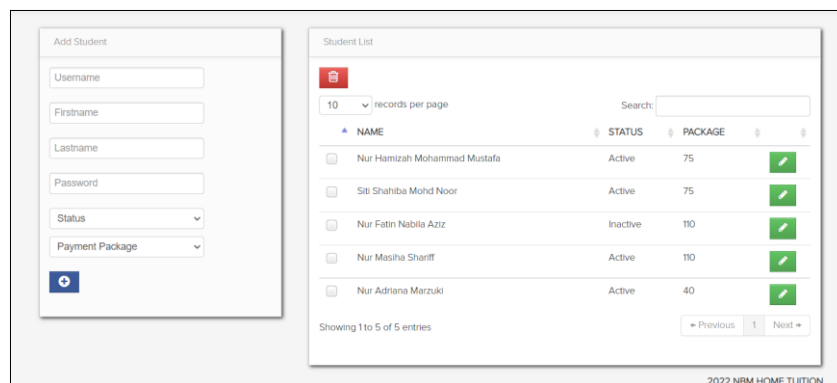
jQuery(document).ready(function(){
jQuery("#login_form").submit(function(e){
e.preventDefault();
var formData = jQuery(this).serialize();
$.ajax({
type: "POST",
url: "login.php",
data: formData,
success: function(html){
if(html=='true')
{
$.jGrowl("Welcome to NBM Home Tuition Management System", { header: 'Access Granted' });
var delay = 2000;
setTimeout(function(){ window.location = 'dashboard.php' }, delay);
}
else
{
$.jGrowl("Please Check your Username and Password", { header: 'Login Failed' });
}
}
}
}

```

**Figure 5: Coding Segment of Login Module**

#### ii. Registration Module

Figure 6 shows the registration interface for the module where the admin will be able to create an account for students in the system. The data filled in the form will be stored in the database using the SQL statement in the code segment in Figure 7. The same concept will be applied in creating a subject, class, admin accounts, and teacher accounts. By using the SQL statement, the admin also can edit, delete, and search the data from the database. In addition, the system would alert the admin if the data entered is duplicate data by displaying a pop-out message ‘Data already existed.’



**Figure 6: Registration Module Interface**

```

<div class="control-group">
<div class="controls">
<button name="save" type="submit" class="btn btn-info"><i class="icon-save"></i> Save</button>
</div>
</div>
</form>
<?php
if (isset($_POST['save'])) {
$subject_code = $_POST['subject_code'];
$title = $_POST['title'];
$description = $_POST['description'];
$query = mysql_query($conn, "select * from subject where subject_code = '$subject_code' ") or die(mysql_error());
$count = mysql_num_rows($query);
if ($count > 0) { ?>
<script>
alert('Data Already Exist');
</script>
<?php
header(
mysql_query($conn, "insert into subject (subject_code, subject_title, description) values('$subject_code', '$title', '$description')") or die(mysql_error());
mysql_query($conn, "insert into activity_log (date, username, action) values(NOW(), '$user_username', 'Add Subject $subject_code')") or die(mysql_error());
?>
<script>
window.location = "subjects.php";
</script>
<?php
}
}

```

Figure 7: Code Segmentation to Create Student Account

iii. Assigned Task Module

Figure 8 shows the assigned task interface for where the system allows the teachers to create tasks for the students. During the creating task process, teachers will be able to set up the due date and details of the tasks and upload the document in the module. Next in this module, students will be notified of the upcoming tasks and the module should allow students to download the documents uploaded by the teachers. Figure 9 shows the code segment of the assigned task module for the teacher.

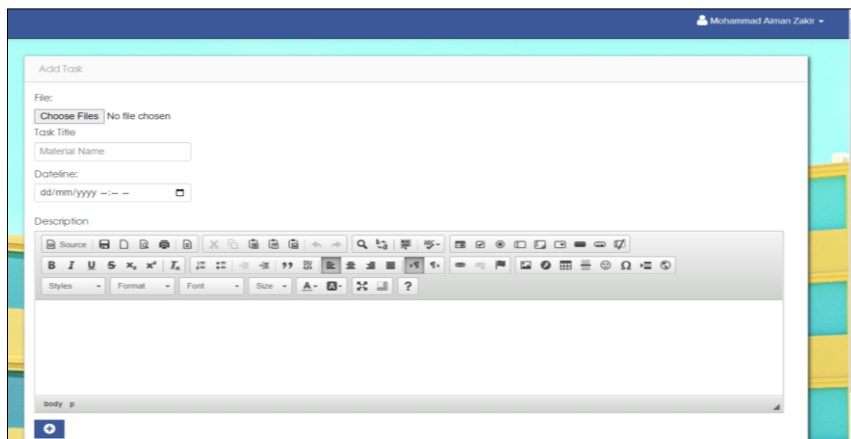


Figure 8: Assigned Task Module Interface

```

<div class="control-group">
<label class="control-label" for="inputPassword">Task Title</label>
<div class="controls">
<input type="text" name="fname" id="inputEmail" placeholder="Material Name">
</div>
</div>
<div class="control-group">
<div class="controls">
<label class="control-label" for="inputEmail">Dateline:</label>
<input type="datetime-local" name="duedate" Placeholder="Date" class="input" required>
</div>
</div>
</div>
<div class="control-group">
<label class="control-label" for="inputPassword">Description</label>
<div class="controls">
<textarea name="description" id="ckeditor_full"></textarea>
</div>
</div>

```

Figure 9: Teacher Create Task Coding Segmentation

#### iv. Task Management Module

The task management module allows the student to submit their task into the system as shown in Figure 10. During the task submission process, students will be able to upload documents into the system. Figure 11 shows the code segment for the task management module where the system will change the status of the task assigned to the students after they submitted their work.



**Figure 10: Task Management Module Interface**

```

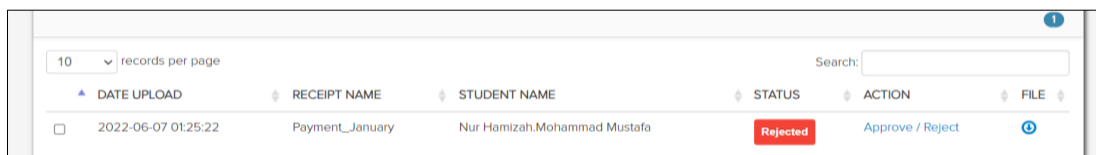
<<?php
$query = mysqli_query($conn,"select * FROM student_assignment where student_id = '$session_id' and file_id='$get_id' order by fdatein DESC")or
die(mysqli_error());
$count = mysqli_num_rows($query);
if($count == '0'){
    ?>
    <div class="danger">
    <p><strong>Not Submitted!</strong> Please submit your works before due date.</p>
    </div>
<?php } else { ?>
    <div class="success">
    <p><strong>Submitted!</strong> Please ensure that uploaded files are not corrupt or broken by downloading it back.</p>
    </div>
<?php ?>
    <div class="container">
    <i id="" class="normal">Instructor Remark</i>
    </div>

```

**Figure 11: Code Segmentation for Task Submission Status**

#### v. Payment and Reporting Module

The payment and reporting module will allow the admin to manage the payment process for each month where they could approve or reject the student’s payment receipt as shown in Figure 12. Next, students can submit payment receipts once by each month into the system as shown in Figure 13. After that, the system also will generate a payment report for admin for each month as shown in Figure 14. Figure 15 shows the coding segmentation of the payment and reporting module which will allow the payment submission by the student to be processed.



**Figure 12: Admin Payment and Reporting Module Interface**

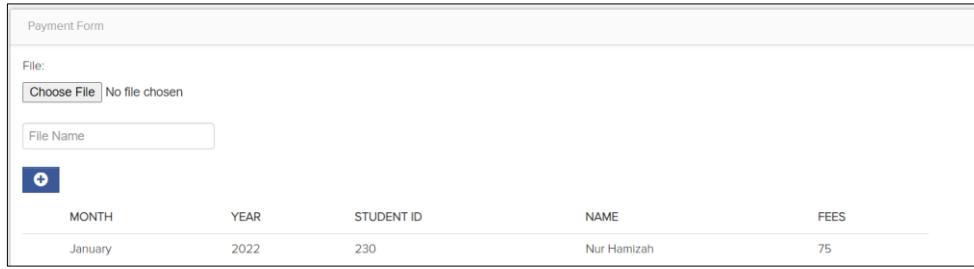


Figure 13: Student Payment and Reporting Module Interface

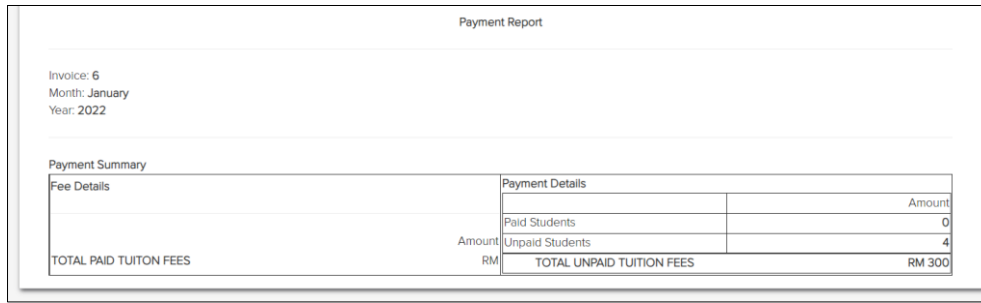


Figure 14: Payment Report Generation Interface

```

<?php
if(isset($_POST['save']))
{
    $fname=$_POST['fname'];
    $vimage1=$_FILES["img1"]["name"];
    move_uploaded_file($_FILES["img1"]["tmp_name"],"admin/uploads/receipt/".$_FILES["img1"]["name"]);

    $query = mysqli_query($conn,"select * from receipt where pay_id= '$get_id' and student_id='$session_id' or die(mysqli_error());
    $count = mysqli_num_rows($query);

    if ($count > 0 ){ ?>
        <script>
        alert('Payment already been made for this month. Do not submit receipt again. Please check your payment status');
        window.location = "student_payment_history.php";
        </script>
    <?php } else{
        $query1 = mysqli_query($conn,"select * from student where student_id='$session_id' or die(mysqli_error());
        while($row = mysqli_fetch_array($query1)){
            $payment = $row['payment'];
            mysqli_query($conn, "INSERT INTO receipt(pay_id,student_id,fname,vimage1,fdatein,pay_status,payment) VALUES('$get_id','$session_id','$fname','$vimage1', NOW(), 'Pending', '$payment')") or
            die(mysqli_error($conn));
        }
        <script>
        alert('Receipt uploaded successfully');
        window.location = "student_payment_history.php";
    }
}
    
```

Figure 15: Payment and Reporting Code Segmentation

vi. Announcement Module

The announcement module will allow the teacher and admin to add announcements into the system which can be viewed by the student. Figure 16 shows the coding segmentation of the announcement module which will allow teachers to add announcements into the system. Figure 17 shows the coding segmentation of the announcement module which will allow teachers to add announcements into the system.

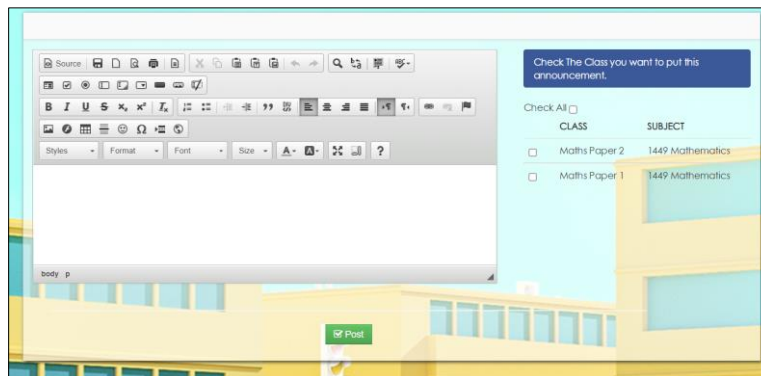


Figure 16: Add Announcement Interface

```

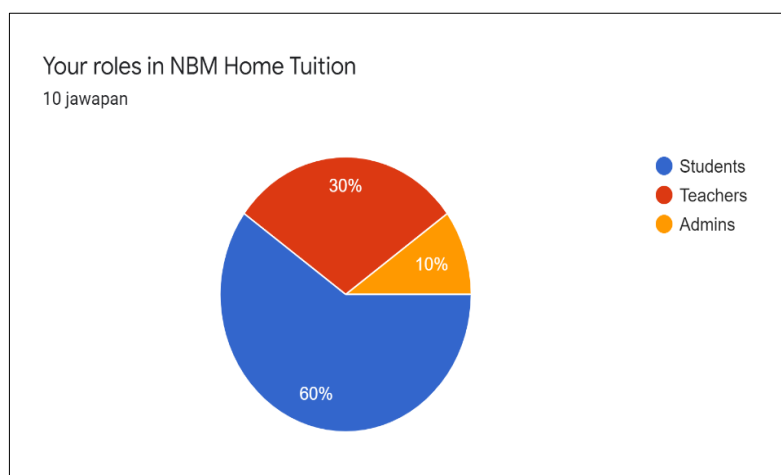
<script>
jQuery(document).ready(function($) {
    $("#add_downloadable").submit(function(e) {
        e.preventDefault();
        var formData = $(this).serialize();
        $.ajax({
            type: "POST",
            url: "add_announcement_save.php",
            data: formData,
            success: function(html) {
                $.jGrowl("Announcement Successfully Added", { header: 'Announcement Added' });
                window.location = 'add_announcement.php';
            }
        });
    });
});
</script>

```

**Figure 17: Announcement Module Code Segmentation**

#### 4.4 User Acceptance Testing

The tests were conducted based on criteria chosen from a questionnaire, using NBM Home Tuition students, teachers, and admins as the intended users for this system. The goal of this test is to guarantee that system design and development meet the needs of users. These factors are decided on a scale of 1 to 5, with 1 indicating strongly disagree, 2 indicating disagree, 3 indicating neutral, 4 indicating agree, and 5 indicating highly agree. The results of the questionnaire are recorded below. The results of the questionnaire are recorded below. Figure 18 below shows the number of participants in this questionnaire which involves six students, three teachers, and one admin.



**Figure 18: Distribution of Number of Participants**

Table 9 depicts the table that shows the response to the general question about the development aspect of the system and the result is recorded in percentage (%). Item 1 which is related to the user-friendly aspect of the system shows that the majority of the participants deemed the system to be user-friendly as they could use the system easily without the user’s manual. Next, item 2 depicts the ability of the users to understand how to use the system which majority of them highly agree that they understand how to operate the system.

After that, the result in the table shows that 80% of the participants highly agree that the interface of the system is easy to use and suits the learning management concept. For item 4 which covers the position of button and interface 90% of participants agree that the buttons are in appropriate places while 10% remain natural. Lastly, item 5 which indicates the use of themes and colors shows that the majority of the participants agree with the use of themes and colors chosen

**Table 9: System Development Questionnaire Results**

| No                 | Description   | 1 | 2 | 3  | 4  | 5  |
|--------------------|---|---|---|----|----|----|
| System Development |   |   |   |    |    |    |
| 1                  | The system is user-friendly.  |   |   | 10 | 10 | 80 |
| 2                  | The users could understand how to use the system.                                     |   |   |    | 20 | 80 |
| 3                  | The interface of the system is easy to use and suits the learning management concept. |   |   | 10 | 10 | 80 |
| 4                  | The position of the button and interface in the appropriate place.                    |   |   | 10 | 20 | 70 |
| 5                  | The system uses the themes/colors accordingly.  |   |   | 10 | 10 | 80 |

Table 10 depicts the table that shows the students' responses about the system's effectiveness which the result recorded in percentage (%). Item 1 which is related to the functionality of the button in the system shows that all the participants highly agree that all buttons in the system are functional.

Next, item 2 states the system allows for deletion, add, edit, and search of the tasks which majority of the students agree that they could perform that process with 83.3% of students highly agreeing with the statement. Item 3 which indicates the ability of the system to allow the students to upload and download the documents also received the majority of students highly agree that they could perform that action while the remaining students remain natural. For item 4, the majority of the students agree that the systems allow them to be notified while the remaining highly agree with the statement. Lastly, the majority of students agree with the statement for items 5 while 16.7% remain natural with the statements.

**Table 10: System Effectiveness (Student) Questionnaire Results**

| No                              | Description  | 1 | 2 | 3    | 4    | 5    |
|---------------------------------|--|---|---|------|------|------|
| System Effectiveness (Students) |  |   |   |      |      |      |
| 1                               | All buttons in the system are functional.                                |   |   |      |      | 100  |
| 2                               | The system allows for deletion, addition, edit, and search of the tasks. |   |   |      | 16.7 | 83.3 |
| 3                               | Users could upload and download the documents.                           |   |   | 16.7 |      | 83.3 |
| 4                               | The system allows the user to be notified.                               |   |   |      | 66.7 | 33.3 |
| 5                               | The system helps in users' payment process.                              |   |   | 16.7 | 50   | 33.3 |

Table 11 depicts the table that shows the teachers' responses about the system's effectiveness which the result recorded in percentage (%). Item 1 which is related to the functionality of the button in the system shows that all the participants highly agree (66.7%) that all buttons in the system are functional.

Next, item 2 states the system allows for deletion, add, edit, and search of the tasks which majority of the teachers agree that they could perform that process with 66.7% of students highly agreeing with the statement. Item 3 indicates the ability of the system to allow the teachers to upload and download the documents also received the majority of teachers highly agree that they could perform that action while the remaining teacher agree with the statement. For item 4, the majority of the teachers highly agree that the systems allow them to notify the students while the remaining remains natural. Lastly,

the majority of teachers highly agree with the statement for item 5 where the system can help them with the grading process.

**Table 11: System Effectiveness (Teacher) Questionnaire Results**

| No                             | Description  | 1 | 2 | 3    | 4    | 5    |
|--------------------------------|--|---|---|------|------|------|
| System Effectiveness (Teacher) |  |   |   |      |      |      |
| 1                              | All buttons in the system are functional.                                |   |   |      | 33.3 | 66.7 |
| 2                              | The system allows for deletion, addition, edit, and search of the tasks. |   |   | 33.3 |      | 66.7 |
| 3                              | Users could upload and download the documents.                           |   |   |      | 33.3 | 66.7 |
| 4                              | Users could notify the students.   |   |   | 33.3 |      | 66.7 |
| 5                              | The system can help to manage the grading process for the teachers.      |   |   |      | 33.3 | 66.7 |

Table 12 depicts the table that shows the admin's response about the system's effectiveness which is the result recorded in percentage (%). Item 1 which states that the system helps to manage the registration process shows that the majority of admin highly agree with the statement and show that the system has simplified the registration process for them.

Next, item 2 states the system allows for deletion, add, edit, and search of the data which 100% of the admin highly agree with the statements. For item 3 that indicates the ability of the system to manage the payment process, the majority of the admin remain natural with the statements. For item 4, the majority of the admin agree that they could notify the students in the system. Lastly, the majority of the admin agree with the statement for item 5 where the system can generate a payment report for each month.

**Table 12: System Effectiveness (Admin) Questionnaire Results**

| No                           | Description   | 1 | 2 | 3   | 4   | 5   |
|------------------------------|---|---|---|-----|-----|-----|
| System Effectiveness (Admin) |   |   |   |     |     |     |
| 1                            | The system helps to manage the registration process.                    |   |   |     |     | 100 |
| 2                            | The system allows for deletion, addition, edit, and search of the data. |   |   |     |     | 100 |
| 3                            | The system helps to manage the payment process.                         |   |   | 100 |     |     |
| 4                            | Users could notify the students.  |   |   |     | 100 |     |
| 5                            | The system allows the users to generate payment reports for each month. |   |   |     | 100 |     |

## 5. Conclusion

A web-based learning management system NBM Home Tuition Management System will be introduced to aid the management of NBM Home Tuition and to provide comfortable and efficient learning and teaching processes for the students and teachers. The developed system is a comprehensive solution to the problems faced arises due to the manual conduct of NBM Home Tuition management. The development of the system will simplify the process of submitting tasks for the students while increasing the performance of the management and the teachers. The NBM Home Tuition Management



System is hoped to produce a good result in enhancing the quality and performance of NBM Home Tuition management.

Improvements and updates can be made to NBM Home Tuition Management System to improve the system's performance and functionalities. Firstly, the system could implement a payment gateway feature in the payment and reporting module. A payment gateway is used to accept debit or credit card purchases from the students. Introducing the feature will provide a faster and more secure payment process. The cases where students make a fake receipt also can be avoided if the payment gateway feature is introduced. Next, the system also can provide a live chat function to the system that will allow the users to interact with the administrator if they have a question or want to get in touch with the management of NBM Home Tuition. Lastly, the system could implement a countdown timer and calendar function so that the students will be alerted about the upcoming tasks. This would ease the process of grading tasks for the teachers as the system will automatically update the status of the tasks if the time already exceeded the due date assigned.

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