Automated Education Progress Monitoring & Analytical System

By

Mahendran Balakrishnan

Dissertation submitted in partial fulfilment of
the requirements for the
Bachelor of Technology (Hons)
(Information and Communication Technology)

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Universiti Teknologi PETRONAS
Bandar Seri Iskandar
31750 Tronoh
Perak Darul Ridzuan

CERTIFICATION OF APPROVAL

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A project dissertation submitted to the
Computer and Information Science Programme
Universiti Teknologi PETRONAS
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Approved by,

_____
(MRS. NAZLEENI SAMIHA HARON)

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
January 2006

CERTIFICATION OF ORIGINALITY

Automated Education Progress Monitoring & Analytical System

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.

MAHENDRAN A/L BALAKRISHNAN

Abstract

Education is an important element in any society, and this is delivered through schooling system. In Malaysia, public schooling system is divided into two parts, the elementary primary school and secondary school. With the increase in the number of intake every year, in makes it harder for the educators to monitor the progress of their own student. Work load of teachers are heavier and they spent more time doing administrative job rather than the actual tutoring task. In order to help ease the growing number of pupil and the task related with education system, a student monitoring system must be implemented. Automated monitoring and reporting system will be capable of handling the growing demand by guardians of the students, and will give a better and error free reporting and analytical view for the administration of the school. This proposed automated education progress monitoring system will be implemented in primary schools, and will be handled by an administrator. The teachers would simply enter all related data that they have and let the system come out with its analytical reporting based on the data fed. It will consist of two major functions, one is for administrators and teachers to input data, and the other is an online reporting tool that would enable teachers and parents to view the progress of their children. Therefore, the proposed automated system will be able to handle the growing numbers and problems related to monitoring pupil by the school.

ACKNOWLEDGEMENT

First and foremost, I wish to thank my family members for their great support and understanding given to me. I realize that I actually carry their trust and hope for a better future. A note of thanks to my supervisor, Miss Nazleeni Samiha, who gave tremendous support and guidance throughout the project. Without her advices and helps, this project may not be able to be completed within the given timeline. I would also like to thank other lecturers especially from the CIS Department who contributed to this project directly and indirectly with their knowledge sharing and guidance.

I would like to express my deepest gratitude to the teachers of the schools that I carried out surveys and user acceptance test.

Last but not least, I would like to thank all my friends for the help and support they lend to me throughout the period of this project. They are the one who stood by me during the many challenging times and with their feedback and suggestions I manage to achieve what I have.

Table of Contents

1.0 Introduction

In any nation that thrives to develop and be on par with the ever changing and demanding global platform, education plays the key role. Only when one educates oneself will one be able to climb the ladders of success. In Malaysia particularly, 1/3 of the nation's annual budget allocation is poured into the education sector and this portrays the Government's continuous effort in improving the people's standard.

In recent years, more and more emphasize was given to the character building of schools either of the national (SK) or the national type schools (SJK). More schools are being built as an anticipation of more student intake. The standard of the syllabus increases as well and more pressure is asserted on both the teachers and pupil.

While the education sector grows, the task of monitoring and keeping tab of the quality and progress of the students is becoming more of a burden and a hassle for the tutors and administrators.

With that in mind, this system is proposed to cater the ever growing needs and demands of the education sector.

The idea of having a progress monitoring and reporting system in schools came after a short social trip to a primary school in Kuala Lumpur. The educators there had to spend more working hours on doing paper works and this reduces their concentration level on the core function of being a teacher; to teach pupil.

1.1 Problem Statement

Currently all record keeping and progress tracking in the public education institutions are done manually by the teachers. It is not only a hassle but also time consuming for a detailed report. It is thus proposed to implement automated system to keep track of the school's achievements and progress development.

1.2 Objective of Study

Develop a reporting system that can not only keep track of every student's progress development and achievements, but also gives an overview of the subjects and classroom progress and use it to bench mark the school's current status in academic achievement.

- To automate the process of progress monitoring
- To create a system that will generate automated analytical reporting to teachers, parents and the students based on results

1.3 Background of Study:

In a primary school in Bangsar, during a short survey trip, this author had to chance to go through the administration of the daily schooling system.

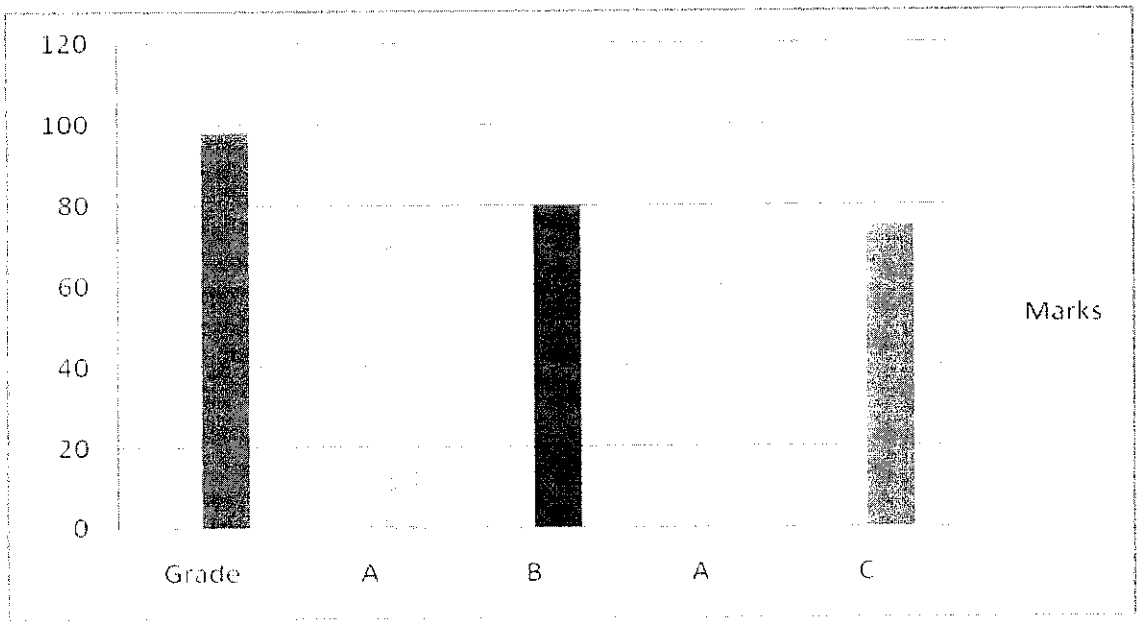
The school ordered all the teachers of each subject to keep a record of each monthly test and the bi-annual examination.

For instance, for the subject of Science Standard 4, for that particular year, there are 4 monthly test and a mid-year examination. On top of that, a class may have 35 students. The teachers are responsible to keep record of the monthly test's marks and profile it according to student's individual record and according to the test papers, match it with the subject and make a report based on the results. A detailed study will be done to show how many the students fared in the monthly test and the examination for each subjects.

Student Name	Sci January Test		Sci February Test		Sci March Test		Sci Exam	
	Marks	Grade	Marks	Grade	Marks	Grade	Marks	Grade
Amir	98	A	90	A	84	A	80	A
Samy	70	B	77	B	80	A	85	A
Chong	80	A	80	A	80	A	76	B
Johny	60	C	65	B	70	B	70	B
Abbas	75	B	85	B	82	A	73	B

From this manually done profiling, the teachers can deduce the following

1. Most students showed improvement overtime for the subject
2. March test recorded the highest improvement and marks
3. Each student can see how they fared for each of the test.



This would enable the teachers to better understand the needs of the students, to know on which sub-topic the pupils are weak in and to narrow down the focus group and revision exercises.

However the hassle of coming up with such reports in piles of papers and manually done tracking is simply putting a toll on the educators. Most of the office time is spend on such paper work that it turns out to be a burden for the teachers. Even though the monitoring process is done by profiling categorically, it is seldom used back for a thorough analysis mainly due to the work done manually. It will take days to do a full comparison of each student for few monthly test and different subjects.

1.4 Progress Monitoring

The proposed progress monitoring system and automated analytical reporting system is to keep tab of the student's education progress and the overall marking and standing.

Progress monitoring is a scientifically based practice that is used to assess students' academic performance and evaluate the effectiveness of instruction. Progress monitoring can be implemented with individual students or an entire class. **[10]**

What are the benefits of progress monitoring?

When progress monitoring is implemented correctly, the benefits are great for everyone involved. Some benefits include:

- accelerated learning because students are receiving more appropriate instruction;
- more informed instructional decisions;
- documentation of student progress for accountability purposes;
- more efficient communication with families and other professionals about students' progress;
- higher expectations for students by teachers; and
- fewer Special Education referrals.

Overall, the use of progress monitoring results in more efficient and appropriately targeted instructional techniques and goals, which together, move all students to faster attainment of important state standards of achievement.

According to researches done by National Center on Student Progress Monitoring, there are many proven facts that doing an automated progress monitoring will benefit directly the students and their education.

A research done by Dr. Lynn Fuchs of Vanderbilt University and Dr. Ingrid Oxaal of the Office of Special Education Programs shows the difference in normal traditional learning method versus the new progress monitoring system. **[13]**

2.0 Literature Review and/or Theory

Research has demonstrated that when teachers use student progress monitoring, students learn more, teacher decision making improves, and students become more aware of their own performance. **[12]** A significant body of research conducted over the past 30 years has shown this method to be a reliable and valid predictor of subsequent performance on a variety of outcome measures, and thus useful for a wide range of instructional decisions.

Although student progress monitoring (then called 'curriculum-based measurement') was initially developed to assess the growth in basic skills of special education students, specific research has validated the predictive use of this method in early literacy programs **(Good, Simmons, & Kameenui, 2001)** and in the identification of general education students at risk for academic failure **(Deno, 2003).** In addition, some evidence shows the reliability and validity of student progress monitoring procedures in evaluating the progress of English language learners **(Baker & Good, 1995).**

Students' performance in early education level should be a concern not only to the academics and educators, but also to the whole society and nation. It is said to be the "starting point" in the supply chain for the labor market **(Alfan and Othman, 2005)**. Therefore, information systems can be used as a catalyst to accelerate student performance, especially in the context of primary education as technological advancements enable systems to be created so as to facilitate automated processes to replace the previous manually performed tasks.

[13] Fuchs and Fuchs conducted an analysis of research on student progress monitoring that considered only experimental, controlled studies. These researchers concluded that

> When teachers use systematic progress monitoring to track their students' progress in reading, mathematics, or spelling, they are better able to identify students in need of additional or different forms of instruction, they design stronger instructional programs, and their students achieve better.

Here, the system is being proposed as a solution that can aid students track their examination results and be used as a tool to aid performance management

2.1 IN MALAYSIA

2.1.1 Ministry's call

On 29th of July 2008, Deputy Education Minister Datuk Noh Omar told reporters that the government is encouraging the creating and setting up of online student track record, which will be beneficiary for all the parties involved. (**Appendix 1-1**) **[16]**

He had hoped that the online systems would help parents monitor their respective children's academic performance and conduct in school. This shows the Government's stand on improving the education sector and schooling system.

2.1.2 SMJK Council

Unknown to many people, a pilot project involving certain selected schools in Malaysia is undergoing an online system implementation. SMJK Council, representing the 78 SMJK schools in Malaysia, managed to secure an official funding of RM1.2 million from the Hua Ren Education Foundation, for the implementation of Perridot's School Management Systems. An initial 60 schools will take part in the 3 phase's project. **[3]**

The consultant responsible for the creating of such system is implementing a Web 2.0 technology for all the school websites and an integrated school management system. This pilot project is still under implementation phase and will be launched fully by year end.

The schools are equipped with 2 major system :

- ✓ iSchool Project
- ✓ Education Data Management System

For now, there are no schools in Malaysia who is implementing any analytical progress reporting system apart from the selected 60 SMJK **[2]**. The fact that no schools has such system coupled with the Education Ministry's calls for developing such system shows that vacuum exist to be filled. Such system is much needed to keep tab of the ever growing needs and demands of the sector.

Creating an open system of such concept will not only be useful for the schools in Malaysia, but also throughout the world. Many Third World countries which are still lacking behind in terms of education can make use of it.

For instance, there is a program called GEMS (Girls Education Monitoring System) **[6]** that is being funded in few select countries to promote education among the female members of the society. They make use of interactive website to keep monitor the results and promote their cause.

2.2 IN OTHER COUNTRIES

There are few available tool which is being used in student progress monitoring program in other countries, but all of them are proprietary software that cost a lot to the schools.

Among the most famous ones are:

AIMSweb assessment materials are *included* with an AIMSweb System software subscription: **[14]**

- ✓ AIMSweb Systems, $2.00-$4.00 per student (approximately RM 6 – RM 12)
- ✓ AIMSweb systems provide assessment tools (CBM) and data organization and management software to frequently monitor progress of all students in grade K and above in the basic skills areas

Monitoring Basic Skills Progress (MBSP)

- ✓ Cost : $ 3.00 for year 1 and subsequent years.
- ✓ It provides stimulus materials, administration and scoring procedures for screening, and progress monitoring in reading.
- ✓ The measure includes oral reading and maze passages, "isolated word" list and letter sound probes for students in kindergarten through grade 5 and above

STAR Reading

- ✓ Cost per student for year 1: $7.89 per student based on 200 students (including a $0.39 per student fee).

- ✓ STAR Reading is a computer-adaptive assessment of general reading achievement and comprehension that can be administered to individuals or groups of students in grades 1 to 12 in approximately 10 minutes.

3.0 Methodology

The proposed system shall be done based on an online application or a web based. The proposed system shall be deployed over the Local Area Network or via Internet. Users will be divided based on the functionalities involved and their job-type.

For the system, a 3 type user level is needed, namely student/guardian, teachers and administrator. Users will be able to access the system via a client terminal that is connected to the LAN or Internet infrastructure. The user client will actually connect to the application server, which holds the system files. Next, the application server will communicate with a database to query the operations.

The application server will proceed with processing the data feed and do the necessary functions and calculations. It will then integrate the output result into XML format which will be used to display the graphical representation of the result.

Graphical representation will be used to ease the usage and make it more readable. Based on the Feasibility Study done earlier, it was evident that users expect a form of graphical output instead of just simple text.

Issues to be taken into consideration are identified as acceptable bandwidth, latency, multicasting and broadcasting capabilities and document caching capabilities to ensure the proposed system can be used effectively across the LAN or wireless environment. In addition, database constraints over distributed environment include concurrency, data integrity and consistency when considering whether users are allowed to retrieve data via real time or information would be disseminated to them periodically via email or other forms of communication. Since the system will be developed as a web based system, the following issues should be taken into consideration when evaluating the identified tools and implementation strategies.

For this project, the Waterfall development method is chosen as the preferred method. The waterfall model is widely used model for system development and it suits this project too as we would need to develop the system in phases, and to review the phases frequently.

Extensible

- The results will be exported in XML format as well, to enable any integration by third parties, or to allow third party to make use of the data exported.
- Integration for any existing reporting system that may exist. This can be done by function calling, using APIs.

Open System

- The system will be build using PHP, an open source web scripting and powered by MySQL, another open source database table type.

3.1 EPMAS : The proposed system

Education Progress Monitoring & Analytical System (epmas) is a school management solution linking school administrators, teachers, students and parents/guardians with the Education Ministry Department officials. Developed in an OPEN SOURCE environment, **epmas** is an integrated suite of applications, specially designed with advanced administration features and analytical tools for the schools.

epmas is student academic results centric. It is designed to provide intelligence reporting system to the school through building of an online repository for the school to store students' personal information including examination results, discipline info, co-curriculum and etc. Coupled with this "Personal Profile" will be the "Academic Profile" data that records students' development in academic performances.

The proposed system would enable teachers to input into the system data of monthly test, bi-annual exams and other related academic benchmark. The system would automatically update the following;

- The particular subject's status, with the breakdown of number of correct answers per question, which would enable the tutors to narrow down and identify their focus target.
- Each student's individual profile. The student profile enables the system to keep track of their personal progress record, their test marks, and passing percentage. This means each student's profile will be kept starting from the Year 1 right up to Year 6. At any period of time the parents, teachers and the student themselves can view their progress.
- School administration can view results categorized per classroom and overall passing percentage.

The system will give a graphical representation of the students' progress. Apart from that, the system must be able to do the following too:

- automatically recognise monthly tests and analyse it to display a detailed report of how many students answered correctly
- graphical representation of a subject's passing/failure status
- individual student's full detailed report based on monthly test, exams
- graphical representation of a classroom's overall achievement
- the school's overall passing rate
- academic related reports and queries

Example of screenshots for the analytical representation of student achievement

3.2 System Design

The system consists of different aspects which are all inter-related;

1. Student's Profile
2. Subjects overview and analytical representation
3. Classroom achievements

Apart from it, the core modules that will be incorporated into the system will be:

- ✓ Full information of each student
- ✓ User Friendly search option allows for quick and easy access to Student information
- ✓ Allow keeping track of results of the students
- ✓ Result management for ease to keep track of student performance
- ✓ Security Management
- ✓ Course Management
- ✓ Enrollment Administration
- ✓ Class Administration
- ✓ Examination Administration
- ✓ Evaluation
- ✓ Report Management
- ✓ Send automated email to guardians

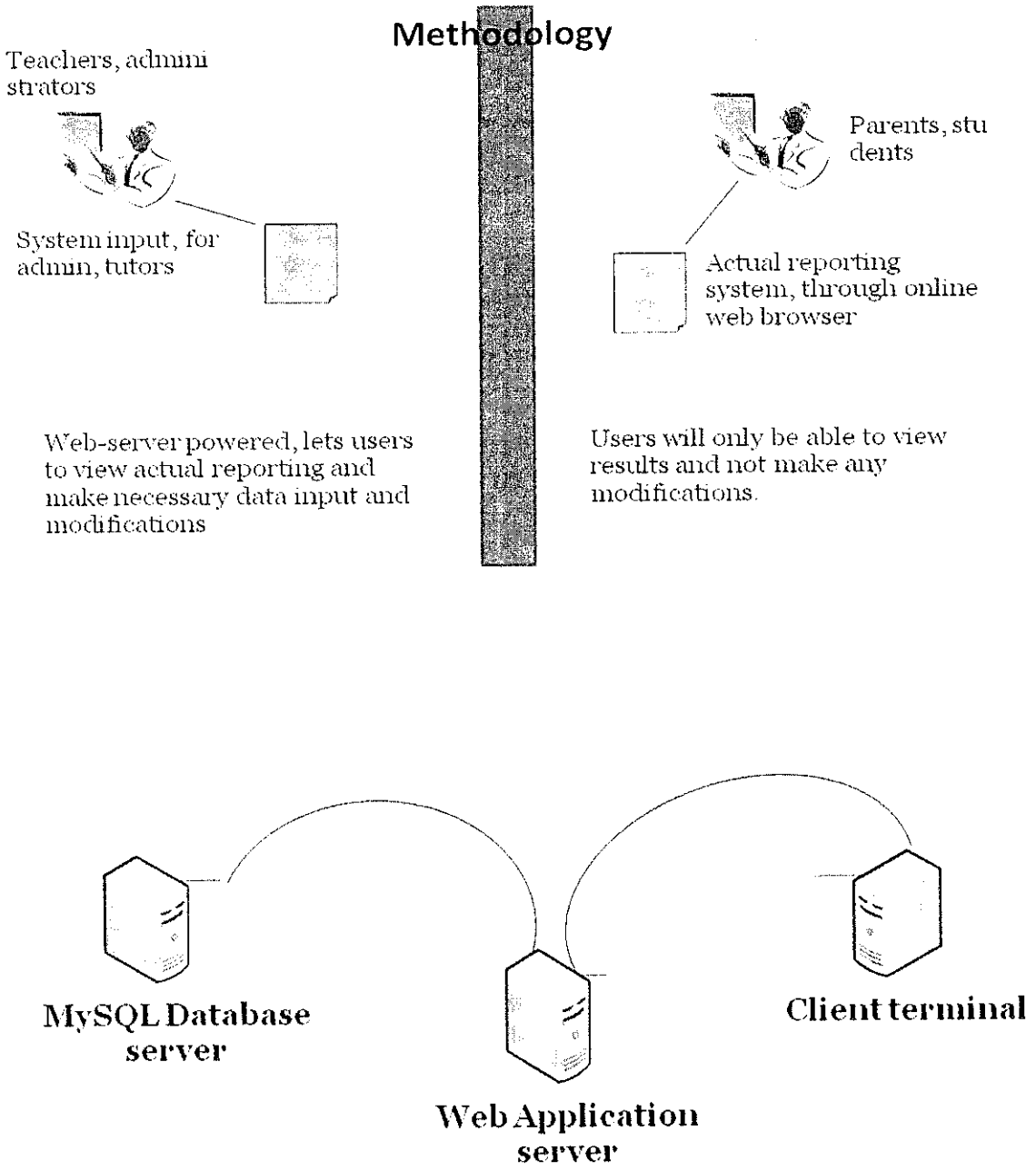


Figure 4: Proposed System Architecture

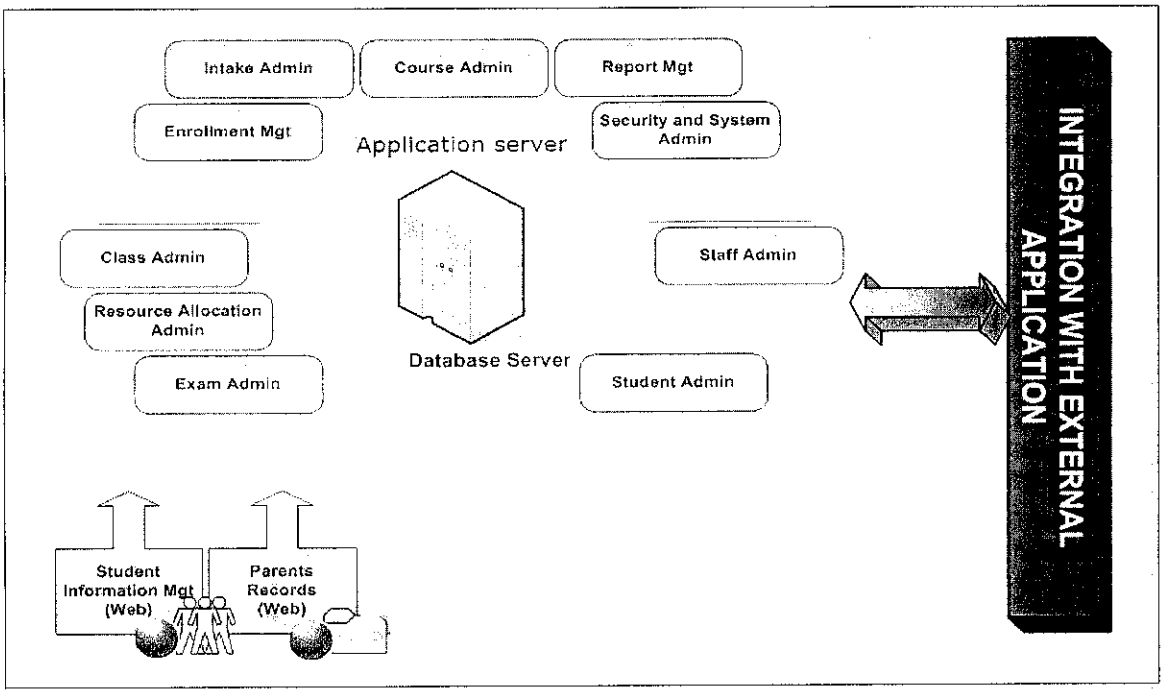


Figure 5: Proposed system overview

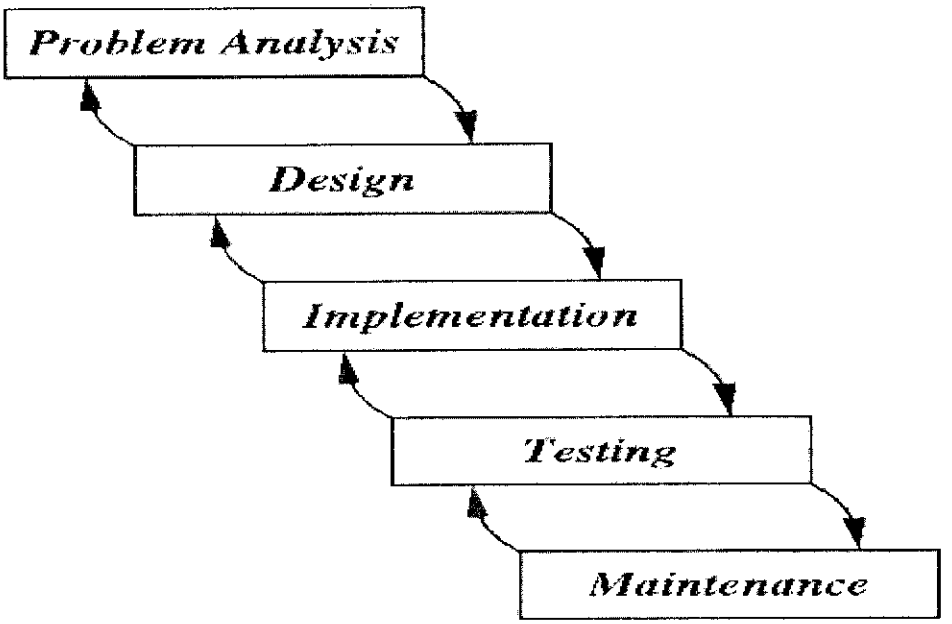


Figure 5: SDLC Waterfall Model

3.3 Job Scope:

- 3.3.1 **Planning Phase:**

  - Draw diagrams such as use case, class diagram and other related diagrams that would help understand the system's functionality better.

  - The timeline that is needed for each phase development and for the whole project.

  - The technical issues that will arise from the proposed system, and its requirements in terms of server setting and environment.

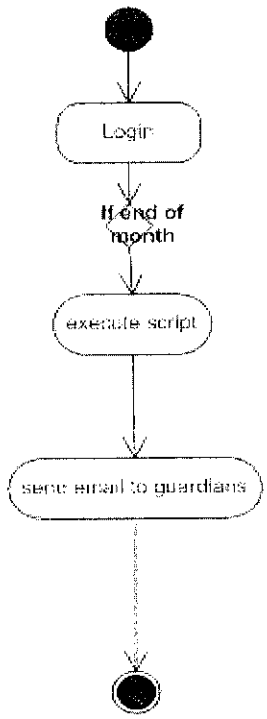


Diagram 1: Activity Diagram of emailing system

Activity diagram

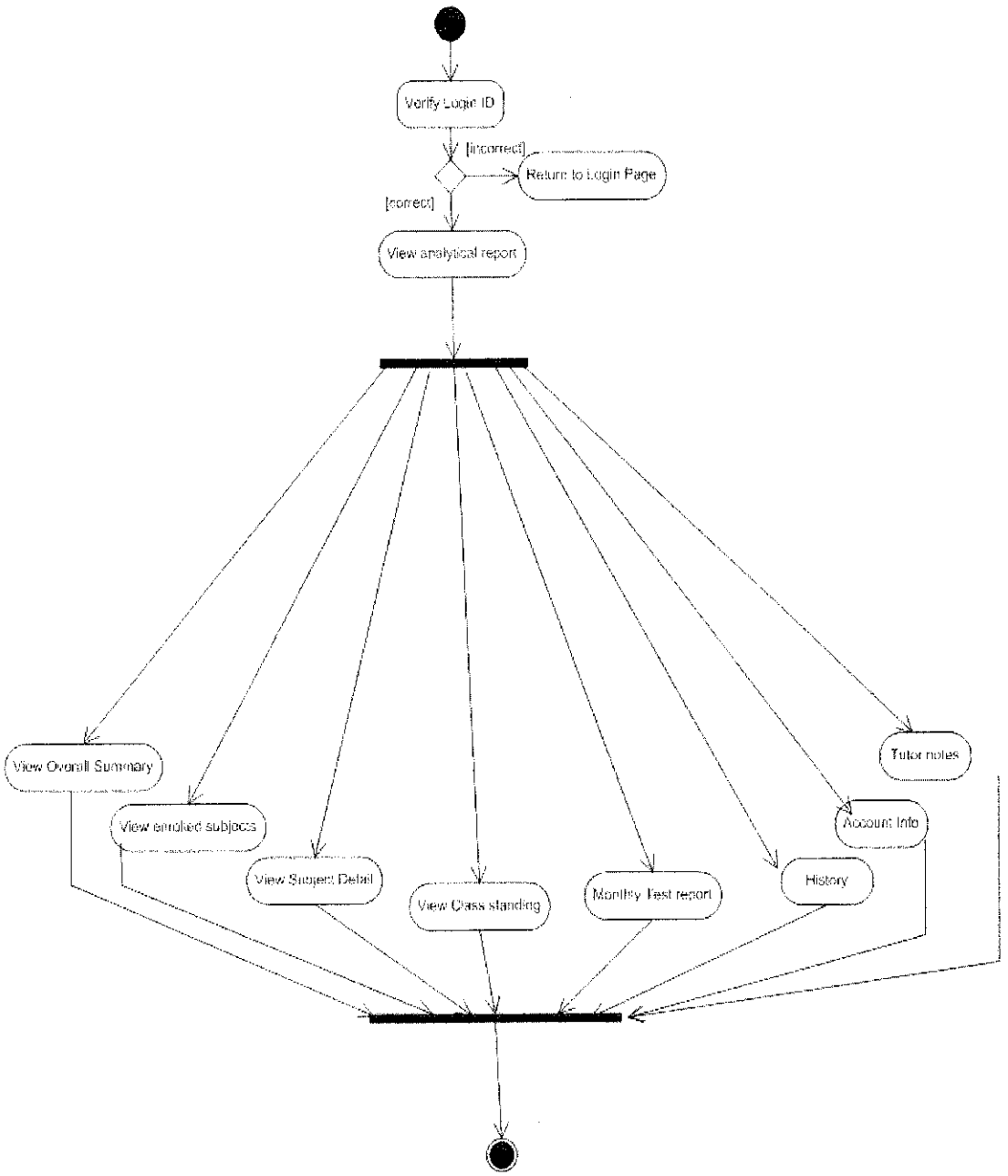


Diagram 2: Activity Diagram of EPMS , Parent's view

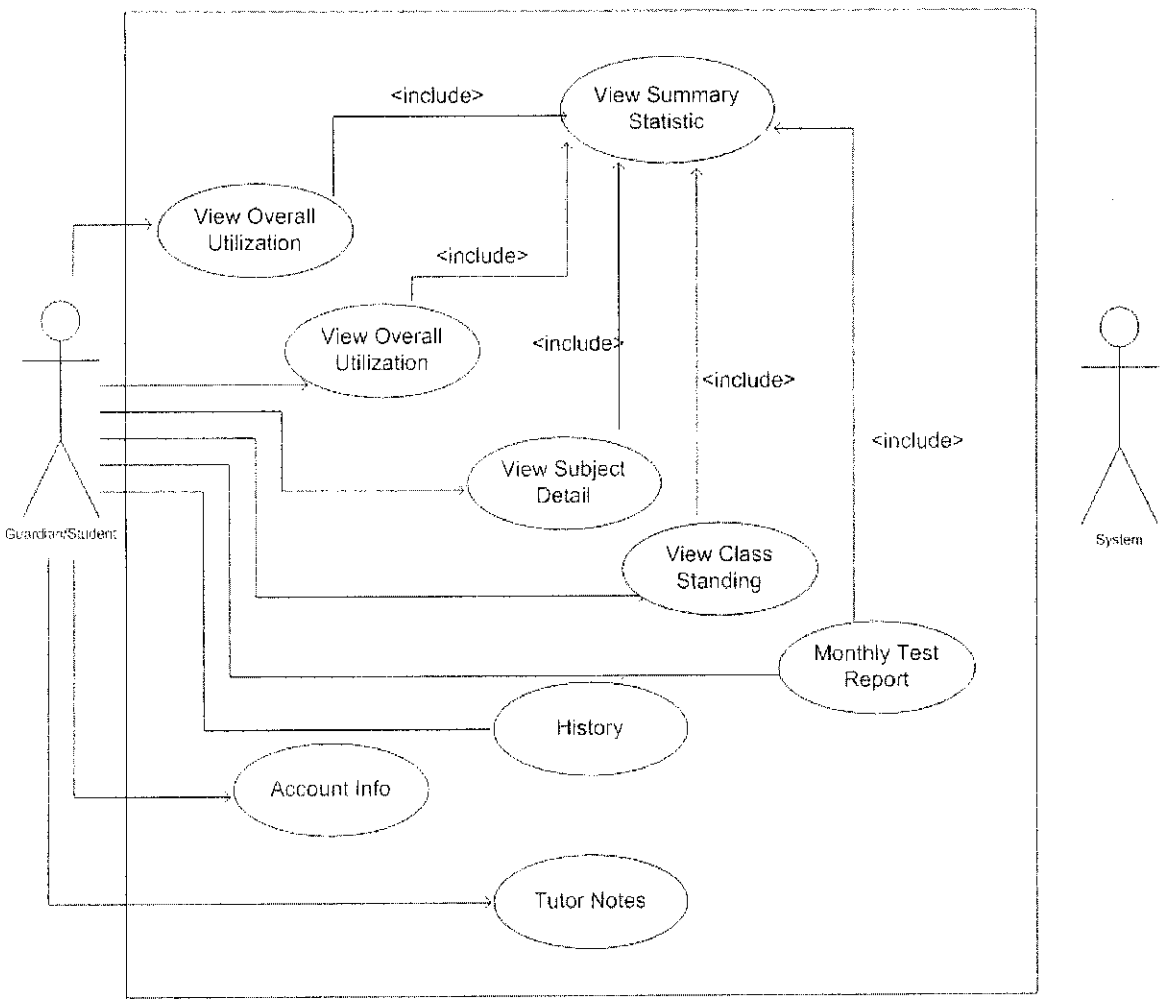


Diagram 3: Use Case of EPMS

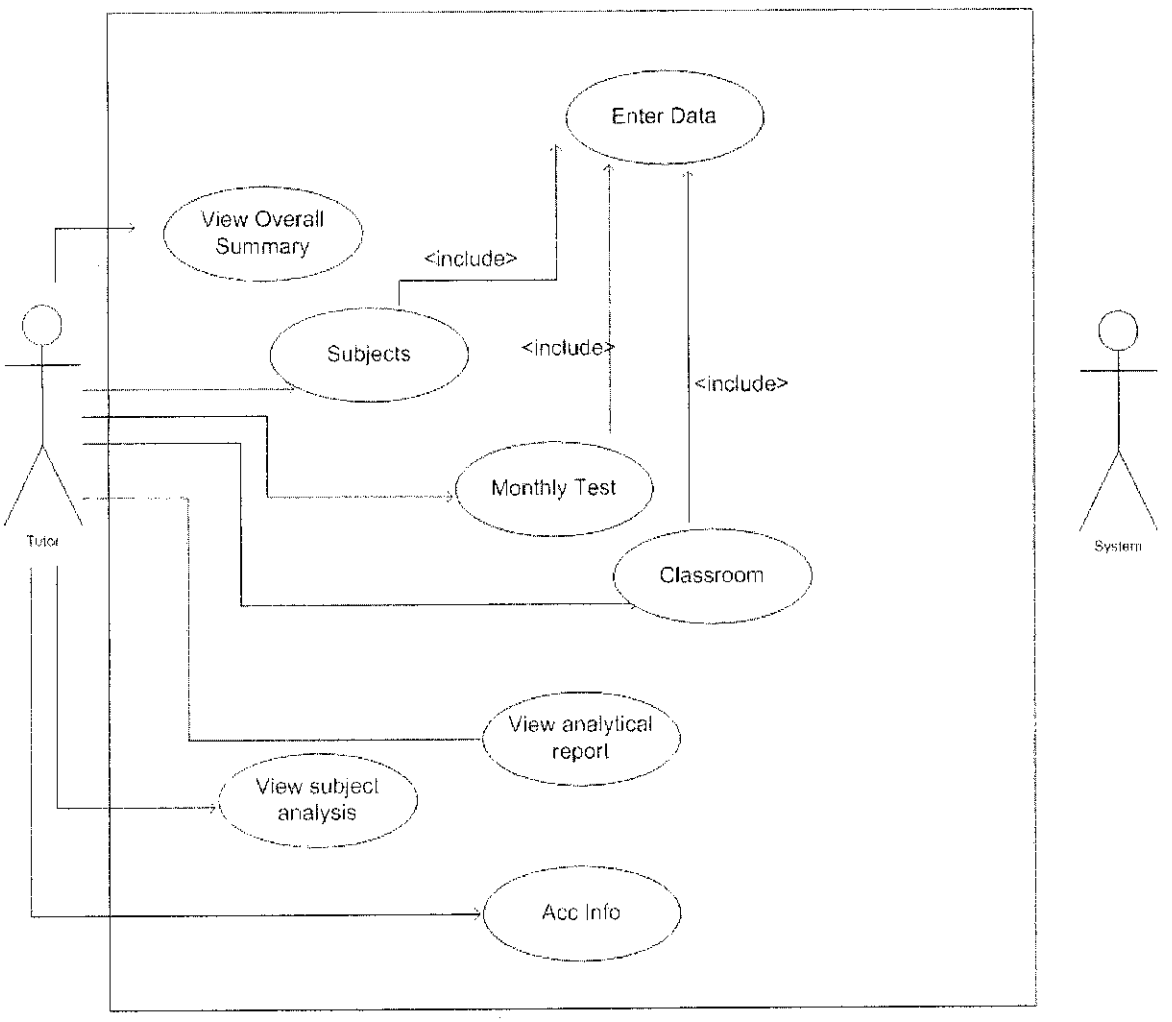
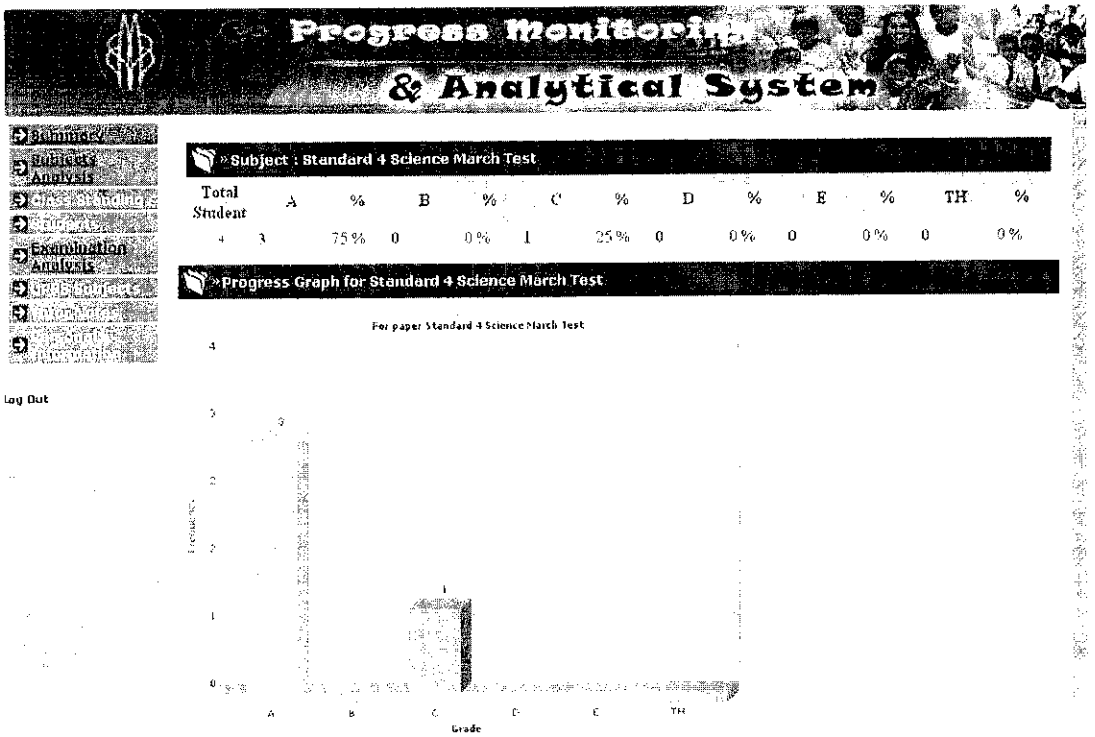


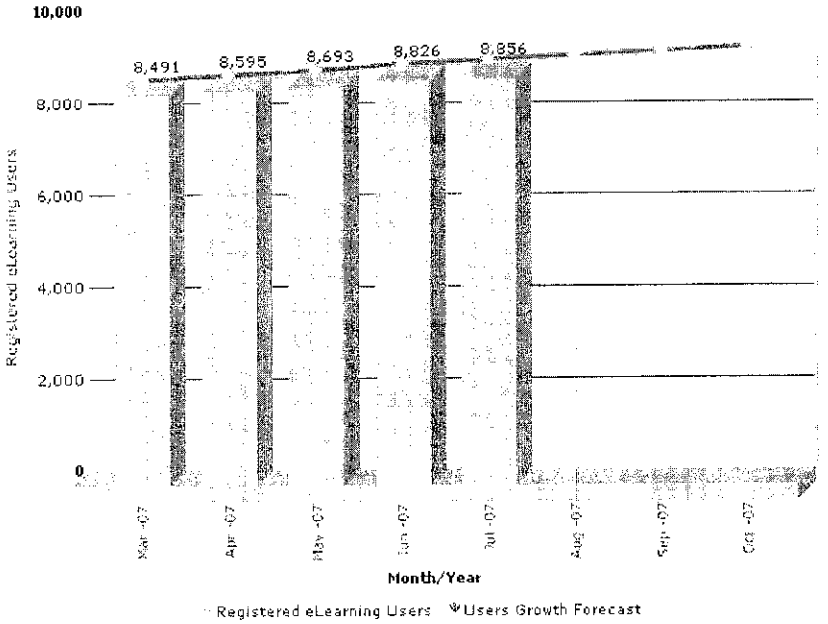
Diagram 4: Use Case of EPMS

- ### 3.3.1 Development phase

The tasks that are identified includes the following

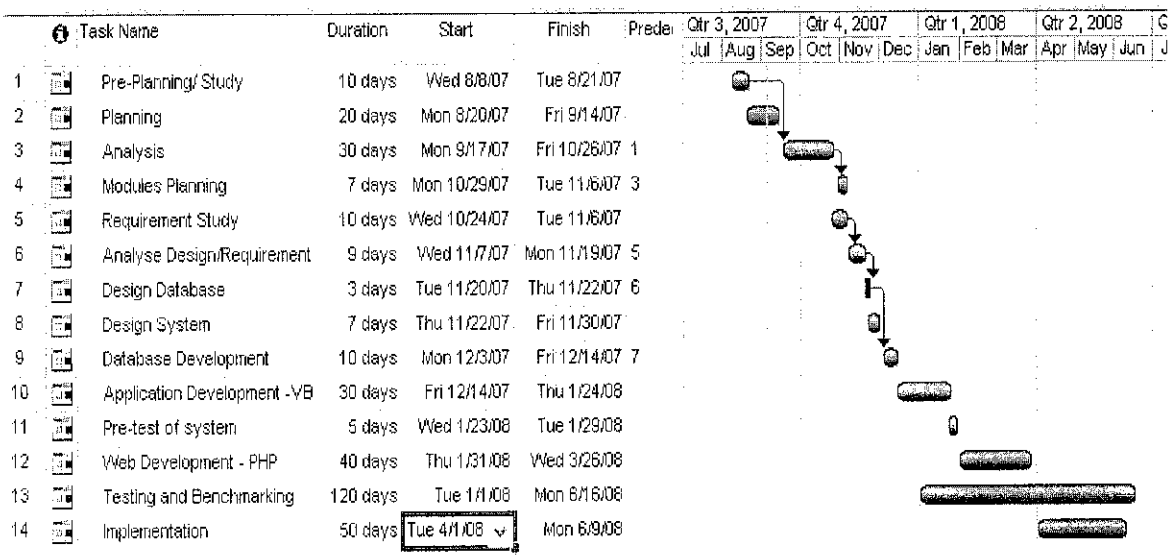
- Create a web server that will be used for the reporting system
- Create database scheme that is flexible, inter-related and suits with the requirement. Flexible in the sense that it will be able to support OLAP type of query.
- Create a connection via tunneling techniques used to make a secure connection between the development server and database. For this purpose, a secure shell connection must first be established using SSH Secure Shell that would successfully forward the incoming port 1521 to the tunneled database server. This is done by listening to any incoming port request and relaying it to the tunneled server.
- Create PHP powered web scripts , using the MySQL database backend
- Indentify and use a automated charting software. For now, an embeddable Action Script/ Adobe Shockwave powered program known as **FusionChart** has been identified as the best solution. However, it is a proprietary version, with limited function freeware. The free version of the charting software is under GNU/PL licensing which allows developer to use it for non-profit projects.
- Export XML data feed, from PHP powered web engine to the charting software. The same XML can be used to export data to third parties and future add-ons.





Analysis : The **Average Growth** stands at **0.97%** per month for the past four months.

Gantt Chart – Project Timeline



	Task Name	Duration	Start	Finish	Predecessors
1	Pre-Planning/ Study	10 days	Wed 8/8/07	Tue 8/21/07	
2	Planning	20 days	Mon 8/20/07	Fri 9/14/07	
3	Analysis	30 days	Mon 9/17/07	Fri 10/26/07	1
4	Modules Planning	7 days	Mon 10/29/07	Tue 11/6/07	3
5	Requirement Study	10 days	Wed 10/24/07	Tue 11/6/07	
6	Analyse Design/Requirement	9 days	Wed 11/7/07	Mon 11/19/07	5
7	Design Database	3 days	Tue 11/20/07	Thu 11/22/07	6
8	Design System	7 days	Thu 11/22/07	Fri 11/30/07	
9	Database Development	10 days	Mon 12/3/07	Fri 12/14/07	7
10	Application Development -VB	30 days	Fri 12/14/07	Thu 1/24/08	
11	Pre-test of system	5 days	Wed 1/23/08	Tue 1/29/08	
12	Web Development - PHP	40 days	Thu 1/31/08	Wed 3/26/08	
13	Testing and Benchmarking	120 days	Tue 1/1/08	Mon 6/16/08	
14	Implementation	50 days	Tue 4/1/08	Mon 6/9/08	

Figure 6: Use Case of EPMS

4.0 Results and discussion

By having a look at the current situation, we can conclude that the whole process of student monitoring is a tedious task done by the teachers and administrators of the school. It is only practical that some sort of automated process be implemented to help ease the system. Education is a very serious sector that must always be emphasized and be maintained at the highest quality.

It suits not only the present needs, but caters to the growing student population and the pressure for a better and more effective teaching and monitoring method. Parents want the best for their children, by having such automated reporting system, they will know how well their children's progress are.

Student progress monitoring fits well into the routine of the classroom. The probes can be administered quickly, and the results are immediately understandable and easy to communicate. In some classrooms, students graph their own progress and find it motivating to "make the line go up."

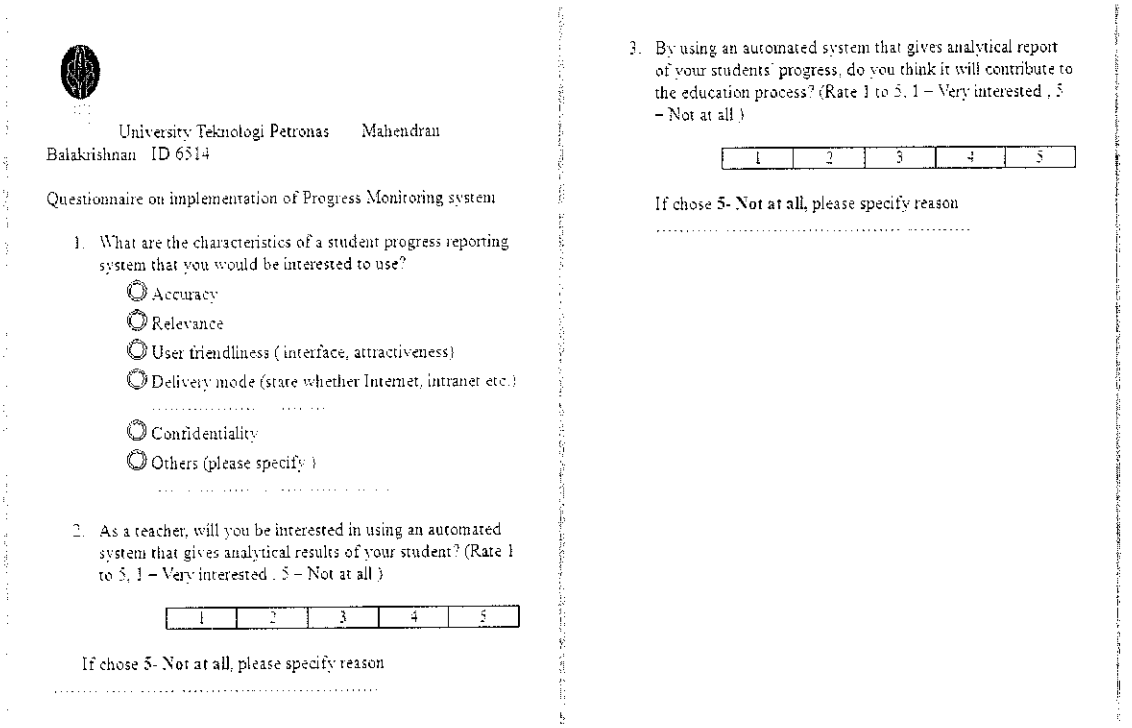
Apart from that, implementing such system will be in line with the Government's call to make use the IT facilities in the schools, and to promote the usage of ICT. Teachers, and the students, will be more technologically inclined and this will spur the curiosity behavior in them on ICT world.

Before going further with the proposed project, a quick research was done with few primary school teachers. The sample was chosen randomly from 2 schools in Alor Star, Kedah namely SJK(T) Barathy and SK Tunku Abdul Halim. The first study was the Feasibility Study, done prior to the project design phase. The second is the User Acceptance Test which was done after the completion of the prototype.

4.1 Feasibility Study

A total of 7 teachers were given the questionnaire survey. The following figure shows the screen shot of the survey handed out.

The questionnaire had 7 questions, which sought to understand respondents' perspective on the implementation of a new grade reporting tool to help students achieve their targeted results. There are two control questions, Q2, Q3 and Q6, used to determine the feasibility of implementing proposed reporting tool.



University Teknologi Petronas Mahendran Balakrishnan ID 6514

Questionnaire on implementation of Progress Monitoring system

1. What are the characteristics of a student progress reporting system that you would be interested to use?
   - Accuracy
   - Relevance
   - User friendliness (interface, attractiveness)
   - Delivery mode (state whether Internet, intranet etc.)
   - Confidentiality
   - Others (please specify)

2. As a teacher, will you be interested in using an automated system that gives analytical results of your student? (Rate 1 to 5, 1 – Very interested , 5 – Not at all)

1	2	3	4	5

If chose 5- Not at all, please specify reason

3. By using an automated system that gives analytical report of your students' progress, do you think it will contribute to the education process? (Rate 1 to 5, 1 – Very interested , 5 – Not at all)

1	2	3	4	5

If chose 5- Not at all, please specify reason

Figure 1: Question 1 – 3

4. Please choose the related functionalities that you would like to have in a student progress reporting system? (Rate 1 to5, 1 – Very interested , 5 – least interested)

Function	Scale (circle one answer)					Reason (if any)
Graphical Report	1	2	3	4	5	
Comparative analysis	1	2	3	4	5	
Detailed Views	1	2	3	4	5	
Benchmarking	1	2	3	4	5	
Future growth estimation	1	2	3	4	5	
Security	1	2	3	4	5	

5. Are you using any student progress monitoring software/system currently in your school?

O No, I'm not
O Yes (state name)
.....

6. Would you be interested in using such system in your education method?

O Yes
O No (please specify why)
.....

7. Do you have any expectations or suggestions for the proposed system

.....
.....

Figure 2: Question 4 – 7

It must be noted here that Q2 and Q6 was made with similar intention, this is to gauge the consistency of the answer.

For this survey, it was done during the school semester break, in December. As such not many senior teachers who responded to the survey. In doing the survey, it was found that the main weakness is that many teachers are not well versed with computer knowledge and its' terms. Also, some respondents did not understand the questions posed and therefore did not respond accordingly.

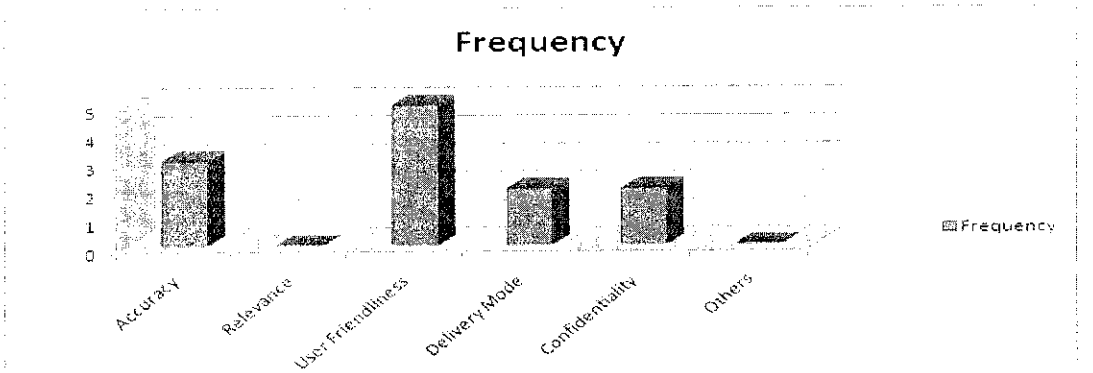
Certain teachers also took the survey lightly and answered hastily, thus there might be certain level of incorrect and inconsistent data pooled.

4.1.1 Results

The results are analyzed as followed based on each category as follow.

For Q1, respondents were asked to select the criteria which would determine the effectiveness and usability of a proposed examination results reporting tool. The results are represented in the chart in Figure 7. Almost all the respondents selected Accuracy, User Friendliness, Delivery Mode and Confidentiality as important issues that they consider as meeting their interests in an student progress reporting system.

For delivery mode, respondents specified that apart from Internet and email, the system must be capable of having export features such as printout and downloadable file to track their progress effectively.



	Accuracy	Relevance	User Friendliness	Delivery M	Confident	Others
Frequency	3	0	5	2	2	0

Figure 7: Main character of proposed system

The analysis begins with Q2, and Q6, the control questions. Question 2 and question 6 was made to sound similar as to gauge the consistency of the data. Of the 7 response, **56.14%** answered in 'very interested' while the remaining chose level 3, which is mediocre interest. This means the proposed system will definitely be of interest among the target group.

Q3 required respondents to rate the impact of such proposed system on the education process, on a scale of 1 to 5 (1 for very interested and 7 for not interested at all) The 5-point scale system was re-coded into a three point scale of very interested "1", neutral "2" and not interested "3" as explained in **(Abouchedid and Nasser, 2002)**. The results are as follows:

Very Interested 42.85%	Neutral 28.57%	Not Interested 14.28%

Q4 required respondents to rate their level of interest on a scale of 1 to 5 (1 for very interested and 7 for not interested at all) for six proposed functionalities or modules to be included in the progress reporting system. The 5-point scale system was re-coded into a three point scale of very interested "1", neutral "2" and not interested "3" as explained in **(Abouchedid and Nasser, 2002)**. The results are represented in Figure 8.

	Graphical	Comparative Analysis	Detailed View	Benchmarking	Future Growth	Security
Interested	6	4	4	4	3	3
Neutral	0	3	2	2	1	4
Not interes	1	0	0	1	3	0

Figure 8: Main functional modules of proposed system

The study also found that 100% of the respondents never used any type of progress monitoring system previously; hence it reinforces the need for such system to be developed and implemented.

Lastly, Q8 asked respondents whether they had any suggestions or expectations from user view of the system.

4.2 User Acceptance Test

For this, a total of 4 teachers were questioned randomly from 2 schools in Tronoh, Perak. The schools involved are SJK(T) Tronoh and SK Tronoh.

A post-implementation questionnaire (Figure 3) has been designed and scales used to measure ease of use, usefulness, compatibility and use motivation, with questions worded to suit the items to the current topic. This exercise was conducted among target audience in classroom environment where respondents granted access to the proposed system's prototype.

Users were required to rate the system by exploring its functionalities on a 5-point scale (1 being strongly agree and 5 being strongly disagree). The results obtained from this exercise is essential as a basis for deciding whether to accept or reject the proposed system that was developed and to gauge the effectiveness of the system implementation from the level of acceptance of its target users.

The weakness of the UAT was that many teachers were still new to such system and was only given a short period of time for testing purpose. Furthermore, the inadequate live data that was pre-loaded onto the database failed to give a deeper view of the whole functionality to the respondents.

Measurement Items	Scale (circle one answer)					Reason (if any)
Ease of use						
Navigating through ePMAS was easy	1	2	3	4	5	
Reporting functions was easily recognised	1	2	3	4	5	
Using the analysis was easy	1	2	3	4	5	
The graphs used suited the reporting style	1	2	3	4	5	
Using the comparative analysis was easy	1	2	3	4	5	
Overall the ePMAS was easy to use	1	2	3	4	5	
Usefulness						
It is time saving to monitor progress	1	2	3	4	5	
It is easier to evaluate results	1	2	3	4	5	
It helps tremendously in identifying academic strength and weaknesses of student	1	2	3	4	5	
It is easier to find out what is the current standing of a subject	1	2	3	4	5	
It is easier to find the academic strength and weaknesses of a subject	1	2	3	4	5	
Compatibility						
ePMAS is suitable for me to monitor my students' progress	1	2	3	4	5	
ePMAS is suitable with how the current grading works	1	2	3	4	5	
Use Motivation						
I will definitely use this system in my school	1	2	3	4	5	
I believe the education sector will benefit the most with the use of ePMAS	1	2	3	4	5	

Figure 3: User Acceptance Test

4.2.1 Results

The results are analyzed as followed based on each category as below.

The results of ePMAS are analyzed. Figure 9 shows the frequency distribution obtained from the test. For this result, each criterion is judged based on the category such as ease of use. The 5-point scale system was re-coded into a three point scale of very interested "1", neutral "2" and not interested "3".

All the answers for each category was added up and percentage was counted based on it.

Figure 9: ePMAS User acceptance

Construct	AGREE	NEUTRAL	DISAGREE
Ease of Use	81.50%	13.50%	5.00%
Usefulness	88.00%	7.50%	4.50%
Compatibility	95.50%	3.00%	1.50%
Use Motivation	97.50%	2.00%	0.50%

The results show that most of the users agree that the system fulfills their needs in terms of Ease of Use, Usefulness, Compatibility and Use Situation. High percentage of users agreed that they have the intention of using it when deployed.

5.0 Conclusion & Recommendation

This project is not just for the sake of finishing or accomplishing requirements to obtain a scroll of degree. It is also not just *yet another* Final Year Project. It is made with a noble intention of actually using technology where it matters most: the society.

It is hope that this project will be a boost and a catalyst for the education system of the country, the core to which our society's future lies in. It is hoped that the proposed system will be used for the betterment of the mass and individual character building.

EPMAS is a web based solution system to help in better monitoring the students and help educators to narrow and identify subjects that needs more focus and attention. It will also be able to reduce the workload of tutors, and effectively be part of the education system, making it more streamlined and efficient.

5.1 Recommendation

It is hoped that the project will be fully implemented by end of the project period. However, due to time limit, there are certain features that could be included to make the system better and more attractive.

Among the possible recommendations for future upgrade includes:

1. Making a standalone application for data entry , preferably based on VB or Java. This will be better than leaving open data-input via Internet or intranet.

2. Making the whole system running on port 443 instead of port 80, this is to make it run on top of HTTPS protocol. HTTPS will be more secure and can avoid the possibility of network tapping by unscrupulous people.

3. Make the system more extensive to include even student details such as extra-curricular activities and discipline records.

4. Make the system more extensive by including more detailed analysis which could include the possibility of viewing progress for each question instead of just per subject. That will enable the tutor to focus more in depth.

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http://thestar.com.my/news/story.asp?file=/2007/7/29/nation/18441019&sec=nation

APPENDIXES:

Appendix 1-1

http://thestar.com.my/news/story.asp?file=/2007/7/29/nation/18441019&sec=nation

Noh: Have online track records of students

SHAH ALAM: Schools have been urged to implement online systems to keep track of students' achievements and disciplinary problems.

Deputy Education Minister Datuk Noh Omar said the online systems would help parents monitor their respective children's academic performance and conduct in school.

"We are encouraging schools to implement this system as parents who cannot come directly to school to find out about their children can do so through the online system," he said.

Noh, who launched SMK Seksyen 19, Shah Alam's e-Academic and e-Discipline website here yesterday, also told a press conference that several residential and regular schools were currently in the process of implementing the system.

"Hopefully, more schools will follow suit soon," said Noh, adding that the system would also create a close rapport between school administrations and parents.

This would in turn curb misunderstandings over issues involving students.

However, added Noh, the Education Ministry did not have any concrete plans to order all schools to implement the online system.

Appendix 2-1 (Feasibility Study survey)

Questionnaire on implementation of Progress Monitoring system

1. What are the characteristics of a student progress reporting system that you would be interested to use?
   - ◎ Accuracy
   - ◎ Relevance
   - ◎ User friendliness (interface, attractiveness)
   - ◎ Delivery mode (state whether Internet, intranet etc.)
     .....
   - ◎ Confidentiality
   - ◎ Others (please specify) .....

2. As a teacher, will you be interested in using an automated system that gives analytical results of your student? (Rate 1 to 5, 1 – Very interested , 5 – Not at all)

1	2	3	4	5

   If chose **5- Not at all**, please specify reason
   .....

3. By using an automated system that gives analytical report of your students' progress, do you think it will contribute to the education process? (Rate 1 to 5, 1 – Very interested , 5 – Not at all)

1	2	3	4	5

   If chose **5- Not at all,** please specify reason
   .....

4. Please choose the related functionalities that you would like to have in a student progress reporting system? (Rate 1 to5, 1 – Very interested , 5 – least interested)

Function	Scale (circle one answer)					Reason (if any)
Graphical Report	1	2	3	4	5	
Comparative analysis	1	2	3	4	5	
Detailed Views	1	2	3	4	5	
Benchmarking	1	2	3	4	5	
Future growth estimation	1	2	3	4	5	
Security	1	2	3	4	5	

5. Are you using any student progress monitoring software/system currently in your school?

   ◎ No, I'm not
   ◎ Yes (state name) .....

6. Would you be interested in using such system in your education method?

   ◎ Yes
   ◎ No (please specify why) .....

7. Do you have any expectations or suggestions for the proposed system

   .....

   .....

Appendix 2-2 (User Acceptance Test)

Measurement Items	Scale (circle one answer)					Reason (if any)
Ease of use						
Navigating through ePMAS was easy	1	2	3	4	5	
Reporting functions was easily recognised	1	2	3	4	5	
Using the analysis was easy	1	2	3	4	5	
The graphs used suited the reporting style	1	2	3	4	5	
Using the comparative analysis was easy	1	2	3	4	5	
Overall the ePMAS was easy to use	1	2	3	4	5	
Usefulness						
It is time saving to monitor progress	1	2	3	4	5	
It is easier to evaluate results	1	2	3	4	5	
It helps tremendously in identifying academic strength and weaknesses of student	1	2	3	4	5	
It is easier to find out what is the current standing of a subject	1	2	3	4	5	
It is easier to find the academic strength and weaknesses of a subject	1	2	3	4	5	
Compatibility						
ePMAS is suitable for me to monitor my students' progress	1	2	3	4	5	
ePMAS is suitable with how the current grading works	1	2	3	4	5	
Use Motivation						
I will definitely use this system in my school	1	2	3	4	5	
I believe the education sector will benefit the most with the use of ePMAS	1	2	3	4	5	