

Notification System Study For E-Learning

by

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CERTIFICATION OF APPROVAL

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Information & Communication Technology Programme
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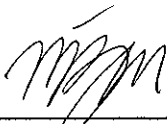
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CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



KHAIRUN NIZAM BIN ROSLEE

ABSTRACT

This Notification System Study For E-Learning project is a research study to be carried out by as part of Final Year Project for the students upon completing the Information & Communication Technology (ICT) degree course. This research is aim to provide a recommendation for future improvement for E-Learning system that is being used in Universiti Teknologi Petronas (UTP). The research will be using the Rapid Application Development (RAD) methodology as the guideline to carry out the study. RAD design has continuous prototyping cycles, by which is an essential element for system environment study and its behavior like the trial-and-error. RAD also emphasize on the importance of finishing the study in-time. It is to be expected that all of the discussion and recommendation be properly understand and accepted. To summarize, the project study will bring about greater benefits for students and lecturers in UTP as the learning portal is a main medium of interaction between them during their study period here in this university.

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LIST OF ABBREVIATIONS

CMS	Classroom Management Solution
CMS	Course Management System
KVM	Kilobyte Virtual Machine
LMS	Learning Management System
MOODLE	Modular Object-Oriented Dynamic Learning Environment
POP3	Post Office Protocol 3
RAD	Rapid Application Development
SMTP	Simple Mail Transfer Protocol
SNS	Social Networking Services
VLE	Virtual Learning Environments

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

E-Learning, short for Electronic Learning refers to the learning process through Web-based learning, online learning, computer-based learning and/or virtual classrooms. The learning is done outside the regular class hour. E-learning delivers its content through media-rich and hyperlinked environment that utilizes internet networking services. In many higher institutional entities, E-Learning is a suitable platform to gather students, lecturers or even employees for them to distribute information for others, acquire updates or news or to interact with one another. After being used for several years, E-learning has undergone several upgrades and improvement, with the most recent is on January 2011. To ensure that the changes are beneficial towards UTP students, a study should be conducted to measure the effectiveness of the new E-Learning and student's perception of it.

1.2 PROBLEM STATEMENT

The current E-Learning system that has been used in UTP is a Learning Management System (LMS) or Course Management System (CMS) named Modular Object-Oriented Dynamic Learning Environment (Moodle). Moodle is an easy E-learning platform provider, which enables lecturers and students to interact with one another outside class. Having been used for several years since other E-learning software platform such as Blackboard, Moodle functionality of UTP's E-Learning has been met with students' satisfaction before, hence with the new improvement there is a need to evaluate and measure how it has been contribute towards students advantages so far.

As of January 2011 also, a new study structure that affecting all existing and new students has been imposed at the same time, where a new trimester period will be replacing the previous dual-semester per year that has long being used. With the new curricular structure, which has been done to comply with the international engineering body standard for the new duration of study for engineering students, has in one way prove to be a challenge for students because of the shorter time period per semester.

The problem is related to student lifestyle here, by which each and every everybody is looking for achievement at different aspects; to name a few management skills, sports and extra-curricular activities as well as peers relationship or even personal business for income generating purposes in daily manner. All of this would affect the students focus, interest and time-management in their daily life activity. Having said that, through a proper study of the new enhancement a thorough discussion and analyze will be done, and later recommendation and suggestion will be made that perhaps can be implement to the E-Learning portal.

1.3 OBJECTIVE

The objectives of this research are:

- To study and analyze the new E-learning's notification system.

1.4 SCOPE OF STUDY

In this study a quick review of UTP's E-Learning old notification system together with proposed project by scholarly researchers will be briefly identify. After analyze the possibility of any alternatives for Moodle notification system functions that can be implement, we will look into depth the current nature of the new E-learning, what and how the notification system is functioning. Bear in mind that this study will be focusing the impact of notification system changes towards students only, that is to say the study notification system is done from the student's perspective. We will study the behavior and pattern for UTP's E-Learning notification system from the UTP students point of view, what it will done and effect that it will have towards students only. The study will be much about the Moodle E-learning platform.

1.5 FEASIBILITY STUDY

This study is feasible in that it is being done in the context of UTP environment; a research study for the beneficial of other student, by a final year students towards his alma mater. Secondly, regarding the changes of new study structure, in the prospect of timing it is suitable for research study to be performed that would provide a means for any improvement or enhancement effort for current E-Learning version that will provide enough time for any review, testing or corrective maintenance. Other than that, Moodle E-Learning also has been widely used for many higher institutional learning in Malaysia. This in a sense will give a strong support for any kind of study towards the new version of Moodle platform for the system feedback and suggestion. Therefore, with the student's perception study that being done after about ten month of the new changes, it did provide ample time for students to get familiar and used to the new changes, and understand them properly for them to react and answer to this study.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Why does there should be notification system for E-learning? A complete and thorough study has been made that analyze and coming out with critical success factor in E-learning ecosystem; specifically Moodle LMS. After much evaluation and qualitative study with the expert, it is true that substance or content of E-learning, process or systems is two of the important components. The other one is principles and methods [13].

Current E-learning are not effective enough one of it in term of pedagogical support and learning contents material. E-learning is not just for sharing traditional lecture slides. A proper synergizing method should be made, especially in term of pedagogies, technologies and content management. Another method to overcoming this inefficiency is through proper training for students and lecturers to optimize the usage of E-learning, improve properly the materials, offer users less-time and effort in dealing with the content materials other than providing a feedback means as soon as possible as they pointed out it is crucial to provide immediate feedback as one of the importance issues [13].

Other reason has been highlight with regards of reasons for improvement of E-learning with notification system. One such factor is to make up with some sort of adjustment or change with current accessibility for E-learning content. This is what has been brought by Hoorebeek et. al. [5] in his paper where he discuss about the duty of 'reasonable adjustment' that should be analyze as enhancement for accessing E-learning resources.

This 'reasonable adjustment' enhancement of E-learning is related with the uses of shared online material of E-learning that should not discriminate disable people. It is crucial that such improvement quality is made available to all, because current E-learning design is lack of knowledge about virtual learning environments (VLE) system.

The improve characteristics of E-learning easy accessibility for resources content would benefit providers with better sales market with it unique add-up value. The analysis and enhancement of new E-learning would not harm existing students, instead E-learning would benefit them as well as wider scope of students.

Pointed out that for the enhancement and betterment of E-learning system should be made by the educational institution itself as they are the one who used it, not the providers, they just sell their product.

2.2 MOODLE LMS/CMS

UTP's E-learning portal is based on Moodle LMS or CMS, and definitely not the only one who implementing it. Two of the famous LMS; BlackBoard and Moodle, although both have lots in common, there exist some distinctive key differences among them. Therefore a concise comparison is being shown that will point out the six main factors of both LMS according to their 52 comprehensive features [10]. All of the comparisons cater about pedagogical factor, learner environment, instructor tools, course and curriculum design, administrator tools and technical specification. Moodle seems to be better than BlackBoard in the term of feedback for users (Feedback module allows conduct survey, smaller in scope and optional and notification is mailed out), discussion forums (can choose to receive email for posts through RSS feeds subscription) and the internal e-mail (built-in email functionality to email individuals or groups, can be sent to many at once, can be forward and deliver online or via email) [15].

These emails capabilities could be done with the configuration of Moodle Cron functionality, that is a script that will run regularly and give like some sort of 'heartbeat' towards Moodle LMS (check up of discussion forums, email/reports distribution, erase inactive users etc) [9][10].

But, not all are available and being implemented here, therefore a combination of push-pull mechanism consisting agent-based framework that can identify and prompt user for every new document uploaded or new forum have been proposed. This automated notification and document downloading features for UTP's E-learning require n installation of mini software at every user's computer [7]. But other suggesting using mobile phone is more effective ways for a notification system developed for Moodle.

2.3 MOBILE PHONE NOTIFICATION

The mobile notification system is better because a log analysis have been done and shows that users session just short, they only check any new events [1]. Mobile phone also other than notebook and PDA could be used and motivates the usage of interaction support system during and outside lecturer. By enabling such integrated system at those platforms, it gives the system more adaptability, recall and social ability [2]. Other than save time (by not constantly checking E-learning most of the time) mobile platform also can spare the overload LMS server [1].

However WAP technology is slow and costly for data transfer. Therefore there is a possibility to have email client code on mobile, due to its thin presentation layer. Therefore they are suggesting a rich mobile client prototype that have sophisticated function, usable, and provide storage capabilities. Their mobile architecture/system design used the J2ME as development platform, and an application on client side to build advanced function for security strategies. A database has been developed that support relational database engine in mobile devices, and online connection to remote database server. A special table data inside is for user to make request. To simplify, the architecture consist of a rich mobile client application, mobile cache table (in database server) and plug-in for Moodle.

Another suggestion talks about 'Extending Moodle to the Mobile On/Offline Scenario'. They suggest to create a special Moodle theme and CSS as software client in mobile devices that will store information locally when offline and sync with server on next online mode. Therefore they have developed a webservice interoperability layer that will extend the LMS. To customize the web browser services there is three architecture approaches: client-based, proxy-based and server-based and all of this will use the web caching tools or RSS feed readers. They are using J2ME as the first platform; it has Kilobyte Virtual Machine (KVM) technologies and an open development platform that independent from hardware & OS.

The platform also support database compared to J2SE/J2EE that is heavy for mobile. Their system used lightweight database called J2MEMicroDB which they have been developed. This system is built for Android phone usage [3].

2.4 SMS NOTIFICATION

Offline mode seems to be a better way of developing such notification system for Moodle. That has been the case at University of Bath, UK where they have been testing implementation of controlled SMS notification there. Tested using Moodletxt, an additional plug-in from Moodle that enable free SMS notification, from September 1st 2008 to February 20th 2009 a total of 1498 SMS notification for 6 projects has been sent and the results is outlined and discussed. Although initial uses are not as high as originally expected, and it is still early to identify the impact, there are some positive observations upon this project, whereas the problems also are being stated clearly. However, these technology does not been made available outside UK [12].

2.5 SOCIAL NETWORKING SITE AND WEB 2.0-BASED NOTIFICATION

Therefore, other aspect of research should be look for implementing a better notification system that suites UTP's environment. One research talks about the possibility of implementing of a classroom management solution (CMS) using Facebook. Facebook, by which has been proven to be addictive and becoming a trend worldwide, especially for college-aged students, surely would make them all spend most of their time everyday without much hesitation. Therefore some people are suggesting Facebook's functionality to be substituted and enhance from common CMS such as WebCt, BlackBoard and Moodle. This bold move has been based to the fact that students used the social networking site in such a consistent manner regardless with their study period and time for example late at night, weekends and even during holiday. Therefore what they do they used the Facebook Groups function and analyzed it to be considered for CMS usage purposes.

After realizing the importance of Facebook that students mostly used to keep up with the latest updates and news, this is suit with the aim for notification system where if given a situation where students being asked for to visit their online university course, it seems to be unsure whether if not all most of them will.

As they discussed in the paper it looks promising that such idea to be experimented about, as Facebook would be able to ease up the communication problems of online course management software, these functionalities should be retain if CMS are going to be migrate using Facebook; that is the discussion, group Email sending, update announcements and online forum. All in all, they are supportive of this idea as in term of library prospect it is very beneficial to implementing such idea [8]. Pepler et. al. [11] pointed out other things; Facebook deep linking features which are very good for notification system; it directly connects students to the content of the site, bypassing the homepage and all the advertisement in between through normal click. As Facebook is one of many Web 2.0 technologies available, is there going to be really major differences if such notification system is implementing Web 2.0 technology features?

A study has been carried out in China to look for usage of any Web 2.0 applications in the top universities libraries there. What they do, they look out and explore for any status or construction pattern usage of Web 2.0 technologies, functionalities and features for any universities there.

From their findings there have been some universities libraries that use such current technologies, and to be specific the OPAC 2.0 is the most popular utility that have been used; as 27 out of the 38 universities results tell. OPAC 2.0 is widely used due to the fact it is the main tool that provide a better and user-friendly search process for their library. Furthermore, OPAC is supported by local ILS vendors, web browser tool and text alert capabilities. Other functionality provided included tagging, book review and rating as well. After their research they are expecting that the universities libraries would look forward for social networking services (SNS) with instant messaging to be included to compliment their current technology.

Even though in the end they claim that China has been using and implementing the Web 2.0 technologies for their universities libraries, it could be still considered that the usage of it is still 'extremely underdeveloped' albeit for the most prestigious universities there [4].

Another finding from research being carried out about copyright concern triggered by Web 2.0 users are, it encourages sharing and joint-venture for the librarian usage to outreach and marketing their activities. Example of such activities is the tweets, by which the librarian use Twitter for publish any workshops, special events, study group information and other important announcements to the people.

The real-time instant messaging functionalities provided by Twitter make enable for just short announcements for events and services possible but towards large group of people. This will ensure any questions could be answered instantly through Web 2.0, without having to go to any office, anywhere like traditionally before. And many of their clients like their approach provided that they can communicate with one another also in real-time.

This shows that Web 2.0 can help build a community of library users as in this paper context, as they feel that they are becoming component of the website they are viewing. As with the fact that millions of social networking's users are accessing their pages every day, that is why the implementation of Web 2.0 services has increasing the number of their web users, in this prospect for their library [14]. The same goes for [6] where social media is the better medium for them to inform people of upcoming events and exhibitions for their museum. What they found out is that their approach seems to give a broader scope for communication, increase the number of people participating and join during discussion among the authority there. Their usage has had help develop and sustain a society that interested in museum. They hope the existence and activities for museum will continuously grow at each and every person or society there afterwards.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

For this study, the research methodology that is being used is the Rapid Application Development (RAD). RAD has been chosen because it is the most suitable one as it highlights the importance of finishing the research project in a short delivery time. Therefore during the first phase of project which focuses on study and second phase for critical analysis, via RAD it provides us with the appropriate guideline for this study to be done. Furthermore, the process of RAD is easy to understand and follow, plus it consists of prototyping cycles that enable for sample version for current UTP's E-Learning system to be installed and tested.

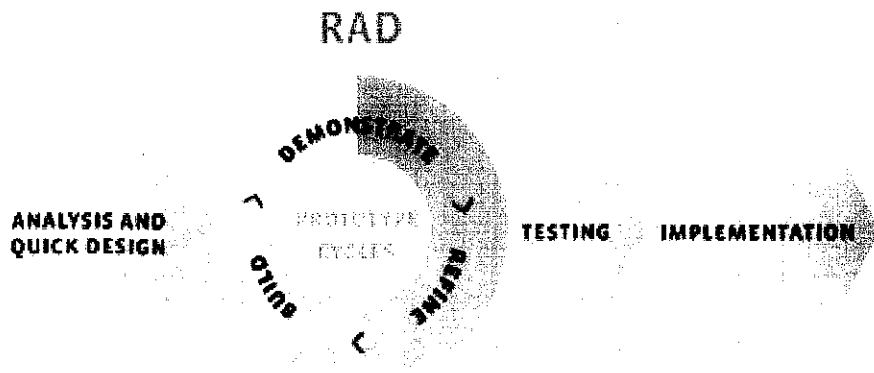


Figure 1 - Rapid Application Development (RAD) Process

The two distinctive key features, the critical analysis and continuous prototype testing of the sample E-Learning perhaps being combined with the exact student's perception study will be able to produce some proper insight and overview towards the current notification system and future recommendation.

3.2 ANALYSIS

The current UTP's E-Learning portal which is based on Moodle could be access via <http://E-learning.utp.edu.my>. Users such as lecturers and students will have to use their *Username* and *Password* that are acquired after successful registration in UTP, and made appropriate changes for the password later on. The portal is being maintained and handled by UTP's Information Technology Management Services (ITMS) department.

Appendix 1 displays the current UTP's E-Learning front page. There will be shown nine blocks that will be displayed at the left and right side of the page; *Login*, *Course categories*, *Navigation*, *Main menu*, *Activities*, *Recent activity*, *Latest news*, *Calendar*, and *Online users*. While at the center or main content of the page is *Important Announcement* and *Course categories*. Further analysis will be made according to blocks that is relevant with the notification system that is being developed; *Activities*, *Recent activity*, and *Latest news*.

3.2.1 Activities block

Activities block is a list that allows navigation between the different activities available in the courses. It can be set by administrator and consist of *Forums*, *Quizzes*, and *Assignments* and so on. This list will grow if there is a new activity that is available in each respective course. For every activity an icon will appear in this block representing that specific module. These icons will link to a list of all instances of that modules activity that appear throughout the course.

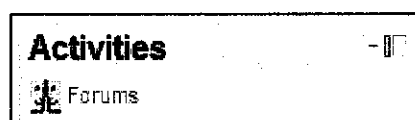


Figure 2 - Activities block

Figure 2 shows the current Activities block for UTP's E-learning site. At the front page and within every course, the activity that is only available is the Forums. When users click at the link, General Forums page will be load, shown at **Appendix 2**. The only thing that will be shown here is the Important Announcement link that will forward users to a page with a table that contain all the Discussion or announcement at the center-front page of E-learning, shown in **Appendix 3**.

3.2.2 Recent Activity blocks



Figure 3 – Recent activity block

The Recent Activity block will list down the course activity since the last user access into E-learning. Such activity is for example updated resources and activities, forum posts and assignment submissions. **Figure 3** for example shows that one new updates is available for users, and upon clicking, they will be forward to the message original location.

There will be also a '*Full report of recent activity...*' link that will show users the page that sums up all the updates that is available, also with filter function to track down previous updates. Example is given in the **Appendix 4**.

3.2.3 Latest News blocks

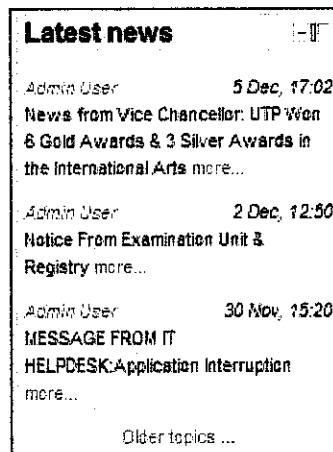


Figure 4 - Latest news block

Latest News block contains the recent posts made in the News forum, along with a link to older archived news. At the block, it will display several numbers of latest news that is being set by administrator. There will be also '*Older topics...*' link that will load page with same content as in **Appendix 3**.

3.3 QUICK DESIGN

To illustrate the current version of UTP's E-Learning, the Moodle version that will be tested and run is the Moodle 2.0. This prototype will be run at local server, and all of the study followed will be run based on this environment.

Currently, the notification system that is functioning in the UTP's E-Learning notably consist of three different types; the popup notification message, recent activities block and forum tracking notification. These are the most used notification and the one that is being enabled right now, but another notification that is the email notification also will be put into consideration for this study later on.

3.4 PROTOTYPE

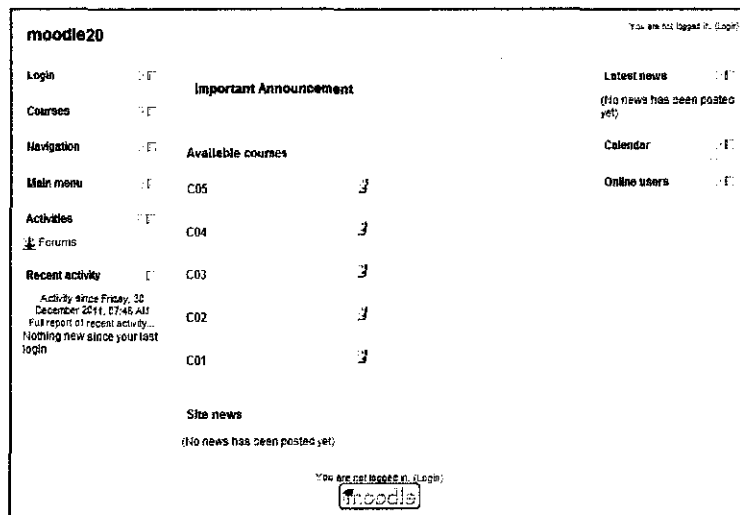


Figure 5 – Prototype E-Learning front page

As shown in **Figure 5**, the prototype version of UTP’s E-Learning portal will consist the same exact blocks that is available at the original UTP’s E-Learning. This is being enabled by administrator, and all of its behavior and functionalities will be the same as the original UTP’s E-Learning.

3.5 TESTING & IMPLEMENTATION

In this section later on, it will discuss about the four notifications system functionalities that have been mentioned before, and they will be tested using the prototype.

3.5.1 Popup notification messages

This notification is basically a popup messages that will be appear once at the front page after user successfully login into the E-Learning page. The popup will contain the information about the type of the notification that is either a courses content update or Chat messages. This functionality can be set to on or off by administrator the user itself at the messaging setting page by clicking at the tick box as shown in **Appendix 5**.

To show the flow of popup notification, an example can be seen in **Appendix 6** where it contains a set of pictures that depict this notification sequences.

3.5.2 Recent activities block

This notification block will contain all the new updates from user's last login activities but show only to its respective content only. As we can see from the **Appendix 7** the updates will appear according to their courses page only, even at the main page the updates that will appear will be the content of main page news or announcement.

3.5.3 Forum tracking notification

This notification as being shown in **Appendix 8** will be consist of counter messages that show the total number of forum messages that have not being read yet. The forum tracking therefore is only functioning for forum activities only.

3.5.4 Email notification

The email notification even though is not being used in UTP's E-Learning environment, it will be discuss also as it is a notification that is already available in Moodle. Later this functionality will be tested in detail.

We are going to use the Mercury mail server that is bundled with XAMPP as the mail server for this study as it is already available there. Mercury can act as an independent mail server that provides email services for us to send, read and write email. It will be using SMTP (Simple Mail Transfer Protocol) to send mails and POP3 (Post Office Protocol 3) to receive mails via Mozilla Thunderbird, an email client software. **Appendix 9** shows the location of Mercury at XAMPP control panel together with its administration page.

The Mercury mail server will be configured and there will be three different email accounts being set up; one depicting the administrator, and the other two as the users. The detail of the email account is being shown in **Appendix 10**.

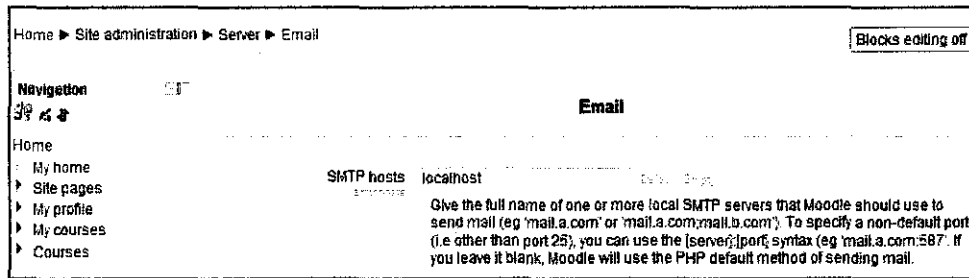


Figure 6 - Moodle Email setting

Figure 6 shows the Email setting page in Moodle 2.0. At *Site administration > Server > Email*, there will be a field that require SMTP hosts information. It will only require information about the SMTP as Moodle will only send notification via email; there is no receiving email by Moodle. For this study the field will be set to ‘localhost’.

As the prototype runs the Moodle Cron to trigger the updates check-up, it will send the email notification to our setup email accounts. At the email content, there will be a link that will redirect recipient to the exact location of the updates. This can be seen in **Appendix 11**.

3.6 TOOLS REQUIRED

The requirement to run this project is easily accessible and is very simple in nature as it hardware claims for Moodle installation would be [9]:

- Software web-server (XAMPP)
- PHP 4.1.0 or higher
- Database server (MySQL)
- LAN or any internet connectivity

CHAPTER 4

RESULTS & DISCUSSION

4.1 RESULTS

Based on research methodology that has been thoroughly being performed before, there has been several findings and output that is worth to discuss about. These end results from methodology process should best being put together with the simple survey that has been performed to study about users' interaction with UTP's E-learning notification system.

4.1.1 Survey

From 26 November until 30 November, a simple survey has been conducted towards students of UTP. As the user of E-learning, the questionnaire simply asks about their experience and observation of UTP's E-learning. A total number of 52 answers were collected, and all of the question and distribution of respondent answer is being shown in **Appendix 15**.

The questions ranging from the rating of UTP's E-learning, current notification system, and usage of it to the student's opinion and usage or time spent on the internet and opening UTP's E-learning. The question will be clarified and be divided into three categories.

First the questions will be categorized as the one that asked about the significance of E-learning portal towards students. It consists of five different questions from number one to five. First two questions asked them about their perception of E-learning importance for UTP students and themselves personally.

These questions intended to know how much difference students will rate for E-learning role that it plays towards whole students against themselves. From these two comparisons, we can later get to further discussion and analyze. Next they will be asked with general question of whether they think E-learning had helped them in their study or not. The question wanted to know at how much rating students will give on their previous experience up to now of using E-learning, that the impact it have on their studies performances generally. Next question asked students if UTP E-learning had been used other than these three types; uploaded materials, news update and forum discussion. It tried to acquire information on whether students agree or not of these activities or resources that claimed to be as the one that had only be used. While the last question asked about the possibility of students facing problem if at any chance they missed out E-learning updates, like lowering their results score.

Second category of the questions will be related to UTP's E-learning notification system itself, consisting of ten questions. First question asked directly on whether there would be alert on every new uploaded material in current UTP's E-learning (within less than two days). The second question asked about alert of new news updates or forum posts. Both questions tried to get the exact picture of current notification system, and each one will be compared on how the students will rate them. The third question is where students will be asked about their opinion of current notification system. They will have to rate what they think about the quality of it; which refer to its functionality, ease of use and per se. This question will be compared against next question that have same question except it is based on overall UTP's E-learning changes. The later comparison will give some rough idea about student's opinion of both updates.

There will be three questions that touch about the component or functionality that is available by Moodle E-learning. The component mention is several numbers of resources or activities that were most familiar in UTP's E-learning previous version. There are nine of them; News Forum (Discussion & reply), File, Folder, Label (Any text messages), Assignment (E-learning submission), Chat, Glossary, Quiz and Survey.

Students will have to rate on each and every nine components based on three requirements; their familiarity with it, their level of importance and on how frequent they have been used by choosing answer from 1 as the lowest rate up to 5 the highest.

The eighth, ninth and tenth question were a general question on students opinion with regards of the notification system and their needs for improvements, as well as previous problem that they have or never encountered about it.

For the third category of questions, it basically wants to figure out the pattern and behavior of students towards E-learning portal. There is six of question, the first was asking about student's behavior on how they would find the study materials and resources for every semester. This is the only open-ended question here, with set of choices is between Wait for uploaded file in E-learning, Copy in class, Asks senior/friends that has taken the courses, and search on internet. Four other answers is about IRC and Google groups. Next questions were asking their opinion regarding the interaction between Students and Lecturers in E-learning, as well as the interaction between students. The intention of this question is basically to directly know the rating for each ones, and how the situation has been like for previous E-learning version. Lastly, there were three different questions that being asked to get know on amount of hours that students had been spending being online, surfing the social media as well as on time spent at UTP's E-learning.

4.2 DISCUSSION

With regards to the prototype of notification block system being discussed previously, some observations and arguments worth pointed out in this section for the future improvement.

4.2.1 User's Perception

After the thorough critical analysis of the survey question before, this section will discuss on the outcome or survey results that are important and have some significance contribution towards this study. They will be consists of nine questions, and each one will be shown in a diagram.

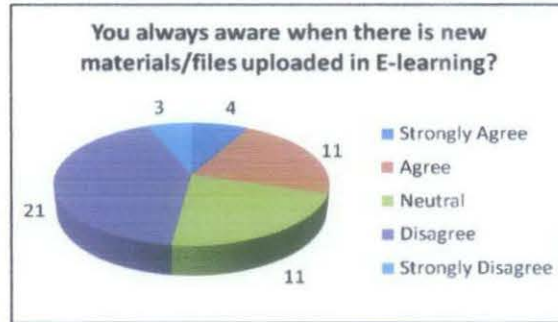


Figure 7 – Student's awareness of uploaded materials

Figure 7 shows the graph for students answer for the question regarding students' awareness of the uploaded material and new news or forum discussion. The pie graph shows that the most selected answer is 'Strongly Disagree' with 21, while 11 of them answered 'Disagree' and 'Neutral' for each. This clearly shows that the majority of them (about 40% choose Strongly Disagree alone) are not agree with the statement, thus implying that they are not always alert on new updates from UTP's E-learning.

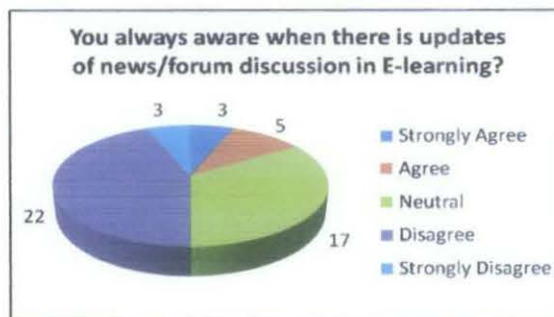


Figure 8 – Student's awareness of new forum post/discussion

Another question that asked about students' level of awareness on new news or forum discussions is depicted in **Figure 8**. A total of 22 students answered 'Strongly Disagree', 17 with 'Disagree' and five of them chose 'Neutral'. Both two tops selected answers in total will consist of 75% students' altogether. From both findings, we can say that clearly students don't seem to always be aware of any new updates or forum discussions/reply from the E-learning portal. From both questions it is safe to say that the exact situation in UTP is that students do not always be alert on any new updates or notification from E-Learning, and by this it clearly shows that there is no form of notification system that is effective enough to reach students for the past few years.

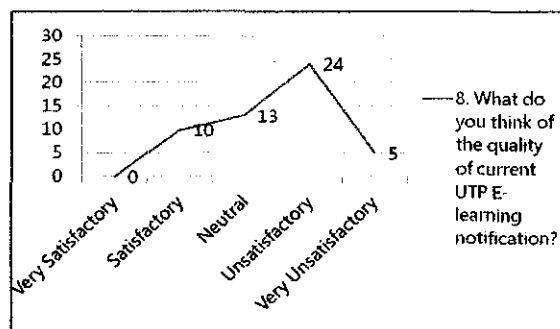


Figure 9 – Student's rating for current notification system

Next, **Figure 9** shows the distribution for students' opinion regarding the quality of current notification system for E-learning. The highest answer selected was 'Unsatisfactory' with 24, while the second highest is 'Neutral' with 13. It is followed by 'Satisfactory' with 10. From this question it tells that the rating given for the current notification is roughly not very satisfactory for students. Therefore, there is a need for improvement of the current notification system given the fact that this question is very direct in nature.

After previous finding regarding rating of current notification system, the results will be compared with this next question that asked students to rate but towards the overall improvement of UTP's E-learning portal. The results is depicted in **Figure 10**, which shows that majority choose 'Neutral' as their answer with 17, the second is 'Unsatisfactory' with 16, and the third is 'Satisfactory' with 15.

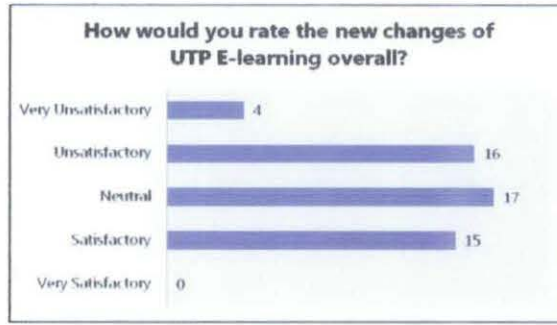


Figure 10 – Student’s rating for overall UTP’s E-Learning changes

For this question, the distributions of answers collected are almost fair between the three mention answers. However, when put in percentage it shows that 33% answered ‘Neutral’, followed by 31% for ‘Unsatisfactory’ and 29% for ‘Satisfactory’. Hence it can be concluded that the students are having no problem with the current E-learning in totality. Compared with students rating for current notification system, it is very clear that the changes of new notification have not been very pleasant to student’s requirements or satisfaction so far.

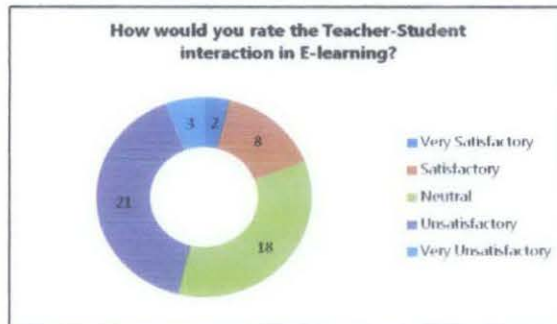


Figure 11 – Student’s rate for Teacher-Student interaction

Subsequently let see the students rating on the interaction level of E-learning users. One question regarding the teacher and students interaction from what the students have observed and experienced shows that the majority had chose ‘Unsatisfactory’ with 21 of them, followed by ‘Neutral’ with 18 and ‘Satisfactory’ with 8 voters. This as depicted in **Figure 11** shows that almost the same ranking of answers had been selected by student with another question that ask about the level of interaction among students as in **Figure 12**.

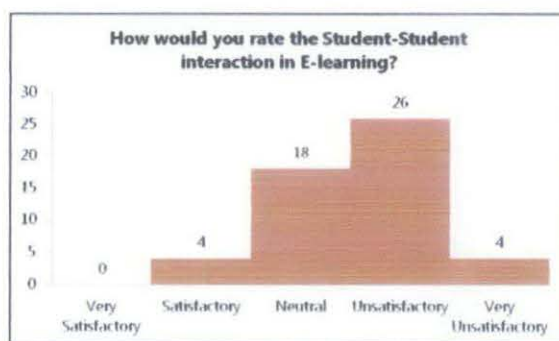


Figure 12 – Student’s rate for interaction between students

If being put in number the majority had chose ‘Unsatisfactory’ with 26, followed by ‘Neutral’ with 18 and ‘Satisfactory’ and ‘Very Unsatisfactory’ with four answers each. From these two questions it is obvious that according to students they are not very satisfied when it comes to the interaction between E-learning users; be it among students or between them and their respective teachers.

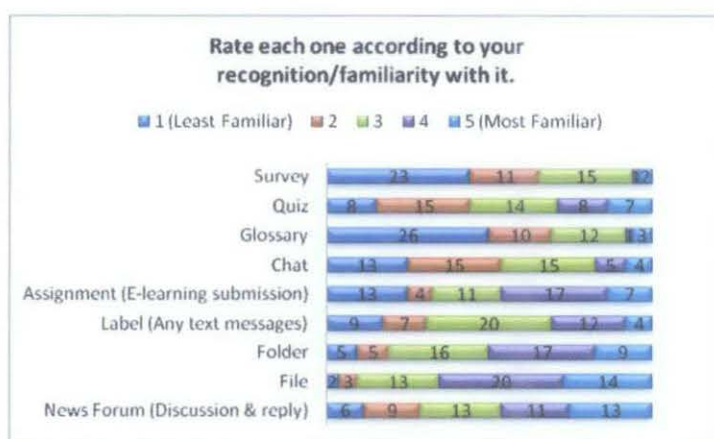


Figure 13 – Rate for student’s familiarity with activity/resources

The following three questions will asks about student opinion on different type of resources and activities in term of their level of recognition/familiarity with it, level of importance and frequency of usage. First, when being ask about students familiarity of these nine different resources and activities, as depicted in **Figure 13**, the appropriate analysis should be about its rank of how many answer is above the average. Therefore, when combining rating for ‘5’ (Most familiar) and ‘4’ (Familiar), the highest answer is File with 34, followed by Folder with 26, and News forum (Discussion & reply) that has the same tally with Assignment (E-Learning submission) with 24 rating.

According to the rank, it is not surprising to see that students is more familiar with File and Folder as that is the most shared material from lecturers to students in UTP's E-Learning. News forum also is vastly being used by the students and hence it is the next highest rated. However, the submission of Assignment via E-Learning as the third/fourth highest is a surprising result due to the fact that most lecturers will asks for submission in class or at their office.

This can be said that students has been misinterpret or confuse with the statement of 'E-Learning submission' that refer to the functionality of uploading file in E-Learning to submit for lecturers with the assignment submission information that they get from E-Learning.

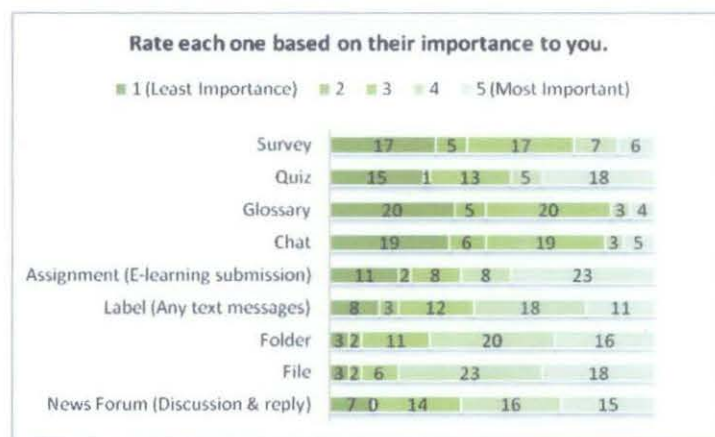


Figure 14 - Rate of importance level for activity/resources

For rating of their importance level towards students, File had the most highest above average rate with 41, and Folder is the second highest with 36, followed by News forum (Discussion & reply) with 31 and Label (Any text messages) that has 29 rate. From this, it clearly shows that students put high emphasis for these four activities due to their usefulness and benefit that they had gained from previous experience.

From the lowest rank point of view, Glossary and Chat both received only a total rate of seven and eight, followed by Survey with 13.

This, needless to say is the least significance activities that students had rate and therefore means should not be notified for them. Bear in mind that Chat has notification functionality that is the popup notification messages, but only receiving a lower number of rate. This indicates that the Chat functionality is rarely being used by students.

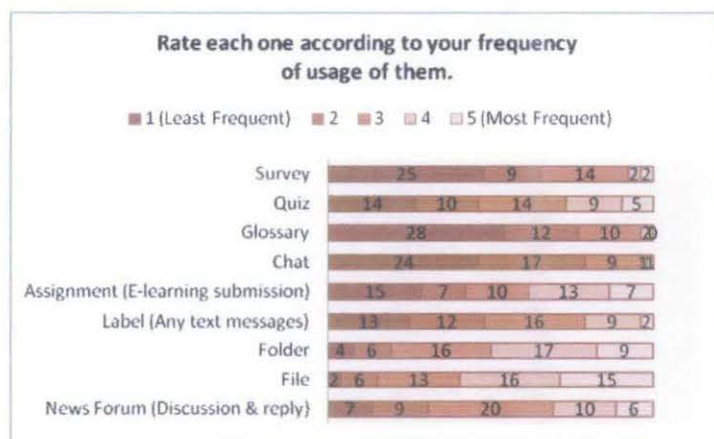


Figure 15 - Rate for student's usage of activity/resources

For rating in term of students frequency of usages for all of these activities, the top four above average rank is File with 31, Folder with 26, Assignment (E-Learning submission) with 20 and News forum (Discussion & reply) with 16. As have been explained before the File, Folder and News forum (Discussion & reply) activities is in fact very widely used in UTP's E-Learning. However, again the submission of Assignment via E-Learning as the third highest is also a surprised results. Therefore the appropriate explanation should be students misinterpretation with the statement of 'E-Learning submission' that refer to the functionality of uploading file in E-Learning to submit for lecturers with the assignment submission information that they get from E-Learning.

It also can be seen that the lowest received rate consist of Glossary, Chat, Survey and Survey. This pattern show almost the same results as the previous question, hence proved the students relevancy of answering this questions.

From this, we can derive that the unsatisfactory of students towards level of interaction is largely due to the ineffective notification system that could ease the communication gap between teacher and students in E-learning and encourage them to use it for their own benefits.

There could be another assumption that the teacher or students are simply lack of interest or knowledge on how to use the notification system, however this could also be the result of the already said causes.

4.2.2 Notification block

There is a Moodle plug-in website that is available for anyone to use, distribute or comment at <http://moodle.org/plugins/browse.php?list=category&id=2>. There we can search and see for any shared plug-in for any version, as for this study there is a notification block called *Unanswered Discussions* developed by Michael de Raadt, a lecturer at the University of Southern Queensland, Australia. This block is generally a new notification block that will update user about any forum post/discussions from them that has not been answered yet. To put it simply, the notification will update user about forum discussions that have '0' replies.

As being shown in **Appendix 12 & Appendix 13**, the Unanswered Discussions block will list down the notification in its content in sequence manner. The notification content will show the hyperlink title of the unanswered discussions that upon click will jump into the forum discussions page content. Below it the date and time of the discussions is also shown.

The reason of discussing this Unanswered Discussion block is due to its potential to be enhanced and upgraded into a better notification block that will show updates in synchronized, timely and user-friendly ways. As compared to recent activities block, this plug-in has better interface design and in term of coding-wise is better to be altered (because it is a plug-in) so it can show all of the forum updates and their replies for every course that is available.

4.2.3 Email notification

As being shown before, the email notification is running perfectly using the prototype. However, in real UTP's E-Learning environment, no email notification is being used, therefore lead to this discussion of whether it is possible to implement the email notification using live server. For that purposes, an update notification will be triggered from the local server Moodle E-learning to be sent at a chosen mail services, for example Yahoo! Singapore email provider.

With email services such as Yahoo!, we are given a mailbox access directly from the web for free. However, email notification functionality that is provided in Moodle is only to send mail. Therefore, at the email settings, it only has SMTP hosts like displayed in **Figure 6**.

SMTP in simple terms is used by mail servers so they can work out the correct routes to ensure messages reach their intended recipients. Thus, to test whether there is email notification from local server Moodle to Yahoo!, we need to configure the SMTP hosts with outgoing mail servers of Yahoo!.

The reason of choosing Yahoo! Singapore is because it provides a free POP access & forwarding functionality for sending and receiving email between mail client software and local server, unlike the regular free Yahoo! account that will require a subscriptions and payments to enable it. Thus, set the SMTP hosts as yahoo.com.sg, username is the user's Yahoo! Mail address and the password is the same as for webmail access. After we run the Moodle Cron script, we can see that in our local email client software (Mozilla Thunderbird), that the notification will be send successfully.

We also can check from our live server Yahoo! Singapore account, that the email notification has been received also as depicted in **Appendix 14**. From the received email, the message content will display the same content as previously tested, and upon click, the respected page will be load accordingly. Example of the message can be seen in **Figure 16**.



Figure 16 - Email services (Yahoo! Singapore) received notification

CHAPTER 5

CONCLUSION & RECOMMENDATION

5.1 CONCLUSION

In this paper, the extended research and studies of various existing notification function of Moodle LMS has been carried out, in addition with the investigation of what is the nature of usage and implementation of Moodle here in UTP. Based on personal observation and experience of using UTP's E-Learning, together with feedback or discussion from the colleagues, all of the underlying problems and possible improvement of Moodle exclusively in term of UTP's environment is hopefully would help students to cater their study needs with the extracurricular activities. With the current academic structure changes effectively for all batches of students starting January 2011, it is to be expected that all students will be more busy and conscious about time management and allocation and therefore with the advancement of their E-Learning portal system, would bring about if not more little help upon them.

5.2 RECOMMENDATION

After thorough study and critical thinking, here are some recommendations worth pointed out:

- The notification block should be enhanced and upgraded that could show all content update into one block within any pages.
- The email notification should be implemented and used extensively, and students should be informed about how to use it.

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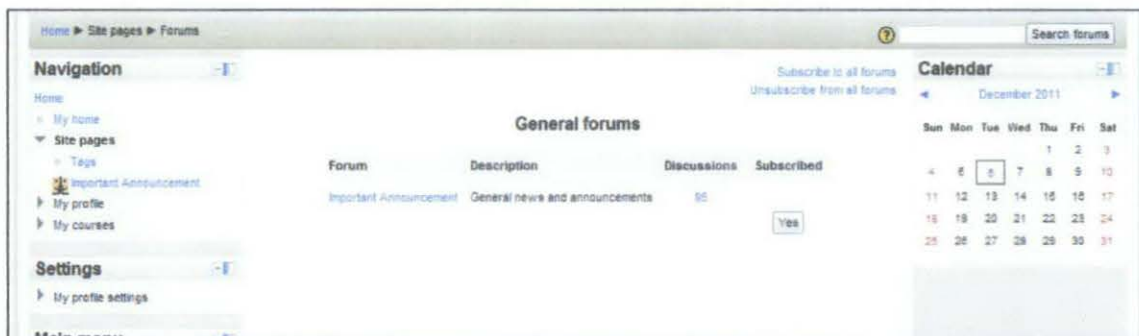
APPENDIX

The screenshot displays the Moodle front page for UTP. At the top, there are logos for 'UNIVERSITI TEKNOLOGI PETRONAS', 'eLearning', and 'moodle'. A banner image shows students in a classroom. The page is divided into several sections:

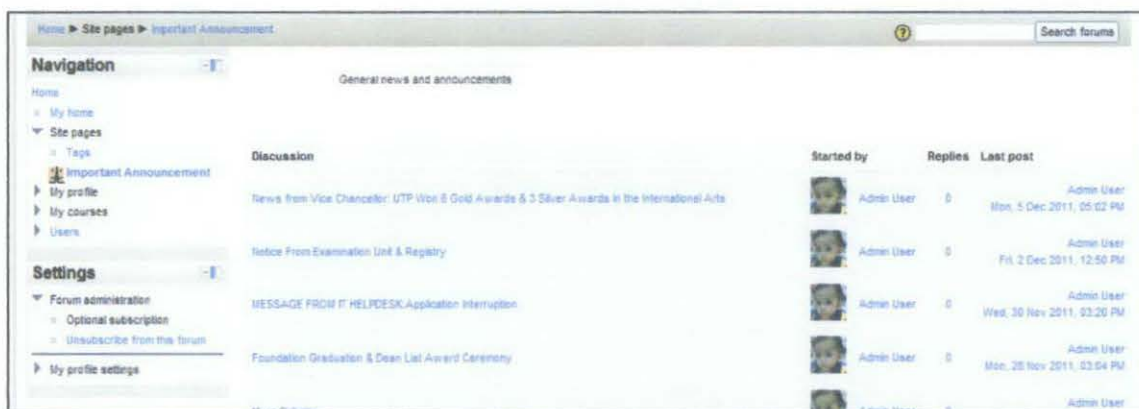
- Left sidebar:** Contains navigation links for Login, Course categories, Navigation, Main menu, Activities (with a sub-link for Forums), and Recent activity (showing activity since Sunday, 4 December 2011, 01:20 AM).
- Important Announcement:** Features a news item titled "News from Vice Chancellor: UTP Won 6 Gold Awards & 3 Silver Awards in the International Arts" by Admin User on Monday, 5 December 2011, 05:02 PM. The announcement details the group's success at the 21st Century International Arts Festival and lists objectives such as promoting arts internationally and providing a platform for talent.
- Latest news:** Lists recent news items, including "News from Vice Chancellor: UTP Won 6 Gold Awards & 3 Silver Awards in the International Arts" and "Notice From Examination Unit & Registry".
- Calendar and Online users:** Sections for the calendar and online users are visible on the right side.
- Course categories:** A list of course categories is provided, including "E-Learning For Staff (1)", "Master of Science (MSc) in Petroleum Engineering (1)", "Computer & Information Sciences (45)", "Chemical Engineering (27)", "Portal for Integrated Student Management System (PRISM) References (1)", "E-learning References (1)", "Latest News from Vice Chancellor (3)", and "Miscellaneous (4)".
- Search:** A search bar for courses is located at the bottom of the main content area.

The page footer includes the Moodle logo and a login status indicator: "You are not logged in. (Login)".

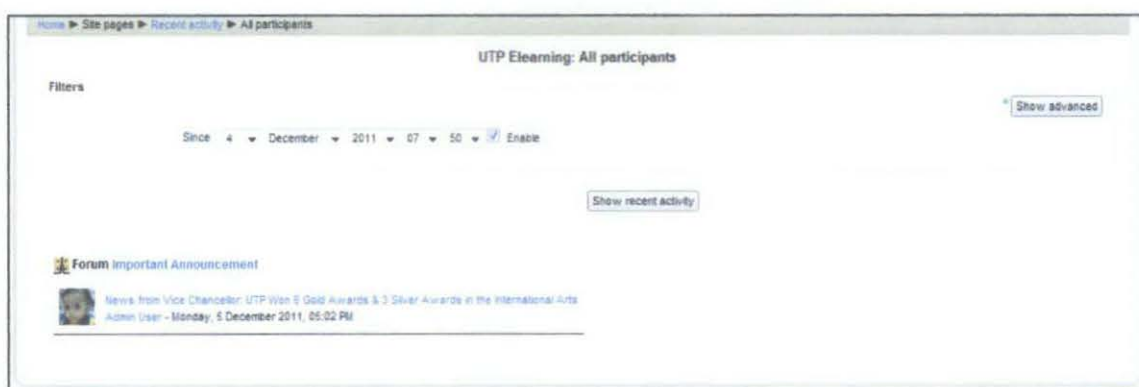
Appendix 1 – UTP's E-Learning front page



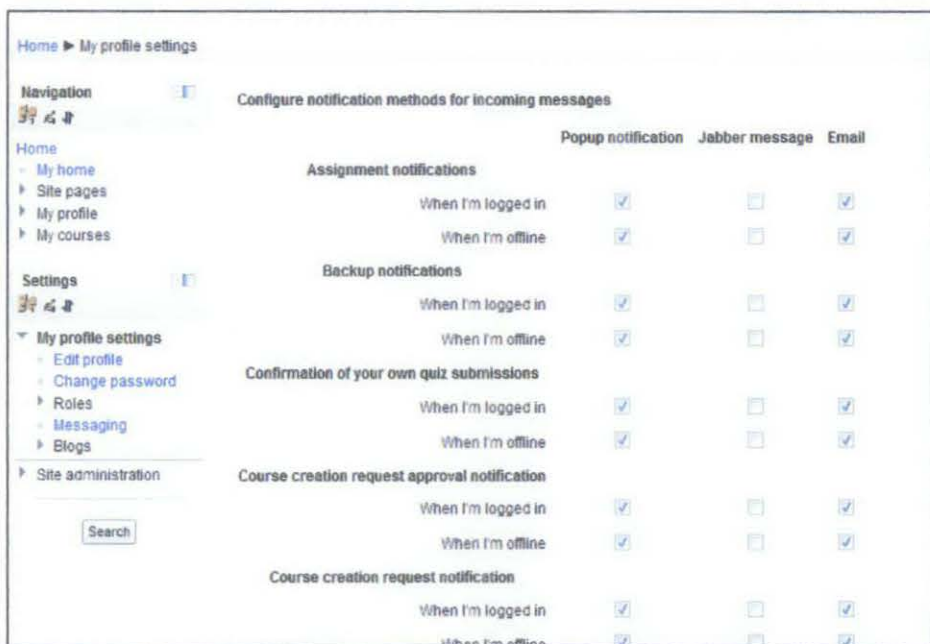
Appendix 2 – Activities block: Forum clicked



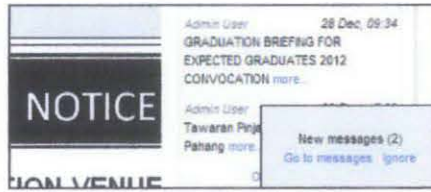
Appendix 3 – Activities block: Lists Forum



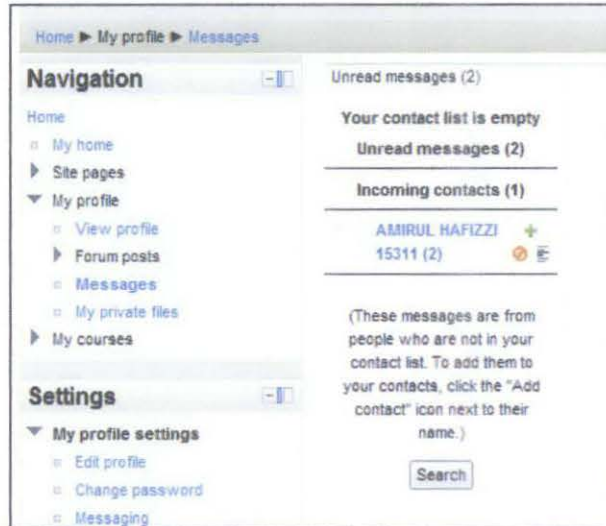
Appendix 4 – Recent Activity block: Lists All



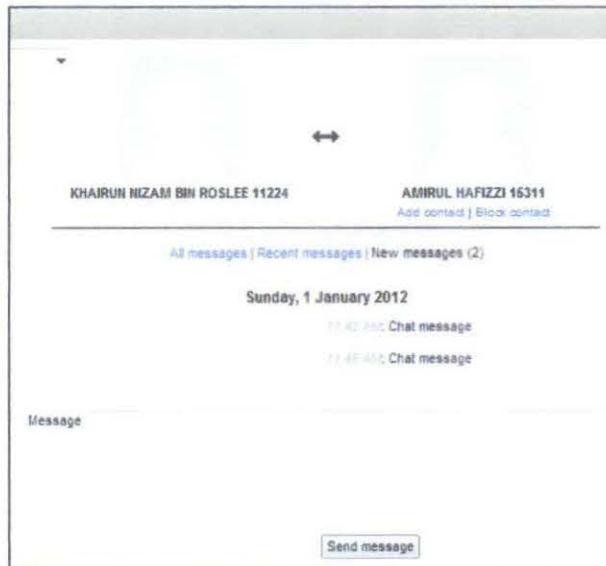
Appendix 5 – Popup notification messaging setting



(i)



(ii)



(iii)

Appendix 6 – Popup notification flow of sequence

C01

Home ► My courses ► C01

Recent activity	Topic outline
Activity since Sunday, 1 January 2012, 05:33 PM Full report of recent activity... Nothing new since your last login	News forum 1
Unanswered Discussions	2
Your Discussions	3
C01 new topic 1	

C02

Home ► My courses ► C02

Recent activity	Topic outline
Activity since Sunday, 1 January 2012, 05:32 PM Full report of recent activity...	News forum
New forum posts:	1
Admin istrator 1 Jan, 22:41 "C02 New topic"	C02 Forum extra
Unanswered Discussions	2

C03

Home ► My courses ► C03

Recent activity	Weekly outline
Activity since Sunday, 1 January 2012, 05:24 PM Full report of recent activity...	News forum
Course updates:	1 December - 7 Decemb
Added File: C03 File name 1	C03 File name 1
Added File: C03 File name 2	C03 File name 2
	8 December - 14 Decem

C04

Home ► My courses ► C04

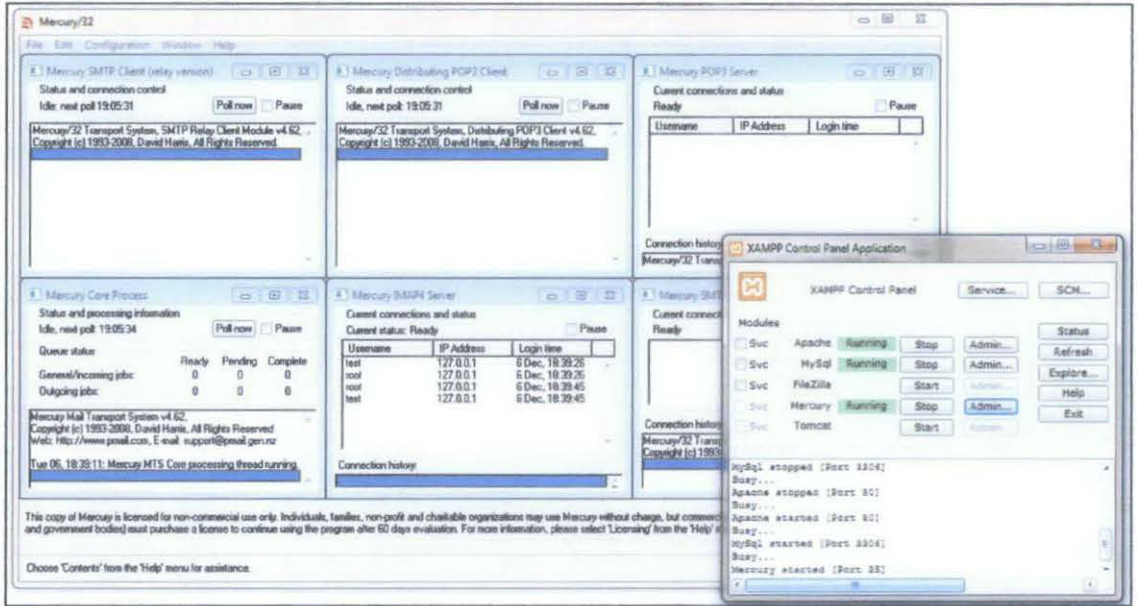
Recent activity	Topic outline
Activity since Sunday, 1 January 2012, 05:24 PM Full report of recent activity...	News forum
Course updates:	1
Added File: File name 1	File name 1
Unanswered Discussions	2

Appendix 7 – Recent activity exclusive content

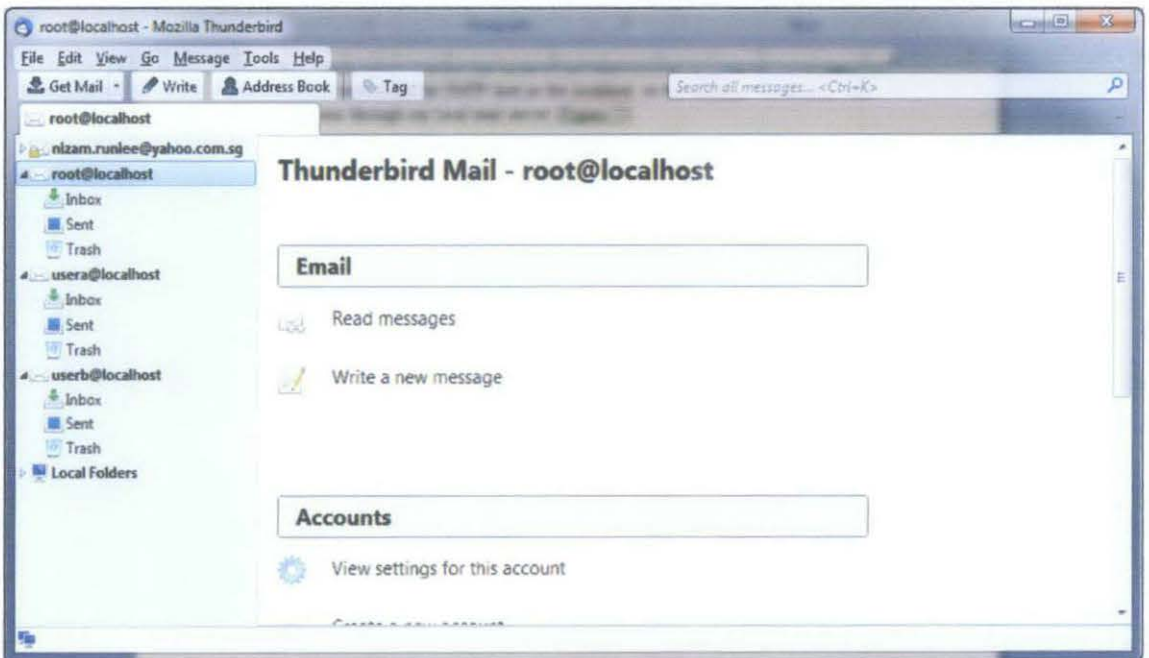
Home ► My courses ► C01

Navigation	Topic outline
Home - My home ► Site pages ► My profile ▼ My courses	News forum unread posts 1

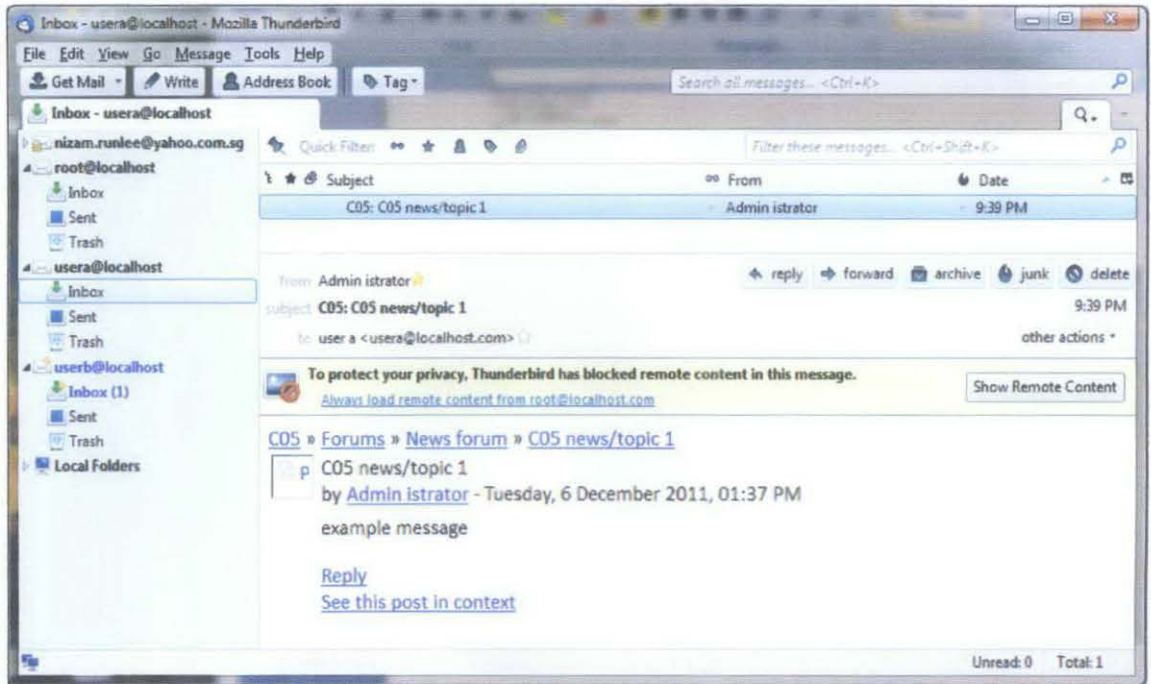
Appendix 8 – Forum tracking notification



Appendix 9 – Mercury Mail Server: Location and Administration Page



Appendix 10 – Mozilla Thunderbird with sample email account



Appendix 11 – Email Notification Content



Appendix 12 – Unanswered discussions block

Discussion	Started by	Replies	Unread ✓	Last post
C01 new topic 2	Admin istrator	0	0	Admin istrator Sun, 1 Jan 2012, 05:33 PM
C01 new topic 1	Admin istrator	0	0	Admin istrator Sun, 1 Jan 2012, 05:25 PM

Appendix 13 – The block content is the ‘zero’ replies discussion

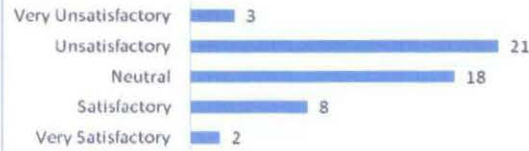


Appendix 14 – Email services (Yahoo! Singapore) received notification

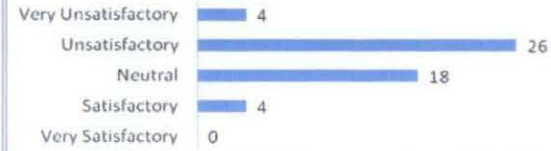


(i)

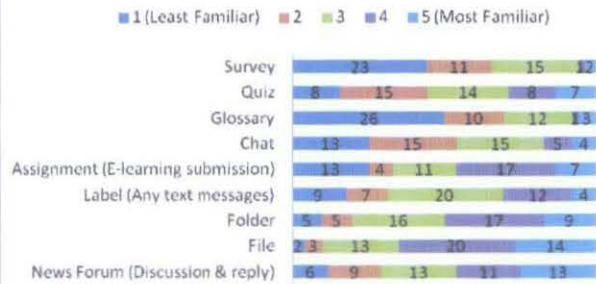
10. How would you rate the Teacher-Student interaction in E-learning?



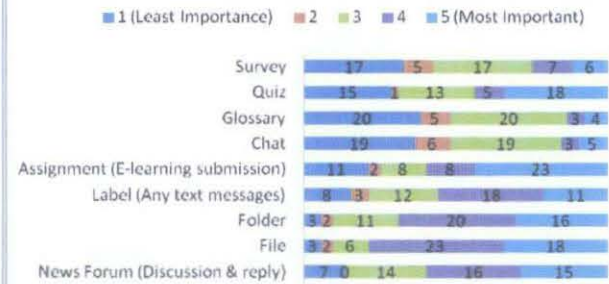
11. How would you rate the Student-Student interaction in E-learning?



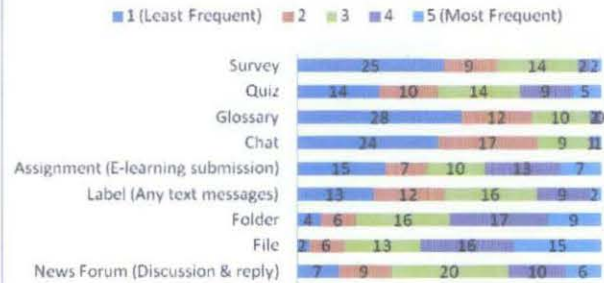
12. Rate each one according to your recognition/familiarity with it.



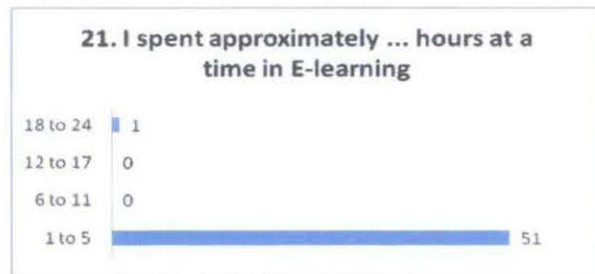
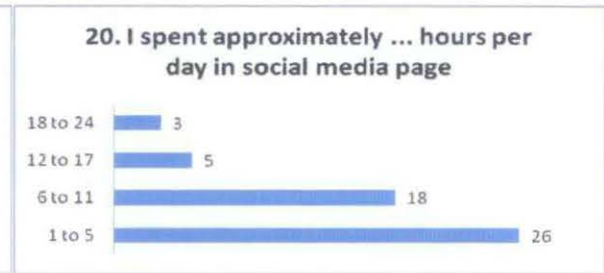
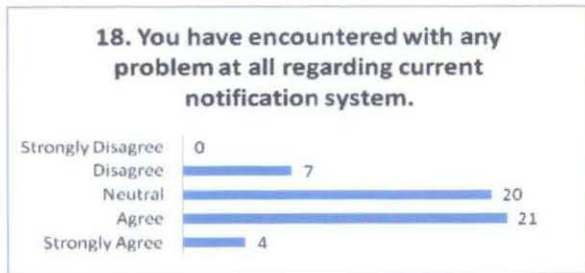
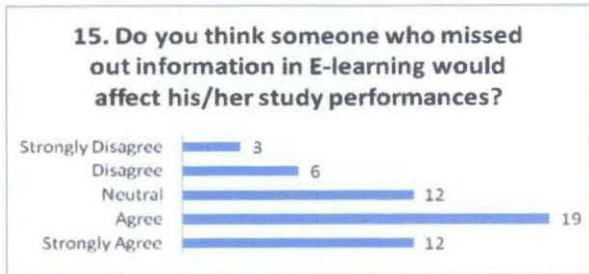
13. Rate each one based on their importance to you.



14. Rate each one according to your frequency of usage of them.



(ii)



(iii)

Appendix 15 – Survey