A New Project-Based Learning Course Simulation System for FEU Institute of Technology


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Abstract - The project aimed to design and create a system for Project-Based learning courses of FEU Institute of Technology, reducing the tasks and managing data more accurately and efficiently. The project was intended to be used generally by the following: i) College of Computer Studies, ii) Students enrolled in PBL 1, 2, 3 and 4 courses. In addition, the conception of a digital portfolio dedicated for the Project-Based Learning courses would help the college to highlight and organize all the Thesis projects in one place for future use. The project was tested using alpha and beta testing and where results must be obtained at a passing rate. The results on the effectiveness of the proposed system is mostly excellent and all of the respondents have strongly agreed on every area as reflected on the results based on the criteria, namely the: Functionality, Usability, Reliability, Performance, and Security. We conclude that the system successfully meets its requirements.

Keywords - web application; digital portfolio; project-based learning; thesis; capstone project; data management; simulation

I. INTRODUCTION

The rapid advancement of computers in the institution has made its daily workloads easier and more accurate. With the vast technological development, the institution needs to set itself apart with the changes and still go with the flow.

That said, the proponent proposes: 1. a system that will automate the core requirements of courses offered in the institution, and 2. the creation of a digital portfolio to showcase the best innovative projects produced by its students. The Project-Based Learning Courses Management for FEU Institute of Technology is a system or software solution that will help manage the Project-Based Learning (PBL) courses’ tasks or processes electronically to eradicate manual tasks that take longer processing time and ensure ease of access to accurate data.

II. BACKGROUND OF THE STUDY

The PBL courses offered in FEU Tech are required of all students to complete their bachelor’s degree. The students must finish and pass the course to be deployed for industry immersion through their internship and to graduate. Currently, all the documentary requirements submitted as part of the course requirements are hard copies and manually compiled. The project development is also being tracked depending on the available resources, whether it is submitted digitally through an online repository, video streaming, among others. Checking and monitoring the project’s progress is a tedious process for all the parties involved namely: the adviser, mentors, clients, and proponents. The completed projects are archived or stored in several repositories which makes it challenging to find projects needed for showcasing or for other purposes.

The FEU Tech CCS’ need for accuracy, accessibility, reliability, and secured data storage becomes a commitment. Each problem must be solved with the least amount of time and energy. The existing system being manual makes it slow and adds difficulty to accessing and monitoring the documents submitted by a large number of students to their advisers. Therefore, for accuracy and speed in tracking reports and deliverables, the system must be automated.

Other issues, see (2), are usually encountered by the PBL course advisers are as follows:

• Too much time consumed in document management
• Lack of centralized project repository
• Level of accuracy of reports
• Level of ease and efficiency of group monitoring
• High data redundancy and inconsistency

A course management system, (3) leverages on technology for the mutual benefit of students and teachers and the education institutions and client organizations. The goal of the system (4) is to aid researchers, particularly those who are preparing their thesis, with their study and data gathering. Lastly (5), a centralized location must be established wherein all the resources particularly the completed projects will be stored

III. METHODOLOGY

An Agile Method was used as the tool for system development because it supports continuous improvement, and is responsive to change.

For testing the developed system, the proponent used Alpha, Beta, and User Acceptance testing. Which all involves having interaction of the developed system’s different output with technical and non-technical users.
IV. RESULTS AND DISCUSSION

The Weighted Mean method was used in this study to determine the effectiveness of the proposed automated PBL courses simulation system of FEU Tech. Weighted mean is an average that is computed with having an extra weight given to one or more components of the sample.

**TABLE I. INTERPRETATION**

<table>
<thead>
<tr>
<th>MEAN RANGE</th>
<th>SCALE</th>
<th>INTERPRETATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.51 – 5.00</td>
<td>5</td>
<td>Excellent / Strongly Agree</td>
</tr>
<tr>
<td>3.51 – 4.50</td>
<td>4</td>
<td>Very Satisfactory / Agree</td>
</tr>
<tr>
<td>2.51 – 3.50</td>
<td>3</td>
<td>Satisfactory / Neutral</td>
</tr>
<tr>
<td>1.51 – 2.50</td>
<td>2</td>
<td>Fair / Disagree</td>
</tr>
<tr>
<td>1.00 – 1.50</td>
<td>1</td>
<td>Poor / Strongly Disagree</td>
</tr>
</tbody>
</table>

**TABLE II. SUMMARY OF RESPONDENTS ASSESSMENT ON THE EXISTING MANUAL SYSTEM OF FEU TECH’S PBL COURSES.**

<table>
<thead>
<tr>
<th>AREA</th>
<th>Course Adviser</th>
<th>Project Adviser</th>
<th>Students</th>
<th>Directors</th>
<th>Panelists</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ease of use</td>
<td>3.67</td>
<td>3.67</td>
<td>3.33</td>
<td>4.00</td>
<td>3.00</td>
</tr>
<tr>
<td>2 The system is scalable</td>
<td>3.33</td>
<td>3.50</td>
<td>3.17</td>
<td>3.67</td>
<td>3.00</td>
</tr>
<tr>
<td>3 The data are redundant</td>
<td>3.50</td>
<td>3.67</td>
<td>4.50</td>
<td>3.00</td>
<td>3.75</td>
</tr>
<tr>
<td>4 The data are consistent</td>
<td>3.33</td>
<td>3.67</td>
<td>5.00</td>
<td>3.67</td>
<td>2.75</td>
</tr>
<tr>
<td>5 The system is complex</td>
<td>3.83</td>
<td>3.67</td>
<td>3.83</td>
<td>3.67</td>
<td>3.00</td>
</tr>
<tr>
<td>COMPOSITE MEAN</td>
<td>3.53</td>
<td>3.64</td>
<td>3.57</td>
<td>3.60</td>
<td>3.10</td>
</tr>
</tbody>
</table>

The system will be created exclusively for FEU Tech’s CCS PBL Courses’ project defense processes specifically PBL see references (1) (2) (3) and (4). The mobile application dedicated for recording grades during the defense will be taken into consideration but may not be included in the final proposal of the proponent. The teaching loads and other requirements submitted by the faculty will not be the basis in the defense scheduling as the latter will still be manually entered in the system and carefully decided by the advisers and the groups that will present.

The different features of the proposed system may be enumerated as:

- PBL Courses Management
- Defense Scheduling
- Course Adviser Module
- Project Adviser
- Advisee Module
- Defense Grade
- Mentoring and Paneling Fee Report
- Digital Portfolio Management

A. Project Design

The website is live at feutechpbl.com.

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**Figure 1. The website.**

A1. Course Simulation

This module controls the PBL courses. You can view, add, update and delete PBL courses accordingly. The setup includes creating the PBL course based on the specialization and assigning a course adviser.

**Figure 2. Course simulation.**
A2. Scheduling System

This section manages the faculty schedule. You can view, add, update and delete faculty schedule accordingly.

![Figure 3. Scheduling System.](image)

A3. Defense Scheduling

Defense Scheduling module can also be found here. You can assign a group to a specific date and time. This will also send a notification to the panels automatically.

![Figure 4. Defense Scheduling.](image)

A4. Portfolio Management

This section manages the portfolio. You can view, add, update and delete portfolio accordingly. The setup includes inputting the project title, abstract, links and group assignment.

![Figure 5. Portfolio Management.](image)

A5. Dashboard

This section displays all the groups that you will be paneling. You will be able to see the group name, title and their defense schedule. Viewing the status and grading the group can be accessed here.

![Figure 6. Dashboard](image)

B. Effectiveness of the Proposed System

<table>
<thead>
<tr>
<th>AREA</th>
<th>Course Adviser</th>
<th>Project Adviser</th>
<th>Students</th>
<th>Directors</th>
<th>Panelists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functionality</td>
<td>x̄</td>
<td>x̄</td>
<td>x̄</td>
<td>x̄</td>
<td>x̄</td>
</tr>
<tr>
<td>1 The system gives accurate results</td>
<td>4.17</td>
<td>4.17</td>
<td>4.67</td>
<td>5.00</td>
<td>4.25</td>
</tr>
<tr>
<td>2 The system perform task correctly and efficiently</td>
<td>4.33</td>
<td>4.00</td>
<td>4.83</td>
<td>4.67</td>
<td>4.25</td>
</tr>
<tr>
<td>3 The system provides the common functions as it is expected</td>
<td>4.50</td>
<td>4.00</td>
<td>4.50</td>
<td>4.33</td>
<td>4.50</td>
</tr>
<tr>
<td>4 The system provides easy controls to change mistakes</td>
<td>4.50</td>
<td>4.33</td>
<td>4.50</td>
<td>4.33</td>
<td>4.25</td>
</tr>
<tr>
<td>COMPOSITE MEAN</td>
<td>4.38</td>
<td>4.13</td>
<td>4.63</td>
<td>4.58</td>
<td>4.31</td>
</tr>
</tbody>
</table>

Table III shows that the Course Adviser, Project Adviser, and Panelists have agreed while the Students and Directors have strongly agreed to the functionality of the proposed automated system. Therefore, they agreed that the functionality of the system can give accurate results; perform tasks correctly and efficiently; provide the expected common functions; and provide easy controls to change any mistakes.
Table IV shows that the Course Adviser, Project Adviser, and Students have agreed while the Panelists and Directors have strongly agreed in the usability of the proposed automated system. Therefore, they agreed on finding the various functions in this system to be well integrated, and they strongly agreed that they would not need the support of a technical person to be able to use the system. They found only minimal inconsistencies in this system. They were confident in using it easily.

Table V shows that the Project Adviser has agreed while the Course Adviser, Students, Panelists, and Directors have strongly agreed in the reliability of the proposed automated system. Therefore, majority of the respondents have strongly agreed that the system was reliable in all the areas covered.

Table VI shows that the Course Adviser has agreed while the Project Adviser, Students, Panelists, and Directors have strongly agreed in the performance of the proposed automated system. Therefore, they agreed that the system performed well.

Table VII shows that in the area of security, all the respondents strongly agreed that the website provides security against unauthorized use. The system requires password and rigorous authentication for a user to login. Therefore, they agreed that the system was secured.

This study was conducted for the purpose of automating the PBL courses by using one system for its management, defense scheduling, maintenance of account profiles, defense grading, establishment of an online repository, generation reports summary, and creation a digital portfolio. Four research methods were utilized and a purposive
sampling technique was employed for gathering data. The questionnaire served as the instrument for data collection. Six (6) are Course Advisers, six (6) Project Advisers, six (6) Students, three (3) are Directors, and four (4) Panelists were the respondents. The research was conducted during the academic year 2017 - 2018.

V. CONCLUSION AND RECOMMENDATIONS

Based on findings, the process of the existing manual system of Project-Based Learning Courses Management of FEU Institute of Technology can be considered neither bad nor good as the Course Adviser, Project Adviser, Directors, and Panelists have neutral responses in some areas or statement. Moreover, these neutral responses open opportunities for continuous improvement. In terms of the features of the proposed system such as the quality, implementation, level of difficulty, all respondents have positive answers and are fairly impressed with the project. The assessment on the effectiveness of the proposed system is mostly excellent and all of the respondents have strongly agreed on every area as reflected on the results based on the criteria, namely the: Functionality, Usability, Reliability, Performance, and Security. Therefore, the system meets the needs and expectations of all its users.

Recommendations: Based on the outcomes, the following are recommended to further improve the Project-Based Learning Course Simulation System for FEU Institute of Technology:

1. Increase the data storage and memory since the system handles all the academic records of the students previously and currently enrolled in PBL courses, thus, requiring more capacity and the back-up of data files.
2. Set up a revision control—a tool that can easily track the differences of the codes and can help maintain the good quality of the system—to maintain the system and its versions of source codes.
3. Compress file storage by using image processing.

REFERENCES

Course Management System

System Features