

Online Project and Assignment Submission, Management and Progress Monitoring System (OPAS)

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Abstract— Online Project and Assignment Submission, Management and Progress Monitoring System (OPAS) is a system that enable the student to submit their assignment or project online without submitting any physical file. This system is integrated with Turnitin system to check the plagiarism percentage. Before the submission, the student needs to update their progress to the system and the lecturer able to view the progress and give comments online. OPAS is providing an online discussion, document sharing for student and lecturer and web real time communication technology. Any project that behind the schedule, the system will be able to send an alert to the student to notify the status. This paper is reviewing several similar system and technologies that going to be used in developing the prototype. The system design for assignment and project submission process is being discussed. The working prototype was developed and some functionalities are highlighted. The impact of the system to students, lecturers and university are discussed. The proposed system helps reducing and minimizing human error, capable to assist supervisors in process controlling and managing students. Supervisors can check the student projects' statuses, the uploaded files online and assist them while they are working in the project if necessary. The proposed system decreases the complexity of managing projects for student by providing them with the current status of their projects and the progresses with their supervisors. Moreover, the proposed system allows supervisors to share documents and files with their students and communicate with them through video call and text chat.

Keywords: component; Turnitin Integration, Online project and assignment submission, Online Project Management and Monitoring System, web real time communication, document sharing.

I. INTRODUCTION

Nowadays, higher education has become one of the most necessary factors in

daily life. Parents send their children to the best colleges and universities that they can afford to make sure their children can acquire knowledge and ready for work. One of the first requirements for recruitment in specialized fields is higher education degrees. According to Value of Education, an average of annual earnings of full time employee with bachelor's degree is 1.8 times the employee without higher education [1].

Meanwhile, higher education providers such as Universities are becoming more competitive and more concerned about their quality. It is obvious that universities are concerned about their image and rank in national and international states [2]. Universities are ranked based on their performance and quality which are the main concerns of students as well as their future employers.

Since the beginning academic education has been evolving and improving itself using different techniques and practices. Higher education is consisting of courses, exams and projects that need to be accomplished to be able to get a bachelor's or master's degree. In modern academic curriculum, the projects are becoming more and more important. Time limitation is an undeniable issue that people face in daily life and work. Student projects are not an exception and most of student and supervisors face this issue during the project progress. Students hardly can manage their time to do their projects and meet their supervisors. This paper will discuss on prototype that will attempt to help in overcoming these issues and provide a good experience for the users.

The objective of OPAS system is to be able to monitor and control the students' assignment or project progress as the following:

- To increase student and supervisor accessibility and availability.
- To ensure projects are always on-track and on-time by proving project management and monitoring.
- To facilitate file-sharing (increase accessibility and availability of files) as well as reducing redundancy through online repository.
- To facilitate communication and collaboration between supervisor and student by use of collaboration tools.

This paper will discuss several similar systems, objectives, functions and system design of the proposed system, technologies used for system development, prototype and the impact of the system to students, lecturers and universities.

II. SIMILAR SYSTEM REVIEW

A. Blackboard Learning Management System

Blackboard Inc. known as a well established developer of education software which provides powerful and flexible eLearning platform systems for educational instructions since more than a decade. Some of the Blackboard learning and teaching functions are to deliver content management and sharing, communication and virtual collaboration which includes - online assessments, student progress tracking, assignment and grading management, as well as create, appraise, analyze, and determine data about of campus activities all at once. The functions allow educators, administrators and students to learn and share materials in an integrated online as virtual campus systems. Blackboard can integrate online learning tools with in-class learning tools [3]. Some of the various functions;

- Course Delivery and Management – Course central repository, manage and create courses online, and the management of content updates. The course contents could be personalized and enable knowledge reuse. Slides, hyperlinks, diagrams, pictures or other audio/video files could be shared. Multiple-choices or true-false

- quizzes with automated feedback to students could be conducted online.
- Grading and Assessment – Upload and set assignment datelines with ability to review and edit assignments for grading purposes directly in the browser. Students able to view on assignment dateline alerts and submit assignment online and see if the assignments submitted have been graded. Consistent grading in parallel with the review process while giving feedback on the students' performance.
- Communication, Collaboration and Engagement – Knowing what needs attention, sharing and discovery of educational, asynchronous discussions among peers, notifications for up-to-date information and any alerts that the students they should be aware of. Alerts could be received via e-mail. Participation of the students could be graded as well.
- Monitor Activity and Progress - Instructor Dashboard monitors activity and progress such as tracking each student usage of courses. Educator can trace on all students or individual students within the course including tracing individual assignment. Date and time stamps are available allowing for identification of late assignments.
- Calendar: Educators can use this function to post due dates for assignments and tests.
- Retention Center - Retention factors towards student engagement to the educators' attention, speedy alerting the student potential risk and permitting educator to act instantly. This function enables to aid students when they begin showing signs of falling below the expectation or disconnect in their subjects. The function enables by monitoring their performance in missed deadlines, ongoing grades, course activity and course access [3] [4].

B. EdmodoSocial Learning Platform

Edmodo is a "social learning platform" website similar to Facebook, founded by two people in 2008 [6]. Edmodo works in a very similar fashion as Facebook, with closed

network, home screen looks like Facebook, and a feed of students' activity in the right hand column, which links to all of the courses in the left hand column, and tabs to access and manage courses at the top of the column [5]. As an online networking application for educators, students and parents, it is in a controlled environment appropriate for schools, colleges and universities. It is functional as a free-of-charge tool for communication with over 500,000 students worldwide [6]. Some of the various functions;

- Engage students – Educators conduct classroom discussions online, carry out survey to test for student understanding, and grant badges to relevant students for their score and performance. Students can connect with themselves within the same group under the educator supervision.
- Safe and closed network - No personal information should be shared. Educators can differentiate instruction by creating subgroups of students. It provides a secure and private environment where the educator invites the members of the group. This controls who can interact with the members of the group [7].
- Connect to resources – an online networking to connect educators to students, administrators, parents, and publishers. Establish online learning conversation between educators and students, as well as within the class/group. Different types of files and folders are available to be shared, including posting assignments. Students may turn in their assignments or upload assignments for their teachers to view and grade. Teachers can comment on the assignments directly in Edmodo to provide instant feedback on what grades the students obtain [7].
- Measure student progress – Tracking students' progress is being done via online, grades and badges are stored and accessible. Badges are awarded to students as recognitions for their achievements to motivate their online participations. Educators measure the students' performance in their virtual

classrooms through their feedbacks to quizzes, assignments, and discussion posts.

- Personalize with apps – User friendly apps which provide personalization learning for each student. These apps aid educators to intensify their lesson plans and integrate with Edmodo, delivering all of the digital content from the social learning platform
- Current use of Edmodo can create polls for student responses, linking video clips, create learning groups, posting and plan scheduled with a calendar [7].

C. Evaluation

Based on both Blackboard and Edmodo has the capabilities of the following;

1. Set assignment datelines, assignment submission and assignment reminder, grading and assessment
2. Communication, collaboration, engagement messaging and feedback
3. Calendar, reminders on important events
4. Sharing of information and files
5. Monitor and measure student progress

Educators should be able to track student progress on the assignment but it requires several actions including setting dates and actions, referring to many different interfaces and need to cross check on the interfaces. This may be too time-consuming to check on individual students and not practical if there are number of students. The assignment comments or feedback is also requires different interface. Therefore the propose system would eliminate this problem, by using project management tool in the interface.

Both tools do not have the capacity to track and monitor student project as the project has many faces with different milestone. Therefore, this paper will be recommending collaboration with project management tool and turnitin system.

III. COMPARISON BETWEEN CURRENT SYSTEM AND OPAS

Most universities in Malaysia have different methods of assignment or project submission. Some of the assignment and project

require many interactions between the students and lecturers. These processes can be very extensive and will eventually become uncontrollable due to the size of students, workload and different deadlines. The table below highlighting the manual process experiencing at most universities including Asia Pacific University of Technology and Innovation (APU). The table also provides the comparison of the proposed system.

Table1. Table of comparison between current system and OPAS

Functions	Manual (Current system)	OPAS
Booking appointment	Online consultation booking via separate system	Online consultation booking via the one system
Monitor and Control	In classroom during tutorial or via consultation hours	Online monitoring: 1. Admin can edit start and due date, so that student can view 2. View Gantt chart using graphical interface
Discussion	Face to face at the University's meeting room	Online communication
Alert notification	Manual alert	Auto email to the student if the progress percentage less than target
Assignment/Project submission	Submit assignment at	Upload the assignment online

	administrati on office	
Assignment/Project Collection	Lecturer receive assignment from administrator	Lecturer download assignment from the online system
Assignment/Project feedback	The feedback form with the grade will be distributed to the students	Online feedback
Assignment/Project review	During face to face discussion or send through e-mail	Online document sharing while lecturer type comments, student can immediately review the comments.
Receive Plagiarism report	Download from Turnitin website	Turnitin integration allows OPAS to create Plagiarism using Turnitin

IV. PROPOSED SYSTEM

This proposed system is a tool for educational industry to be used for the management of student assignment or projects. This system is a web based system which will help educational organizations such as universities and colleges to improve the process of managing students' projects. This system will allow the students to communicate and discuss their project or assignment with their supervisor. Moreover, supervisors will be able to see the progress of the students' projects and their work. This system allows supervisors to track the productivity and effort of the student in projects and help them with projects if it is

necessary. This system can help universities and other educational firms to increase their productivity and quality of services. Figure 1 shows the use case diagram for overall system.

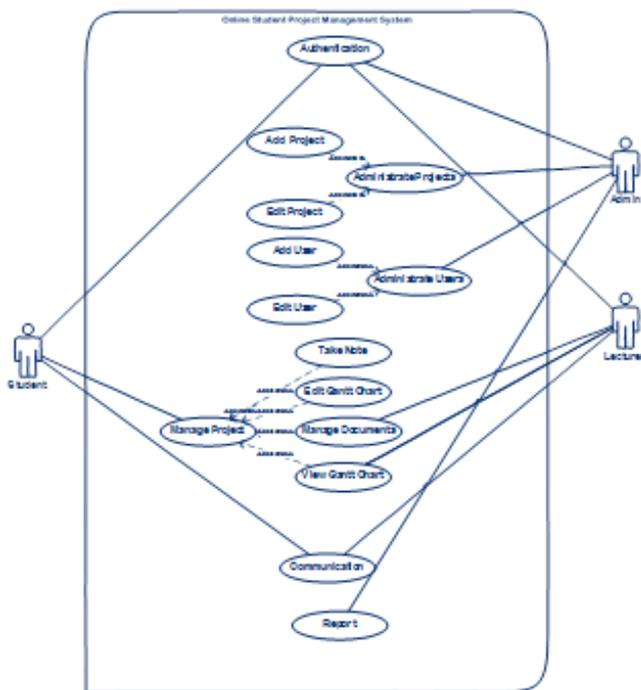


Figure1. System Use Case

Online Student Project Management system could help students in configuring their projects task and help them to manage their projects. This system will allow students to interact and communicate with their supervisor. Besides that this system also will allow supervisor to keep track of the students and look up their progress and help them if it is necessary. This system will keep supervisor updated on the progress of their supervisees. The functionalities of the proposed system are as follows:

- Monitoring and Control functionalities that able to:
 - Provide worldwide access to the system.
 - Assign and edit projects status by Admin
 - Provide project management tool
 - Provide authorization for supervisors to view and track supervisees projects by administrator

- Show the percentage of assignment/project progress
- Notify users if he/her is behind schedule projects.
- Online repository for projects
- Link to the Turnitin integrated system
- Submission functionalities
 - Uploading and downloading files by lecturers and students
- Communication functionalities that allow to:
 - Collaborative communication between student and supervisor
 - System would provide Text chat.
 - Would allow private messaging between students and supervisors.
 - Would provide screen sharing features.
 - Would Provide online slide presentation.

Figure 2 shows the process flow of an assignment or project submission by students. The process is as the followings:

- Firstly the students need to login to the system. If the user is the first time user, they need to register to the system first.
- Then, students can upload their documents to the OPAS which has Turnitin integrated to it. This will allow the system to generate Reports using Turnitin features.
- The students able to view project status that will provide information such as start date, due date, plagiarism report, Gantt chart and percentage of progress.
- If the progress is behind the schedule, the students will need to submit their reasons to the system and an email will be sent to the student.
- Any discussion needed, the student will need to upload the files that they are going to discuss with their lecturer and start with the online communication. During online discussion, the system able to provide screen sharing of the documentation to be discussed between the student and lecturer. The lecturer able to identify and comments

on which part of documentation that need to improve.

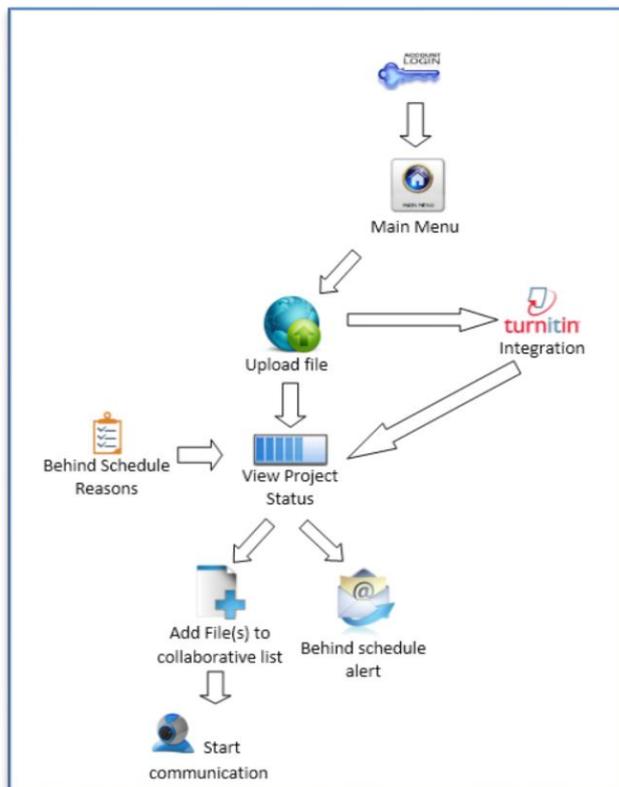


Figure 2. Submission Process for user: Students

V. TECHNOLOGIES REVIEW

A. Programming language

OPAS system is a web-enabled application, therefore web application framework has been considered in the development process. The web application framework (WAF) has a software framework that is designed to support the development of dynamic websites, code reuse and provides collection of libraries and tools. Framework provides a trustable establishment for system development which assures that the establishment is less vulnerable and less prone to bugs

- ASP.NET

ASP.NET is a framework to develop webpage and websites. This framework supports HTML, JavaScript, CSS and server scripting. ASP.NET has three different models

which are Web Pages, Web Forms, and MVC [8]. Each model is appropriate for different task as the following;

1. Web Pages model is the simplest ASP.NET
 - Simple website development
2. Web Form model is the traditional ASP.NET event driven development
 - Reuses of controls throughout the development of the website
3. MVC model separates the web application into Models, Views, and Controller.
 - Separation of elements into three different modules

Other than the above, ASP.NET has the following advantages [9]:

1. Access to .NET Framework which extend the windows API and Reach Library.
2. ASP.NET runs on Server side and creates HTML codes that are being displayed by most of browsers
3. Supports C# object oriented language.
4. Platform independence (user can access the web app by most regular browsers.)
5. Massive resources and component
6. Reusable codes and controls.
7. Integration with ADO.NET and VistaDB for database design and control.
8. Full support of XML, CSS, HTML and AJAX

- Additional languages - AJAX

Asynchronous JavaScript and XML (AJAX) is a technique for creating dynamic web pages. AJAX allows updating web pages asynchronously by exchanging small amount of data without need to reload the whole page [8]. Before AJAX, in order to update content of a web page, it was necessary to reload the entire web page. This disadvantage was a limitation for server side applications which needed to communicate with the associated server continuously and update the entire page all over again.

AJAX allows dynamic webpages to communicate with servers in a more optimized way. This technique allows web transaction to overcome the limitation of stateless request-response protocol [10].

B. Online Multimedia and Communication

OPAS should have the function of collaborative communication, therefore it is essential to select a tool that is compatible with the main platforms, fulfill with the requirement at least to achieve minimum level of configuration and setup for users.

The main criteria in choosing between communication and collaboration tools it is the compatibility of the technology with chosen platform and requirements, as well as the minimum level of configuration and setup for users during use.

- WEBRTC

Web Real Time Communication has been selected to facilitate the real time communication due to its capability. The technology enables application such as multimedia, real-time video chat made available via simple JavaScript APIs. This technology provides Peer to Peer connection directly through web browser.

Web-RTC offers open source, plugin-free, real-time video, audio, and data communication. Web-RTC has been incorporated by other websites such Skype, Facebook, and Google Hangouts. These websites need plug-ins which requires downloading, installing and updating that may become complex and error prone. Deploying plug-ins, testing, maintaining and debugging might be difficult. Also it requires licensing, may be expensive and need complex technology. Therefore, Web-RTC is selected as it is providing open source, free, has standardized APIs built into major available browsers and more efficient than existing technologies.

Web-RTC was initially supported by Google, Mozilla and Opera. Web-RTC currently is available on Chrome, Firefox Nightly, Opera, and it will be available on Internet Explorers newer version [11].

Developer has decided to test communication component that use the same technologies such as Web-RTC and Flash. Developer has studied different components for integrating communication into the system. Some of these components are suitable for the online student project management system such as “EasyRTC”, “X-Sockets” and “TokBox”. These components will be tested and evaluated to avoid incompatibility, and select the most suitable for the system and where necessary, modification is required.

OPAS has communication module that includes video call and text chat which enable supervisors and students to communicate and view the files which are set by either users. Developer is using HTML 5 WebRTC technology which is a plug-in with minimal requirement, that is a web browser that Supports WebRTC. Due to complexity of this module developer has researched and tested different types of open-source web communication APIs and tools such as Phono, Easy RTC, Webinar, and X-Sockets. Developer has decided to develop prototypes to find the most suitable APIs option for this project. Challenges that occurred during the testing are high complexity in developing WebRTC and using server, Incompatibility and complexity of the APIs. From the tested prototypes, developer has found that the X-Sockets’ WebRTC API is the suitable choice for the project due to its nativity in .NET platform.

C. Originality of Contents and plagiarism checking

OPAS should be able to identify the originality of the contents in projects to help avoid plagiarism in project. Turnitin is one of the most well-known tools used for identifying originality and minimizing plagiarism by

millions of students in different faculties and institutes [12].

Turnitin is integrated to large number of famous learning platforms (CMSs / LMSs / VLEs / SISs) such as Moodle, studywis and Blackboard. Turnitin has been providing plugins for these platforms as well as supporting self-integration. Under this option Turnitin provides API documentation upon request under certain conditions [13].

Integration of the Turnitin requires collaboration between developer of the system and Turnitin team. Therefore, it is necessary to fill up a request inform the Turnitin Group regarding the purpose and nature of the planned integration [14].

D. Database Management System (DBMS)

Developer chose the database based on the requirements of the system. The criteria in choosing a Database Management System is as follow:

1. Compatibility to the chosen framework and language
2. Data Integrity and security
3. Concurrent access
4. Data recovery support

- MSSQL

Microsoft SQL is a relational database management system, product of Microsoft, mainly designed to store and retrieve data on behalf of other applications [12]. MSSQL provides other features such as database encryption, compression auditing and monitoring data. One of the most important factors about MSSQL is its compatibility with visual studio and ASP.NET which makes it the most optimum DBMS choice for .NET programming.

Advantages of MSSQL:

1. Close integration with .NET framework (compatible with the chosen framework)
2. Data Recovery support

3. Concurrent access
4. Data integrity and security
5. The license is available via APU MSDN

VI. PROTOTYPE

Online Project and Assignment Submission, Management and Progress Monitoring System can be divided into three categories of system functionalities which are

- Monitoring and control
- Communication
- Report generation

A. Monitoring and Control

Monitoring and control functions are used to manage the project schedule in detail by viewing, editing, and updating details of the Gantt chart using Graphical interface.

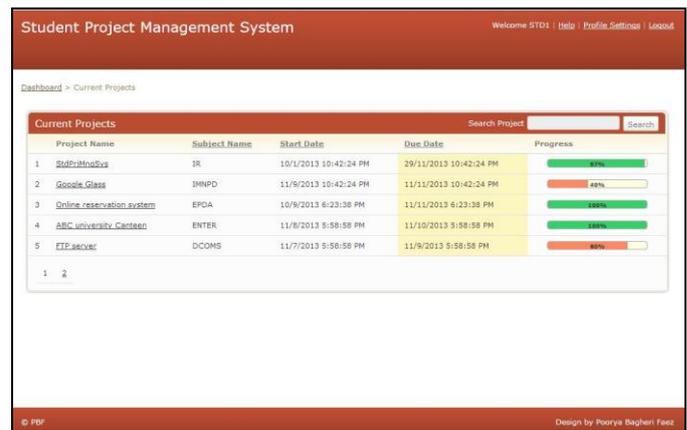


Figure 3. Current Project Dashboard

Figure 3 shows the project dashboard that includes the list of project and allows user to search for the specific project. Project dashboard will display progress of the project and there is an indicator that will show whether the project is behind the schedule or not. The progress bar with pink color shows that the project is behind the schedule and the percentage will also be displayed. The progress bar with green color is to indicate that the project is following or ahead the schedule.

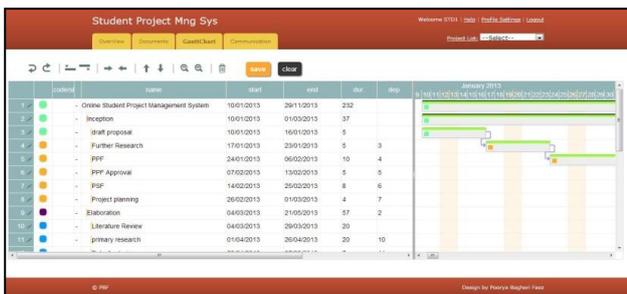


Figure 4. Project schedule for lecturer and students

Figure 4 shows the interface for project schedule for both supervisor/lecturers and students. The function of this module is to manage the project schedule in detail by viewing, editing, and updating details of the Gantt chart. The lecturer use this project schedule to monitor, marking and giving feedback to the students while the students use this function to plan and update their project or assignment progress. Developer has tested different available open-source Gantt and schedulers based on .NET framework such as “daypilot“ as well as jQuery components such as “teamwork gantt”[13]. After few testing experiences developer decided that “teamwork gantt” meets the required features by the system.

B. Document module

Document module as shown in Figure 5, includes handling documents and files that user uploads. It’s also, allows downloading the files and set the files the student is interested to “collaborative list”. Then, the student can initiate online communication with the lecturer to discuss the document. Figure 6 shows an interface for uploading file to the system.

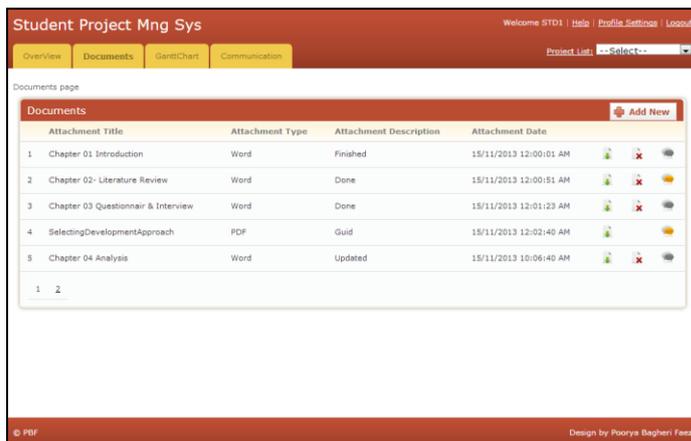


Figure 5. Document Module

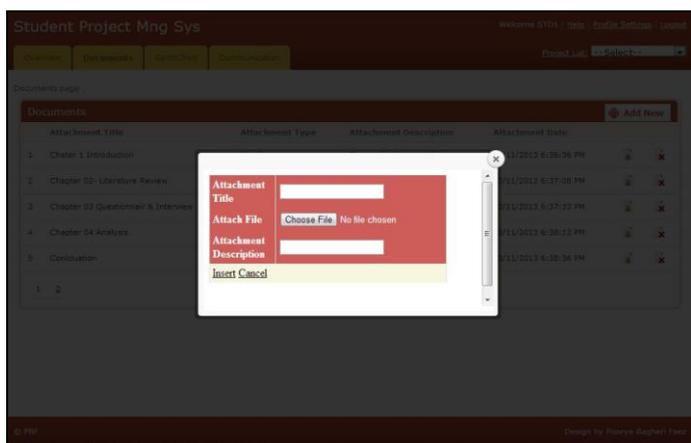


Figure 6. Upload File to project’s documents

C. Communication module

Figure 7 shows the communication module interface that enables the student to connect and start the online communication with their lecturer.



Figure 7. Communication Module

Figure 8 show screen sharing that enable the students to show their document or slides show to their lecturer during online discussion.

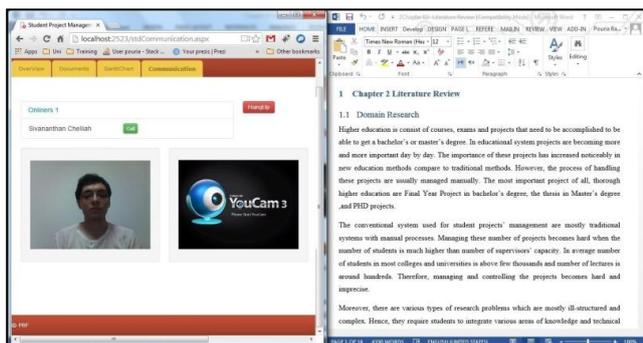


Figure 8. Communication While View the document

VII. SYSTEM IMPACT

The prototype developed is a working prototype and this system able to give benefits to the students, lecturer and university as a whole. Below are several advantages that highlighted.

A. Students

- Cost saving, eliminates the unnecessary meeting and the cost of travel
- Timeline of the project is visible thus deadlines can be achieved on time.
- Higher performance, students can manage their projects a lot easier with a decent project management timeline and deadline.
- Convenient for students and supervisors, using the online student management system is a lot easier to use since they can simply go online 24/7 without any time restriction.
- Higher security and privacy.

B. Lecturers

- Higher visibility of project progress for students' supervisors and easier management of projects.
- Convenient for supervisors, using online student project management system supervisors can simply monitor the progress of students.

- Students and supervisors can communicate in an effective and efficient way using online web communication features.

C. University

- Enhances the quality of university/college services.
- Reduce pollution, by elimination of unnecessary usage of fossil fuels or other resources.

VIII. CONCLUSION

The paper presented a workable prototype of an educational web based application that is capable to track students' progress, allow communication between student and educator and equip with project management tool. The prototype has 2 major functions 1) Monitoring and Control and 2) Communication. The key functions in 1) Monitoring and Control are web enabled, assign and edit project status, project management tool, track student progress and notify students who are behind the schedule. The key functions in 2) Communication are collaborative communication, text chat, private messaging, screen sharing and online presentation.

The prototype was developed with ASP.NET, HTML, JavaScript, CSS, server scripting, Microsoft SQL and technology such as Asynchronous JavaScript and XML (AJAX). Web Real Time Communication (WEBRTC) has been selected to facilitate the real time communication which enables application such as multimedia, real-time video chat made available via simple JavaScript APIs.

The prototype has been tested with 1) Unit Testing 2) Integration/Module Testing, 3) System Testing and 4) Acceptance Testing. Several improvements have been made to eliminate system error and at the end the system is running properly and all tests have passed correctly. The system has been tested by potential stakeholders and obtained a good score in acceptance testing. Therefore, the result has been fulfilling requirements.

ACKNOWLEDGMENT

The authors thank the Head of Computing & Technology, Muhammad Ehsan Rana for his constructive comments and suggestions that were vital in improving the quality of our paper. The authors also wish to express gratitude to the management of Asia Pacific University for their support.

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