Students' Academic Performance Accelerator System: An Online Tutoring System for Accelerating Students Academic Performance Using Moodle

by

Mohamad Syafiq Iffat Shaifuddin

A project dissertation submitted in partial fulfillment of
the requirements for the
Bachelor of Technology (Hons.)
(Business Information System)

MAY 2012

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CERTIFICATION OF APPROVAL

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Approved by,

_____

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UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
May 2012

CERTIFICATION OF ORIGINALITY

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

MOHAMAD SYAFIQ IFFAT SHAIFUDDIN

A B S T R A C T

Students' Academic Performance Accelerator System: an Online Tutoring System for Accelerating Students Academic Performance Using Moodle is an educational online webportal which provides four main purposes via a platform known as Moodle;

- A tool of supplementary teaching for teachers in sharing the resources
- A tool for teacher in identifying student's weak points thus accelerating the academic performance
- A tool for students to encourage self-learning based on their capabilities
- A tool of informal communication between students and teachers

The main target group in this project encompasses of primary school students. The service enables the students to learn in an interactive and enjoyable way via online. This new way of study will promote the concept of learning at own pace as students might have different capabilities in understanding the subject that being taught in class.

The features of **Students' Academic Performance Accelerator System: an Online Tutoring System for Accelerating Students Academic Performance Using Moodle** are;

- Online questions or tests
- Question banks with answer schemes
- Discussion forums
- E-report card

The objective of the project is to provide benefits to the project's stakeholders which are;

- Students
- Parents
- Teachers
- School management

A C K N O W L E D G E M E N T

First and foremost, I would like to express my gratitude and appreciation to Almighty Allah for His blessings and goodness I was able to complete the task within the time given, all praises to Him as my project is reaching towards the objectives despite shifting the direction several times.

Then I would like to express my highest appreciation to my supervisor, Dr Vivian Yong Suet Peng for her useful guidance, wise advices besides offering relentless moral support since the beginning of the project up towards the accomplishment of my Final Year Project.

I would like to dedicate special thanks to Miss Hasyikin Halim from Sekolah Kebangsaan Seksyen 24, Shah Alam for sharing many useful input towards the accomplishment of this project.

Last but not lease, I would like to thank my beloved family members and friends for the continuous moral support and encouragement throughout the completion of this final year project.

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INTRODUCTION

1.1 Background of Study

Students especially are facing issues such as increasing pressure and expectation to excel in academic resulted by competitive environment in schools. Parents played very major role in leading to this environment as they want the best for their children as most of the parents believe that by having excellence in academic performance, their children will have better future. Teachers also being affected by this situation as the parents expected them to drive and guide the students to succeed in the examinations. They felt extra burden on their shoulders

Tuition classes as the supplementary lessons for students were established to help the students to capture better understanding and able to conceptualize on what the teachers taught in the classrooms. As a result of that, the number of tuition centers and private tutors began to increase. Job opportunities have been created as the teachers began to offer their services as the private exchange in exchange of additional income. Schools also are expected to play their role in helping the students to exceed in the class by organizing the extra classes during the weekends for example.

Advancement in IT enabled teaching and learning to be conducted via electronic medium such as online learning which create an environment that provide conduciveness and flexibility in traditional 'blackboard, tables and chairs' classrooms. The students can have the learning session without the need to attend the class as they session can be conducted at their living rooms or even bedrooms. This flexibility also

allows the teachers to have more personal time for themselves and their families. Apart from that, online learning also encourage the learning process at own pace which solely depend the capability of a student.

Students Academic Performance Accelerator System is a web based application which leverage on the diverse functionalities of Moodle. The teaching and learning process (T&L) now can be very accommodating to the students and teachers as students especially less-performed students can learn at their pace without the need to absorb the pressure exerted by their peers and the teachers which in the long term can be seen as one of the way to help this type of students to build internal self-esteem despite having difficulties to catch up with the learning activities in the classrooms.

1.2 Problem Statement

Based on the observation made, there are two clear observations that can be made which are;

1.2.1 There is no reliable medium of communication between the students, parents and teachers in accelerating the academic performances of the students.

Madge Alberts, Program Coordinator for Partnering for School Success, University of Minnesota had practiced the (Alberts, 2009) which highlighted the importance of having proactive, persistent and positive communication between the parents and teachers and the students as the communication will not be oriented on education or academic only as parents and teachers are assuming the role and responsibility in developing and grooming the personality of the students. Proper communication with the teachers can help the parents to take appropriate actions in helping their children in learning process besides helping them in coping with the stress at school and classroom. By having proper conversation with their children, parents can avoid themselves from being judgmental which in normal scenario will exert unnecessary pressure to their children to perform well in their studies without knowing the reason why their children are underperformed in classroom.

In Malaysia, one of issue faced by the students especially in big cities such as Kuala Lumpur as the huge number of enrollment in every year lead to huge size of the classroom members. This situation creates a new challenge for the teacher to control 40-over-classroom-sized which limits the attention that could be given to the students. As a result, some of the students might be left-out as they are unable to catch up with the pace of teaching and learning in the classroom. The situation will be worsened once these students lose the motivation by making absence during the class hours and the teachers lose the faith and making minimal effort to help the underperformed students.

1.2.2 There is no reliable platform or bold approach in our education system in helping the students with lower ability in learning process.

Co related with the first problem statement, the second problem statement highlighted the flaws of our education system that lack of support system in handling with the issue of underperformed students. Teachers are expected to voluntarily to take initiatives in coaching and organizing extra classes for the underperformed students. Teachers in most of the schools in Malaysia have very wide job scopes largely due to extracurricular activities which lead schools to become high stress-level working environment. Teachers nowadays have been pressured as much as the students because the school management does not provide the proper support system especially in helping the underperformed students.

In this scenario, parents are expected to play their roles in providing supplementary lessons in resolving the problem of being left behind in the learning activity as parents so eager to send their children to go for tuition classes. Self-learning or learning at home are highly encouraged as limited hours in school are no longer being seen the effective hours for the absorptive capacity on what being taught by the teachers are greatly influenced by huge size of the classroom and commitment of the teachers themselves. Learning materials such as reference and exercise books should

been provided by the parents in order to see their children excel in the classrooms.

1.2.3 Over reliance on teachers in ensuring students are well performed in academic

Another setback that being faced in education system in Malaysia is the "spoon-feed" culture that being practiced in schools in Malaysia as the teachers always give away the materials which affected the students in many aspect such as lack of self-initiative, less creative, over-dependence on teachers which in generally discouraging the students from independent learning and thinking, Academicians have arguing that students should not only being seen as empty vessels that will be filled with knowledge as teachers need to nurture them to become more independent thus to be able to survive in tertiary educational institutions such as university. Incompetency such as low thinking capacity will become a major obstacle for students in the universities which highly encourage the concept of self-learning as students need to acquire critical thinking in finding the knowledge beside given by the lectures during the lecture hours. The continuation of this practice also resulted in high number of unemployment among fresh graduates who did not have the skills such as independent and proactive which are required by the employers. School is the right place to nurture the students in the most effective approach in preparing them in a more competitive world out there.

1.3 Problem identification

1.3.1 Parent Factors

- Safety concerns of their children during the journey go and back from the tuition center
- Financial commitments as the fees for tuition class quite high
- Time commitments as the parents are occupied with their jobs
- Quality versus value as the number of tuition center affected the quality of deliverance as they are being driven by the monetary benefits
- Parents have minimum supervision on the progress of their children in the classrooms as they tend to leave the responsibilities to be bear by the private tutors and teachers

1.3.2 Student Factors

- Huge size students in the classroom become obstacles to the teachers to give fair attention to all
- Too many distraction at school and home such as peer influence discourage the students to do revision and homework
- Parents' expectation to excel also giving unnecessary burden for the students as they are studying for the sake of the parents not for themselves
- Students of lower self-esteem tend to be left behind as they do not have the courage to ask the teachers for further understanding

1.3.3 Tuition Center Factors

- Lack of attention given by the teachers to slow learners and passive students hindering these kind of students to excel in classroom
- Profit-oriented tuition centers disregard the quality of education given the students as the teachers hired might be not qualified and lack of experience

- High fees charged by the tuition centers become a financial burden for parents especially who earned middle size income.
- Accessibility factor as most of the tuition center located in town or city area which limit the number of students who live in suburban area to have tuition class

1.4 Objectives

In general, the objectives of this project are;

- To promote new concepts of teaching and learning that leverage on IT
- To create an effective medium of communication between the teachers, parents and schools through functionality of discussion forum in Moodle
- To help students with issues of difficulty in learning and low self-esteem in catching up with the learning process by leveraging on the functionalities in Moodle
- To help schools by providing a centralized platform that helps the students to prepare for public examinations such as UPSR. (PMR and SPM for the later stages)

1.5 Scope of Study

The scope of study for this research covers the application of open source like Moodle to support function of courseware management for education purpose. The designated users that been targeted for this application are students and teachers in primary schools which are sitting for Ujian Penilaian Sekolah Rendah (UPSR) which is compulsory to all Standard 6 student in Malaysia. Student Academic Performance Accelerator System is being recognized as a tool to help the teachers in accelerating the progresses of the students by providing a very reliable platform which serves as resource one-stop center for the students to access the materials related to the subject learnt. By utilizing the functionalities provided in Moodle, teachers can conduct interactive activities which can attract the participation of the students through online quizzes and tests, discussing using

forums, uploading video in order to create a whole new experience in teaching and learning besides orthodox-brick and mortar class approaches implemented in school.

In terms of contents for this project, these are the UPSR subjects that will be used in the Student Academic Performance Accelerator System;

- ❖ Bahasa Melayu Pemahamaman (011)
- ❖ Bahasa Melayu Penulisan (012)
- ❖ Bahasa Inggeris (014)
- ❖ Science (018)
- ❖ Mathematics (015)
- ❖ Ujian Aptitud (013)

1.6 Relevancy of the Project

Benefit of this web portal to customers or users is that it provides supplementary lessons to the students to reinforce their understanding on certain concepts. It will help teachers in teaching where they can deliver any topics of the studies in an interactive way. Besides, it will improve interaction between parents, students and teachers where teachers can monitor and record the students' behavior and achievement during the learning session and then email the record to their parents.

Students will enjoy;

- Complete education material as the preparation to sit for public examination
- Reinforce the understanding and concepts on subjects in classroom
- Offer flexibility for students for studying as the application can also accessible at home
- Enjoy discussions with teachers and friends
- Giving fair opportunities for everyone to ask questions to the teachers
- Help students to allocate time for studying
- Give different experience in learning activities
- Introvert students can enjoy learning and be a part of learning process
- Materials can be accessed 24 hours a day, 7 days a week

Teachers meanwhile will benefit in terms of;

- Fair attention given to the students regardless the personality or confidence level
- Ensure that there is no favoritism being practiced in class
- Can identify non-performing students thus teachers can make effort to help those based on the progress of the tests and quizzes
- Establish communications with the parents as parents can involved more in terms of supervision at home
- Teachers can encourage the practice of knowledge pooling as the member of the class can share their opinion or knowledge on issues related to subjects or studies.

Parents then can;

- Encourage and monitor their children exercises while at home
- Constantly updated with the performance of their children through e-Report Card system
- Can work together with teachers and school management to accelerate the progress of their children by communicating through the discussion forums
- Reduce financial burden as the of private tuition class are relatively high nowadays
- Reduced time spent on sending and fetching their children to and from tuition center

The impact on the school then;

- Help the management to achieve good results in public examination which can increase the school's reputation
- Solution to School-Based Examination initiative as school can leverage on this application
- Help the management making the projection for public examination

1.7 Feasibility of the Project within the Scope and Time Frame

This project is feasible in terms of scope as it focuses on students who are sitting for Ujian Penilaian Sekolah Rendah (UPSR) examinations and teachers who teach Standard Six students. By using Student Academic Performance Accelerator System, teachers can provide systematic individual monitoring for each student who has different level of intelligence. The goal of this system is to promote self-learning or learning at own pace where students are expected to take full initiative in improving their academic performance.

Looking from the realistic angle, this project has several limitations as the implementation of online learning in Malaysia is very limited especially at primary school level. For the beginning stage, teachers as the course administrators might face difficulties in managing and organizing the contents as it may create additional work burden to the teachers despite the existing job scopes. The idea proposed for the students is to encourage students to study at home which require them facilities like computer and internet connection. However, not all students being equipped with this accommodation at their homes besides huge number of schools that do not have proper IT facilities which can be classified as one of the limiting factor towards the effectiveness of the project. Despite this scenario, study conducted by Internet World Stats, Malaysia recorded approximately 17 723 000 Internet users as December 2011 with 61.7 % of Internet penetration which considerably high (Internet World Stats - Asia, 2011).

This project will be developed within two semesters starting from January 2012 to September 2012. This project will be developed based on four main phases, which comprises of project definition, implementation, project test and integration and verification and validation. The research phase will be carried out during the first semester, which is in January until May 2012 whereas the development of the prototype will be initiated immediately in March 2011. Testing will be conducted after each of the drafts of experimental model is ready. Thus, based on the division of how the project will be developed, this project is believed to be completed within the timeframe.

CHAPTER 2

LITERATURE REVIEW

2.1 Background of Online Learning

According to J. Rosenberg, online learning is the use of internet technologies to deliver a broad array of solutions that enhance knowledge with experts. As for Elliot Masie, he defined that online learning is the use of network technology to design, deliver, select, administer and extend learning activities.

Anuwar Ali of Open University Malaysia (OUM) defined the content of e-learning is in the electronic form and is stored either in CD ROM's or on servers (Ali). Learners access these contents directly from stand-alone computers or from the servers through the networked computers. The contents are typically developed to be engaging and interactive and the learners are supported "virtually" by the instructors.

According to Bates (2001), e-learning is a continuum that is based on the location aspects of learning as illustrated in figure below.

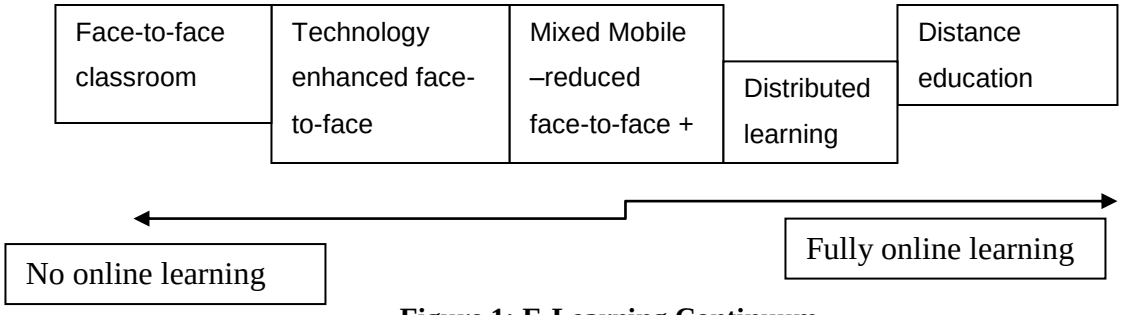

Figure 1: E-Learning Continuum

Based on the figure above, the transition from traditional classroom consists of teacher, students, chairs and desks (brick and mortar class) to fully online learning which leverage IT as the medium of teaching and learning.

From Malaysia perspective, e-learning is being defined as "the use of network and multimedia technologies to improve the quality of learning by enabling access to knowledge and remote resources for the development of a K-Society" (Ministry of Energy, Water and Communication and Open University Malaysia, 2004)

2.2 Why do Students Like Online Learning

Based on article wrote by Stephanie Coleman dated 16th July 2007 entitled 'Why Do Students Like Online Learning?" which she came with several factors that influence the students to favor online learning method (Coleman). The factors are;

- Students can attend a course at anytime from anywhere, which provide high degree of flexibility. This situation also enables parents to attend their children and be part of their children education progress. Work commitment no longer become an obstacle for working parents as they are able to monitor the progress of their children in the classrooms.
- Through online learning, students are encouraged to have extra initiatives in understanding the concept which promote the student-centered teaching approaches. Using this approach, students will have freedom in designing their own way of studying and understanding a particular subject. Some might favour studying in a group to increase understanding through discussion with the classmates.
- The materials are accessible 24 hours a day, 7 days a week which provide ample time for students to read the materials several times, have discussions and seeking for further explanations from the lecturers or teachers.

- Online learning encourages multiple interaction and communication as participants can easily exchange information, debating over a particular issue, and asking for an expert's view.

In generally, online learning is a new approach of teaching and learning that provides ultimate flexibility as it promotes the class to be conducted where and when it accommodates most especially the students.

2.3 Background of Intelligence Tutoring System

Intelligence Tutoring System is a computer application or system that evolved from computer assisted instruction/ learning (CAI/CAL) with the objective of providing the benefits of personal one-on-one instruction automatically and cost effectively (Nwana). Approaches like CBT or computer-based training and WBT or web-based training however limitations as pedagogical approach of the system is to have full reliance on asynchronous communication as users or trainees are affected by the waiting period of instructors or moderators to respond to their problems and needs thus reducing the effectiveness of these approach of training.

In order to cater for that problem, Artificial Intelligence have been embedded into Intelligence Tutoring System as computer or the system now being able to solve problems based on its knowledge on the database in responding to request or question made by the users. According to general consensus among researchers, modern day of Intelligence Tutoring Systems are consist of four basic components which are;

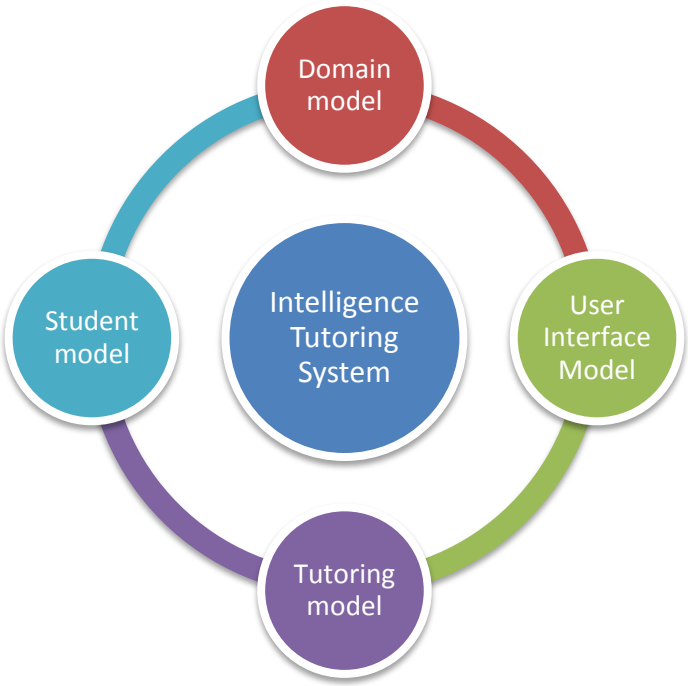

Figure 2: ITS Model

Domain model which is also recognized as expert knowledge model is the brain of any intelligence tutoring system. Domain model or cognitive model is the element which will comprehends and predicts the output from the input given based on the rules that have been defined by the database or the system itself. One of the most widely known cognitive architecture is ACT-R or Adaptive Control of Thought-Rational which consists of human-like assumption which specifying how the brain organized and operated. Two main knowledge sources of ACT-R are declarative knowledge and procedural knowledge.

As for student model, it is considered as the most important element of an intelligence tutoring system as students are the main user for the system. One of the main goal of intelligence tutoring system is to help student in learning process by emphasizing on the cognitive and affective ability. A method that been created which known as model tracing has been introduced to provide step-by-step guides in problem solving process. The system will recognized error if there is any irregularities between the student model and domain model as cross checking activities are conducted in order to test the validity of the input given by the students.

The tutoring model will accept input or information from both the domain model and student model thus serve as brain to make judgment on the tutoring strategies and actions. It is a normal scenario when users or the learner will request for guidance on further actions to be taken. The rules that being used by the model is the production rule which will pre-determine and assessed consistency between the user and the model. The conditions of the production rule is learned and unlearned category which will indicate the users' accomplishment upon certain areas or knowledge of the modules in the system. The system will automate the loop in executing the same exercise of the students unable to comply with certain level of achievements.

The very last model of the intelligence tutoring system is user interface model which integrate three domain of information in general conversation which are;

1) Knowledge about patterns of interpretation which to understand a speaker and action which used to generate utterances
2) Knowledge needed in communicating the content
3) Knowledge needed for communication intent

2.4 Intelligent System using Fuzzy Models

Dongming Xu, Huaiqing Wand and Kaile Su have developed a multi-agent based student profiling system by integrating four models which are

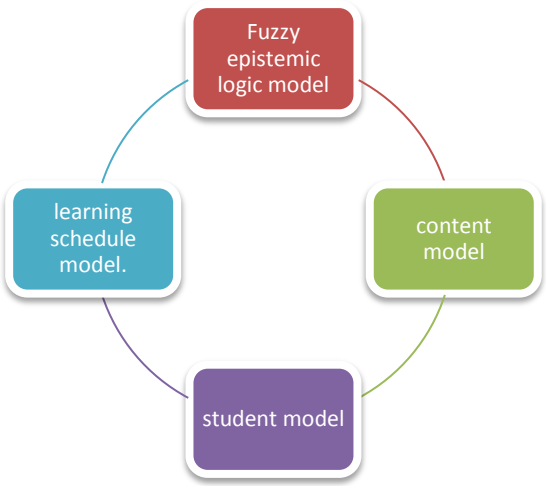

Figure 3: Fuzzy Logic Model

The profiling system recorded all the learning activities and interaction history of each individual student and stored them into the student profile database. Then, the profiling data will be abstracted into a student model and based on that student model and the content model, dynamic learning plans for individual students will be automatically generated. From this planning, students will get personalized learning materials, personalized quiz and personalized advices. The learning process for this system consists of learning materials, quiz, quiz analysis and learning analysis. Fuzzy rules have been applied in student and content model where it contains fuzzy values of the student's behavior and content model contains the definitions of each topic, the fuzzy relations between these topics and a number of fuzzy functions. In order to further improve the students' learning effectiveness, the developers had conducted a field survey and the result from the survey indicates that the prototype system makes great improvement on personalization of learning and achieves learning effectiveness. Fuzzy model is one of the examples of Artificial Intelligence usage in Intelligence Tutoring System.

Figure below is an example of Fuzzy Logic models;

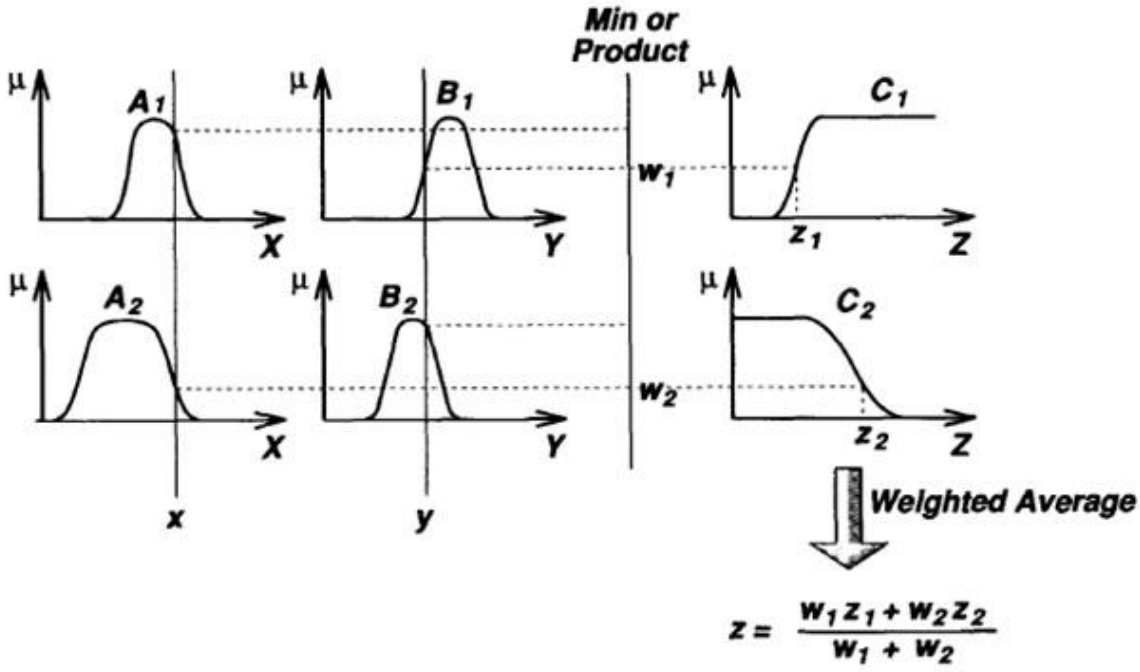

Figure 4: Fuzzy Logic Model 2

2.5 Scenario of Education System in Malaysia

In Malaysia, the competition in schools quite high especially school in urban areas such as Petaling Jaya, Shah Alam and Damansara. The expectation of students to excel in class and perform academically create an expectation of "must score straight As" in public examination. The extra burdens to succeed are being faced by the students of 12 years olds who are sitting for Ujian Penilaian Sekolah Rendah up to candidates of Sijil Pelajaran Tinggi Malaysia. As a result to this condition, the trend of sending the children to go for extra classes becomes popular among the parents as they try to get the best educational opportunities for their children. "The parents are willing to spend thousands just for the sake to get the best tutor in town".(Alycia Lim, 2011)

Rozanna Latiff in her article, New Straits Times dated 15th March 2011, quoted that a 36 years old mother, Sharon Lieu need to send her 8 years old daughter as she cannot keep up with her class in school. "The size of the class is so big that the teachers don't have time to help the few who cannot follow the lessons. Some teachers even told the students; "Ask your tuition teacher" when they told that they could not understand of the lessons (Latiff, 2011).

As for tuition classes, the students also face the same problem as the tuition centers are being established with the goal of profit maximization. They might here unqualified and experience teachers as the parents have the perception that," When you send your children to tuition, they will perform better in class" (Rozanna Latiff, 2011). The students will bring their school homeworks and they will seek for help from their tuition teachers. In the end, the tuition teachers are being paid to help the students to complete their schools' homeworks.

The new initiative of Ministry of Education of Malaysia to introduce school-based performance evaluation create a challenge for the teachers and school management as they need to have proper internal tests and examinations system. Few factors should be taking into consideration such as students' capability and numbers of teachers are very crucial in determining a school performance and rank. Besides that, school managements through Parents and Teachers Associations (PTA) highlight the importance of good communication between the teachers, parents and students. The combination between these three groups could become the crucial factor in ensuring the success of the students in academic field.

Therefore, it is a crucial need for schools to have their own internal examination system with the features of providing medium for teachers and students to conduct teaching and learning activities besides create a network of integrated communication between the teachers, parents and students.

2.6 Shyness

Shyness is a social psychology term used to describe the feeling of apprehension, lack of comfort, or awkwardness experienced when a person is in very close distance with others, being approached, approaching people which normally applied in new situations or with unfamiliar people. One of the widely known possible causes of this problem is the hereditary genetic traits besides the environmental of the children upbringing and also results from personal experience. The most common behavior displayed by those suffered with this issue is that they tend to avoid human beings and any situation which has the tendency to make them feel uncomfortable and inept which in certain cases may cause to the inability of expressing their feelings. Low self-confidence also one of the sign or cause factor for this issue which creating a gap between normal people and those who suffered this problem. According to Bernardo J. Carducci, director of the Shyness Research Institute, people who suffered this problem can be categorized as having introvert personality where they have high tendency to avoid social situations because they derive no reward from them, or may find surplus sensory input overwhelming. This situation will be misinterpreted by others which hinder them from participating or taking charge in any social activities which require socialization and communication. They are also unable to be at their relaxed posture and unable to make good eye contact.

Relating with the academic world, students with this type of personality might face difficulty in understanding what being taught by the teachers in class which could affect the academic performance. By the failure in coping with the pace of teaching and learning at school, introvert students might get dropped out as they begin to lose interest to learn and go to school.

Normal approach that being implemented in our education system is to put the students with this problem in a special class called ‘Kelas Pemulihan’ where intensive teaching and learning will be conducted after class hours. The effectiveness of this approach is entirely depending on the commitment given by both teachers and students. However, there are few cases where the students who participated in the special class faced great

stress as the special class is distancing themselves from other students. They also have the impression that they are stupid and underperformed. This kind of scenario is very dangerous as it could diminish the motivation of introvert students to learn and go to school.

2.7 Existing online educational webportal

Web portals and websites are widely used by schools in Malaysia which served as one stop center for news and announcement primarily besides providing a medium for teachers to share related materials at the portals or websites. Open source platforms like Joomla and Flash are used in developing the portals and websites.

Score A (http://skora.com.my/eng/index.cfm) is one of online education portal provider where users will be charged at certain amount of fees. Features like revision notes, past year examination papers, assessment and mock exam is being offered by Score A in helping the students to get better results in public examinations like UPSR, PMR and SPM. However, the relatively high fees may cause problems to parents with big number of children who are still in school as fee for Score A could reach about RM 100 per month for a student.

Research conducted shows that Modular Object-Oriented Dynamic Learning Environment or Moodle, an open source platform which specialized in e-learning is the most suitable platform to be used for the proposed Students' Academic Performance Accelerator System. In addition to that, many tertiary education institutions are using Moodle as the platform of e-learning.

Table below indicated the comparison between the existing Score A portal with SAPAS which supported by Moodle platform;

Table 1 : Comparison between functionalities of SAPAS and Score A

Features	SAPAS	Score A
Discussion Forum	YES	NO
Question Bank	YES	YES
Online Question	YES	NO
E-Report Card	YES	YES
Online Revision Notes	YES	YES

2.8 Conclusion

Education system in Malaysia nowadays is heading towards an advanced state in parallel with Malaysia vision to become a developed country. Teaching and learning can be conducted using technology as online learning provides various advantages to both students and teachers such as high degree of flexibility as 'brick and mortar' class is not needed anymore. The introduction of Smart School program and High Performance Schools indicated a serious effort by the Government to empower academic sector which has been recognized as one of the NKRAs. The concept of self-learning which the integral element of online learning becomes not will improve the quality of education system but also increase the competence of the students. SAPAS is being seen as a reliable solution to help students in accelerating their academic performance.

CHAPTER 3

METHODOLOGY

3.1 Research Design

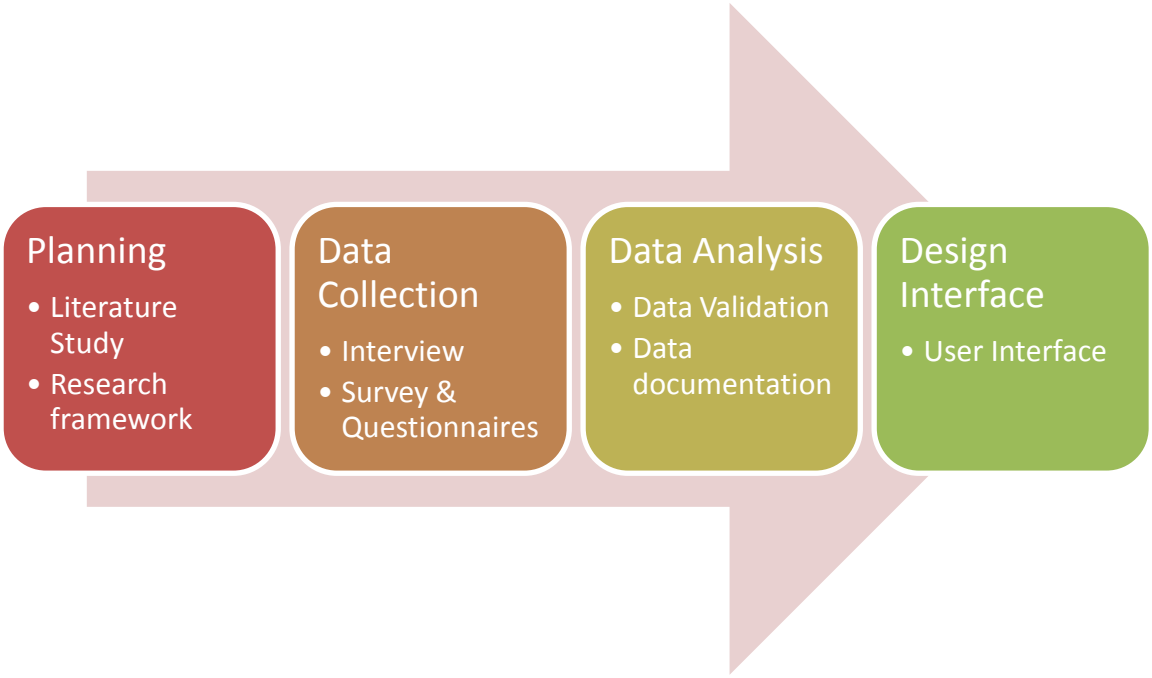

Figure 5: Research Construct

The approach that been used while conducted the research of the project is the constructive research. By using this approach, the steps for later stages become very clear as the elements in the construct will be clearly defined. The ultimate goal of this activity is gathering the requirements which can be used as the input in designing the

prototype. The very first element in this constructive research is conduct a very extensive study on the literature which for this project would be on subject of online learning and education scenario in Malaysia especially for teachers and students in primary schools which has been identified as the target niche. Research framework is been created to serve as guideline to monitor all activities while conducting the research.

The next element of constructive research is the data collection or gathering. The method that been used in gathering the information is through online survey to the UTP students on the subject of E-Learning as the medium of teaching and learning, and also interview sessions with the teachers, primary school students and few parents on the current problem that being faced besides the understanding on online learning concept. Table below shown the framework of the interview and survey sessions which had been conducted;

Table 2: Users Requirement Gathering Framework

Audience	Purpose	Validation	Examples
UTP Student	To discuss on the important elements of Moodle as platform for E-Learning	UTP student on the capacity of experienced Moodle@E-Learning users	*What is the most important function of E-Learning?* *How often do you use them in a week?* *What do you think of E-Learning practicality among primary school students?* *What is the current lacking of UTP E-Learning in terms of functionalities?*
Primary School Teachers	To discuss the challenges in teaching process & familiarity with Online Learning	Teachers with the hands-on experience with the students and subjects	*What is the biggest challenge during teaching?* *Is there any courseware management system provided in school?* *What are the actions taken in dealing with students of lesser*

			learning ability? *How to encourage students with learning difficulties?* *How familiar are you with online learning concept?*
Students	To identify and study the problems faced by the students & discuss the concept of online learning	Primary school students in Shah Alam with access to computers at schools and home	*What is the biggest challenge while learning in classroom?* *Do you need any supplementary classes like private tuition?* *How often do you communicate with teachers in classroom?* *Do you feel pressured to cope with parents' expectation?* *How familiarize are you with Internet application like online tuition?* *What do you think of learning through online?*
Parents	To study the parents attitude & discuss their views on online learning concept	Parents in Shah Alam who able to provide computer and Internet connection at home	*What is the most important factor in ensuring the excellence of the students?* *How importance is the tuition class?* *What is your action in helping the children to perform well in academic?* *Is it practical to conduct teaching and learning through online?*

The interview session are conducted using unstructured approach where most of the questions that been asked are open-based which the subjects can answer freely based on their experience and knowledge pertaining the question and issue that have been raised.

For data analysis stage, data and inputs gathered from survey and interviews are collected and analysed to produce several general conclusion on the issues that related to the project. The data collected then being verified through discussion with the involved parties and references to other past similar works.

The last stage of constructive research is to design the User Interface and System Architecture based on the input gathered and validated in the previous stage. The focal objective is to design suitable interface equipped with the functionalities which provided by Moodle as the platform used.

3.2 Prototyping Methodology

After hours of findings and researches, Throw Away prototyping method is been selected as the prototyping methodology approach in this project as its criteria meets the expectations and needs of this project.

This methodology is based on the outcome of the design experiment that intended to be discarded that flush out the initial requirement. This method is really effective in exploring new ideas and gaining more understanding the concept on the subject matter besides acquiring the feedbacks and output from the end users. In this scenario, feedbacks were taken through questionnaires which the outputs become the requirements of the project. As the preliminary requirements are identified, the next stage would be the building of layout and prototype of the application. In this project, several prototypes are expected to be delivered as the project is progressed.

There are a number of advantages of this prototyping method such as lowering the risk of proceeding with the prototype code into design and construction. The project will not progress into its second prototype unless the first prototype has been analyzed and new

requirements have been identified, apart from that, it helps the developers in visualizing the implementation of the new requirements besides reveal the weaknesses in the requirements that should be eliminated. As a result of that, the end users can determine whether the requirements will enable the necessary functions and processes to take place.

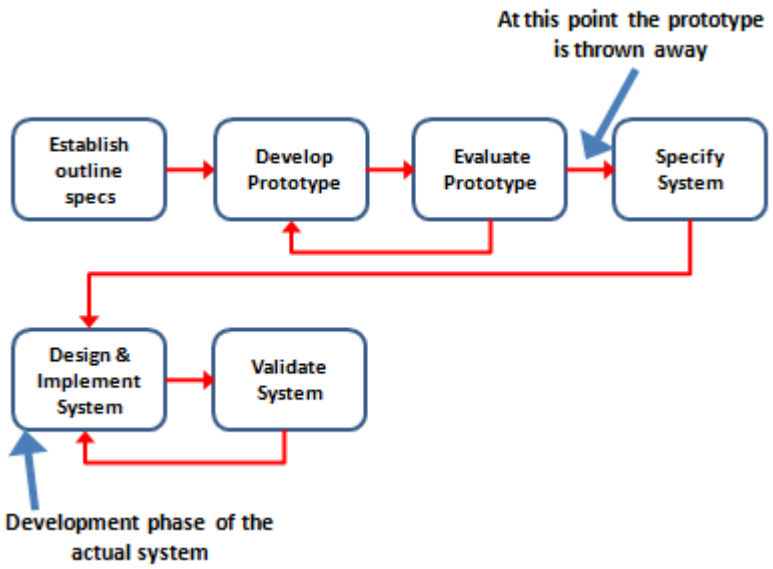

Figure 6: Throw Away Prototyping method

Why Throw Away Prototyping was chosen?

- Reveal gaps in the user requirements
- Users judge whether the requirements will enable the necessary business processes
- Helps the users to visualize the system being built
- Prototype can be built continuously which eliminate time wasting
- Visualize the real working system

In the process of designing and developing the prototype for this project, several numbers of prototypes will be delivered in parallel manner as the users constantly giving the feedbacks and suggestion to further improve this portal.

3.3 Project Activities

3.3.1 Planning

- Identify project title and area of study
- Conduct feasibility study
- Drafting project plan

Under this stage activity such as interviews, questionnaires, discussions and research will be conducted to identify the requirements of the system. Issue in education system particularly challenges faced by the students and teachers is selected as the domain area of the project. Tools and software needed also been identified in developing the functionalities of this system. Other requirements such as problem statement, objective and scope of the study also been defined as the guidelines for this project. Other deliverables such as Gantt chart and project timeline also been prepared in order to monitor the progress of this project and ensuring that it can be completed within the time given. Some ideas on expansion strategy of the prototype also being discuss for future works as the complementary activity for planning stage.

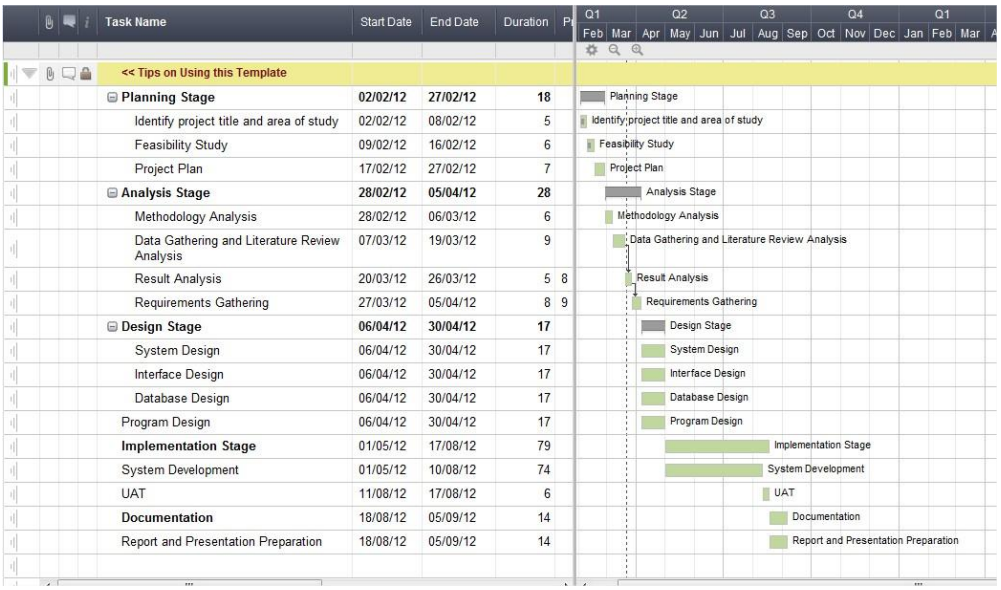

Figure 7: Project Gantt Chart

3.3.2 Analysis

- Methodology analysis
- Data gathering and Literature review analysis
- Result analysis
- Requirements gathering

The analysis will be based on the functionalities of the application which solely based on the discussions and requirements from the end users. The requirements or functionalities of this proposed project which have been identified through users' requirement process are;

- Question banks with three different level of difficulties which are Easy, Intermediate and Hard
- Discussion forums which to promote interaction among the students and the teachers
- Notes in form of Powerpoint Slides, Microsoft Word and pictorial forms which are accessible 24 hours in a day, 7 days in a week that can be used by the students as reference material
- E-Report card to track the progress of the student
- Online tests and quizzes which have time-based functionality as the users need to complete the activities within the time allocated
- Online Assignment Submission

3.3.3 Design

- System design
- Interface design
- Database design
- Program design

This phase is the most important stage in developing a prototype as the accurate design will ensure the effectiveness in terms of functionalities which aim the users' satisfaction. The level of complexity also becomes the deciding factor as the system architecture of this SAPAS should be in simplest means for the easy use of the users. The web portal prototype will be developed using suitable platform that suits the capability of the developer and fulfilling the expectation from the end users.

While designing the Intelligence Tutoring System, according to Anderson et al. (1987) eight principles for intelligence tutor design should be applied which are;

1. To represent student competency as the production set.
2. To communicate the structure of the problem solution.
3. To provide instruction in the context of solving the problem.
4. To promote abstract understanding of the problem-solving knowledge.
5. To minimize the working load memory.
6. To provide immediate feedback on errors.
7. To adjust the instruction size of the learning process.
8. To facilitate successive approximation to the target skill.

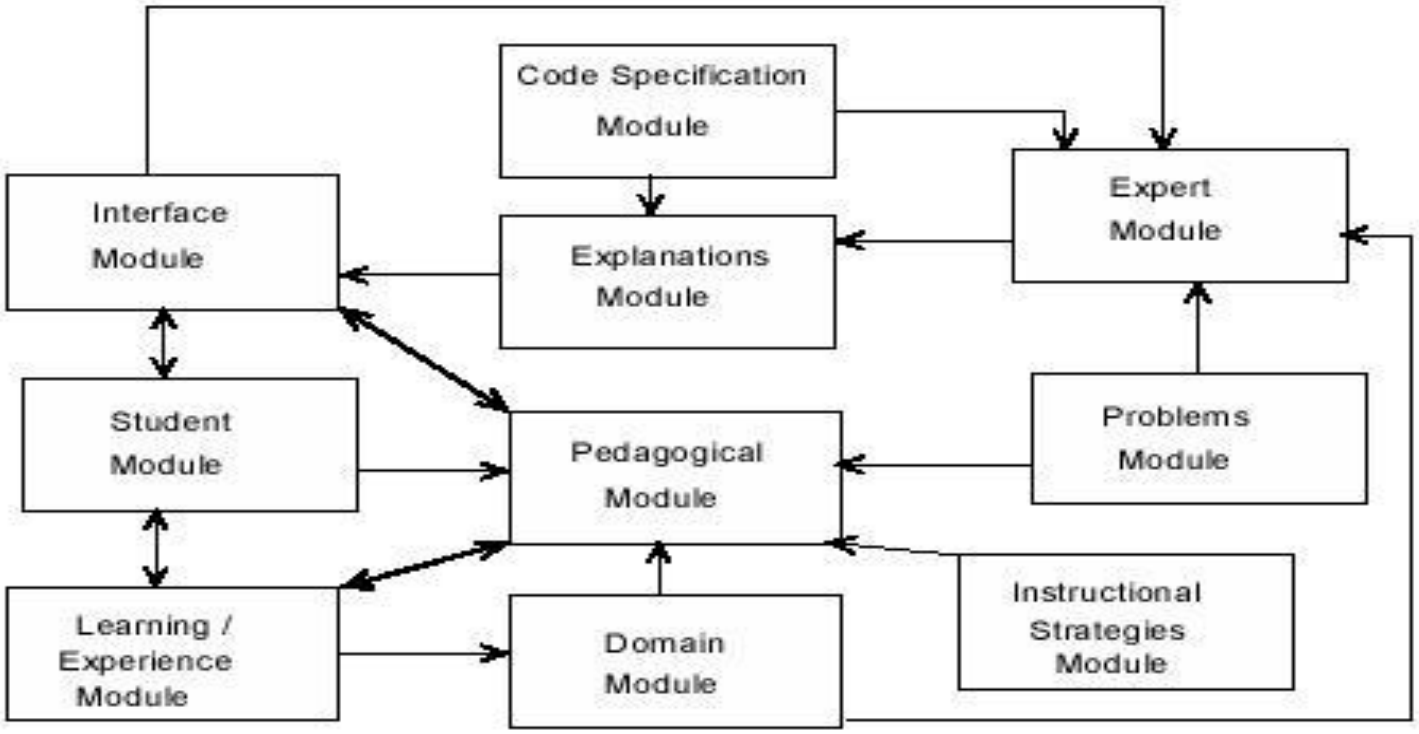

Figure 8 : Architecture of SAPAS

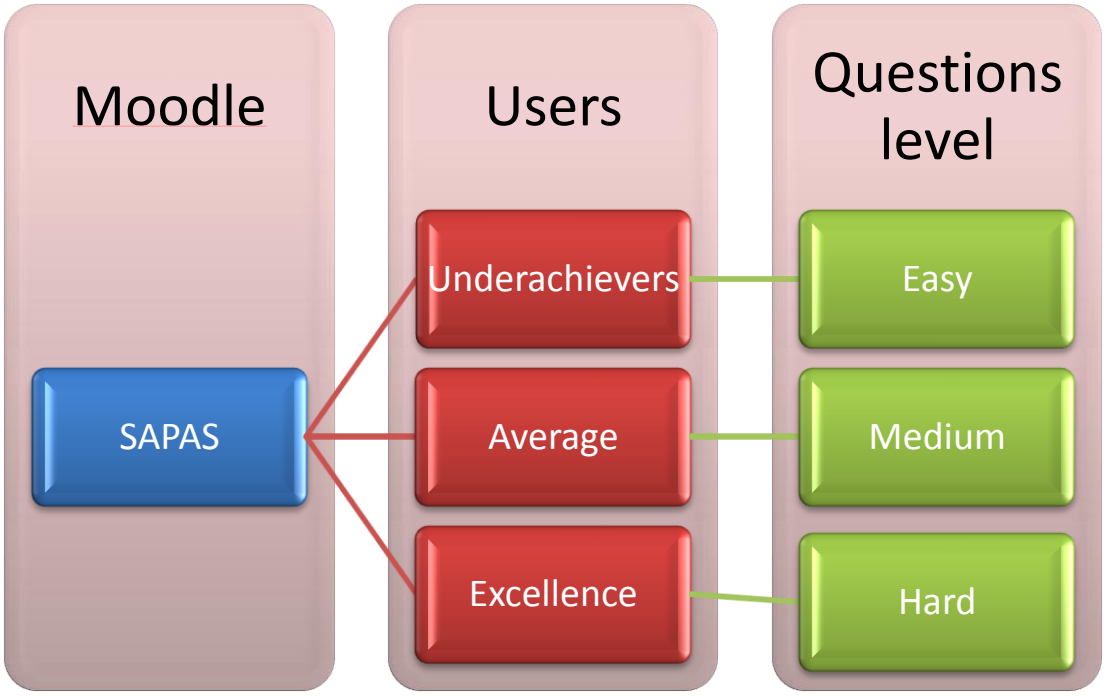

Figure 9: SAPAS Question Banks Framework

The concept of self-learning promoted in Students' Academic Performance Accelerator System will help the teachers in providing suitable action in helping the students' progress in the academic. One of the primary objectives of SAPAS is to highlight the need for teachers to help weak students to excel in academic. In order to support the objective, a specific architecture has been designed. Users of SAPAS are being categorized into three main groups based on the academic ability which are;

- Excellence
- Average
- Underachievers

Online tests feature in SAPAS is being used as the evaluation model where using question banks, three different levels of difficulty question sets can be made which are;

- Easy
- Medium
- Hard

A specific set of conditions has been made as the default rule of SAPAS which are;

- Easy-difficulty type of questions are meant for students of Underachievers group
- Medium-difficulty type of questions are meant for students of Average group
- Hard-difficulty type of questions are meant for students of Excellent group

Students who have been categorized into respective groups will get accessed based on the group. Stronger emphasize will be given to Underachievers group where teachers will give a lot of revision tests and sharing more materials in ensuring that the students of this group can excel in the academic. Students who scored consistent marks can upgrade themselves into higher-level group for example Student A who scored 85% of Underachievers can move into Average group. The ultimate goal is to ensure that zero number of students in Underachievers group which will prove the effectiveness of SAPAS in accelerating the students' academic performance. On the other hands, students who failed to project good results in the test can be downgraded into lower-status group.

The justification of differentiating students into different groups is to encourage learning at own pace where students will be suited into the learning capabilities. By understanding and capturing all the concepts, the students can develop the sense of confidence which will drive them into excellence in the academic field. Another justification that can be made for this approach is to ensure proper organization of students who need extra attention by the teachers as they are always being left behind for inability to catch up with the learning pace. Students are motivated to put consistent efforts and commitments towards learning as they want to be in the "Excellent" group which is encouraged by the competitiveness spirit among the students themselves.

3.3.4 Implementation

- System development
- Content management
- User and Acceptance Testing

At the final stage of this project, the final prototype is been expected to meet all the requirements and is able to perform these functionalities;

- Question banks and answer for the students
- Discussion forum for the usage of knowledge sharing between the teachers and students
- Revision notes and tips for quick and effective revision
- Electronic report card system that will generate student's individual performance for the parents' and teachers' references
- Fully functional news and announcement functionality for the purpose of disseminating the important information to the concerned parties

As for content management, suitable materials will be uploaded into the system mainly related to Ujian Penilaian Sekolah Rendah or UPSR subjects of Bahasa Melayu Pemahaman, Bahasa Melayu Penulisan, Bahasa Inggeris, Mathematics, Science and Ujian Aptitud. Materials will be ranged from revision notes, mind maps, sets of model test paper, past year examination papers, answer schemes for the usage of the students. In addition to that, interactive element also will be used to make the system more attractive by uploading suitable videos and games into the portal. The format will be in word processing documents (.doc), presentation format (.ppt) and others such as .pdf, and pictorial form.

The last step in this stage is to conduct users testing and analysis where SAPAS will be deployed offline on a personal laptop to test the functionalities and operability of the system. Few accounts will be created as the users of SAPAS and various activities such as discussing using Discussion Forum, conducting online tests, uploading the

assignments, sending private messages to teachers, creating question banks also will be created. Using the functionality in Moodle, graphical results of the students' performance in the online tests can be projected.

3.3.5 Documentation

- Finalizing prototype
- Writing technical reports

Documentation is the last stage of this project where a brief technical report is expected to be submitted for evaluation process. The report will contain the main idea of the project where particulars like objective, scope and literature review will be discussed. The report also required on the details of methodology, right from the planning process until the documentation of the project. The technical report also serves as an evidence to prove the originality of the project without any exact plagiarism from the existing projects.

3.4 Tools used

In the designing stage, Balsamiq mockups tool is used. This application provides the designer with all the necessary objects to be used in designing a mockup interface of a website or portal. The development of the portal is fully developed by using Moodle (Modular Object-Oriented Dynamic Learning Environment) which is a free source e-learning software which widely known as course management system.

1) Moodle as the platform for Intelligence Tutoring System

   In order to accomplish this project, all functionalities will be heavily leveraged on Moodle operability as content management system (CMS) which encourage virtual-learning environment (VLE). Moodle is the definite solution for pedagogy as its main elements are activities and resources. With the features like;

- Assignment submission through online
- Discussion forum
- Files sharing and download
- Grading feature which allow teachers and parents to monitor the progress of the students
- Instant messages
- Online news and announcement
- Online quiz which can be moderated in-house; teachers as the coordinators can develop the questions on their own
- Question banks which serve as repositories which either can be manual created by the teachers or directly imported from external resources in format of Moodle XML for example

Then, there are other three important stages which includes design, development (front-end and back-end) and testing. In design stage the web portal is designed by using Adobe Dreamweaver and Balsamiq Mockup Tools. In testing stage, the product is conducted by using XAMPP APACHE Web Server in which it will be hosted in my computer hard drives. Besides that, Adobe Photoshop CS5 application also will be used to design images and figures to be put in the web portal. In a nut shell, these are the list of tools required to develop this project:

- Balsamiq Mockups
- Moodle
- XAMPP webserver
- Adobe Photoshop CS5
- Adobe Dreamweaver

CHAPTER 4

RESULT AND DISCUSSION

4.1 Gathering Requirement Analysis

Gathering requirement is one of the most crucial processes prior to development of SAPAS. Few groups have been identified as the focal group in providing the requirement of the project. Methods such as online survey, questionnaires and interviews are conducted with the UTP students, teachers and students from Sekolah Kebangsaan Seksyen 24, Shah Alam and few parents in Shah Alam Figure below shown the users involved with the respective objectives of the requirement gathering processes;

Table 3: Users with their Objectives for Gathering Requirement Activity

Users	Objectives
UTP Student	To discuss the important elements of Moodle
Teachers	To discuss the challenges in teaching process & familiarity with online learning
Students	To identify and study the problems faced by the student
Parents	To study the parents' attitudes

Online survey and questionnaires have been conducted among UTP students with the primary objective to discuss the important elements in Moodle. Another objective is to identify the functionalities that useful to students. UTP students are being chosen as the target group for the experience and familiarity using Moodle as the e-learning platform. Among the questions that have been asked to the UTP students are;

- What is the most important function of E-Learning?

  Most of the respondents respond that sharing the course material is the most important purpose of E-Learning as Moodle is being used by the lecturers to share notes and presentation slides with the students. Moodle allows students to access the materials 24 hours – 7 days in a week. There are few responds stated that the news and announcement is quite important as students can check for any updates from the lecturer on Moodle. Announcements such as details on the test, presentation schedule are among the items that always being regularly checked by the students.

- How often do you use them in a week?

  For this question, there are various answers which majority of them assessed e-learning portal on daily basis as students are looking for updates from the lecturers. They are also utilizing the discussion forum to discuss on a particular topic among themselves and also with the lecturers. The students can share ideas regarding on the solutions for the assignments which encourage the participation and communication between them. The functionality of private messages also been used by the users as a communication tool.

- What do you think of E-Learning practicality among primary school students?

  For this question, there is a very obvious response as almost half of the respondents think that it is practical to implement in primary school while other half oppose the idea. Those that agreed with idea stated that the familiarity of primary schools students with the Internet will become the critical factor in implementation of e-learning as part of teaching and learning activities. In

addition to that they agreed that it is a good approach to expose students with online learning at the early age.

- What is the current lacking of UTP E-Learning in terms of functionalities?
  In terms of functionalities, UTP students feel that the current lacking of UTP E-Learning is the question banks as they feel the needs of doing exercises which could help students to better prepare for the final examination. Past examination papers can be uploaded into question banks which should be accessible to the students.

Another approach that been used in gathering the users' requirement is by interviewing teachers with the objective to discuss on the challenges during teaching activities and also on the familiarity with the online learning. These are the questions that been asked to the teachers;

- What is the biggest challenge during teaching?
  Majority of the responses stated that the biggest challenge during teaching activities is coordinating a huge size of classrooms as they were unable to give enough and appropriate attentions to the students who needed the most especially those who are having difficulty in understanding the subject taught as they have lesser abilities that other most students. Apart from this, there is a small portion of respondents that giving responses like managing the course materials, time management between teaching in classrooms and other extra-curricular activities outside the classrooms, encourage students to induce self-learning and few mores.

- Is there any courseware management system provided in school?
  Based from the responses given, one deductive statement can be made which no proper courseware management system is provided by the schools via online as every material are stored in hard copies as in filing system. CD-ROMs contained course materials and resources also being provided to the teachers as the

teaching guide. However, they felt that this approach is not effective as the CDs might get lost or inaccessible. If such system in existed, the implementation would be very minimum or the system would be based on individual's initiative (teacher) instead of collective (school) as a platform in storage and handling the resources.

- What are the actions taken in dealing with students of lesser learning ability?
  The most reliable approach that been taken by teachers in dealing with students of lesser learning ability is by conducting special classes known as 'Kelas Pemulihan'. This special class will help the students who failed to understand the concepts taught in normal class to better understand as pace of teaching is being slower to match the students' capabilities. Another advantage of this approach is the teachers are able to allocate more individualized attention time thus helping the students to deal with the problems faced by each of the student in the extra class. The drawback of this approach would be the 'gap' experience between the students who participated in 'Kelas Pemulihan' with the normal student which in certain cases they will feel inferior and experienced low-self-esteem when communicating and socializing.

- How to encourage students with learning difficulties?
  Based on the responses given by the teachers, majority of them feels that the best approach to be undertaken in encourages the students with learning difficulties is to develop self-confidence among the students by giving a lot of exercises from the easiest difficulty up until the hardest difficulty. Apart from that, teachers should give personal coaching to the students in need of assistance and attention from the students. Students sometimes feel shy to ask in public as they prefer to approach the teacher in person to ask for assistance in resolving the issues on subjects. Some teachers feel that by slowing the pace of teaching might prevent those students from being left behind as they also can capture the concept of

subject taught. However, this approach might affected other students as they might get bored to wait for the teachers before proceeding to the next subtopic.

- How familiar are you with online learning concept?
  Based on the respondent given, there are considerably number of teachers have familiarity with online learning as they have undergo training in applying the learning concept. The training also becomes one of the requirements upon the completion of teaching training. The implementation of technology in education is very significant as teaching process can be conducted more effectively. The respondents stated that they are familiar with the objective, scope and impacts of online learning as they have hands on experience in using the system or platform while training or their studies back in university's days.

Students from Sekolah Kebangsaan Seksyen 24, Shah Alam have been interviewed in order to gather the users' requirements for this project as students have been identified as the primary users of the project. All the inputs given by the students are really important in identifying the important features of the system besides area of improvements that can be suggested towards improving their academic performance with the help of Students' Academic Performance Academic System.

- What do you think of learning through online?
  Most of the students have basic understanding on the concept of learning through online as resources can be gathered through Internet such as online tutoring. Few of them have exposure on the system by having experience in using the application. However, they do not understand the impacts or the depth knowledge of teaching and learning conducted. The idea of learning through online is generally accepted as students are equipped with proper facilities at home such as computer and Internet connection. Learning through online also will provide a whole new experience which will further increase the interest among the students to learn new things every day.

- What is the biggest challenge while learning in classroom?

  Among the biggest challenges faced by the students while learning in classroom is catching up with the pace of teaching as teachers might prefer to teach at fast pace and often skip subtopics or chapters with the reminder to read at home. However, after reading and studying, students might fail to get proper understanding on the concept as they need proper explanation by the teachers. Apart from that, there is no platform provided for the students to access the learning materials in the future as all notes are based on individual efforts copied by the teachers.

- Do you need any supplementary classes like private tuition?

  Based on the respondents given, majority of them are agreed on the need of supplementary classes like private tuition as there are few major factors which disrupt the learning activities in classrooms. Among the factor identified is huge size of classroom which caused the teachers to give less attention to the students. As a result, the students failed to capture the understanding thus need for supplementary lessons like private tuition. By attending the extra classes, students can reinforce their understanding besides gaining extra knowledge which is useful in mastering the concept of a subject or theory.

- How often do you communicate with teachers in classroom?

  Based on the respondents, majority of them are aware on the importance of frequent communication with the teachers as they can get better understanding on the subject. However, there is no specification on how often the students communicate with their teachers as the basis of communication is upon the necessities. Students will communicate with the teachers if they did not understand on the subject.

- Do you feel pressured to cope with parents' expectation?

  Students cited that parents have the perception of to ensure a good future, ones must excel in academic. Education system in Malaysia which is academic-oriented also becomes the driven factor in pursuing academic excellence which will create unnecessary pressure and stress among the students. Parents' initiative in sending their children to tuition classes also burdened them as they have lesser time for leisure activities. This condition will lead to bigger impact situation such as over exhaustion and imbalance schedule between study and play time.

- How familiarize are you with Internet application like online tuition?

  A larger portion of the respondents knew about the existence of online tuition portal like Score A which students will do several exercises and question sets on the Internet. However, only a few have experienced in using such application due to relatively high fees charged to the users. There are few portals that provided question model tests without any charge like Portal Pendidikan Utusan (http://www.tutor.com.my/)

Random subjects of parents in Seksyen 24, Shah Alam has been interviewed in order to get the feedbacks and views on the implementation of online learning. Among the questions that have been asked are;

- What is the most important factor in ensuring the excellence of the students?

  Majority of the parents agreed that the deciding factor in ensuring the excellence of the students is the availability of good facilities which ranged from conducive environment, quality and committed teachers and in-depth teaching materials and resources. In addition to that, few opted for unanimous supports by parents also played a huge role towards encouragement of students' excellence in academic field.

- How importance is the tuition class?

  A general conclusion that can be made is that the parents feel it is a necessity for them to send their children to go for tuition classes. They feel that at tuition class, their children can get better understanding and proper attention from the tutors as they are willing to spend just for the sake of getting the best education for their children.

- What is your action in helping the children to perform well in academic?

  In order to ensure the excellence performance of the children in academic, among the actions taken by the parents are sending their children to go to tuition classes, buying exercises and reference books, continuous monitoring on children progress in class and constant communication with the teachers and tutors.

- Is it practical to conduct teaching and learning through online?

  Based on the responses given, most of the parents are excited with the prospects of teaching and learning through online as it will provide a new experience which could encourage and attract their children towards interactive learning process. They also appreciate the importance of Information Technology in helping teachers and students activities becomes easier.

Based on the analysis of the requirements' gathering and the functionalities supported by Moodle, the elements of Students' Academic Performance Accelerator System are;

i. News and Announcement features
ii. Interactive videos and games
iii. Electronic Report Card
iv. Online assignment submission
v. Discussion forums

vi. Revision notes

vii. Online tests and quizzes with grading features

viii. Question banks with three different difficulty levels (Easy, Medium, Hard)

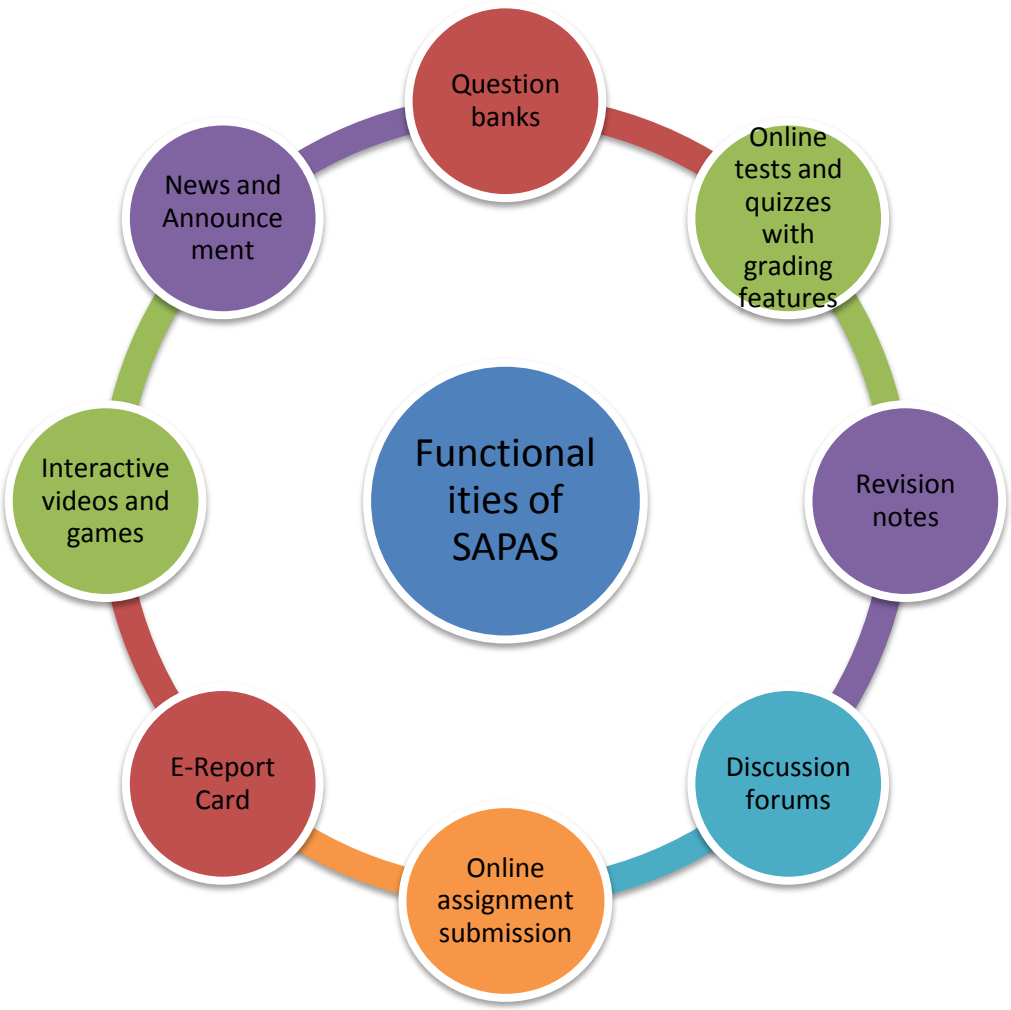

Figure 10: Functionalities of SAPAS

4.2 Online Grading Feature

Online Grading feature is one of the elements of Students 'Academic Performance Accelerator System. Activity like online tests and quizzes can be conducted based on the question banks as the grading process can be done instantly right after the students completed the activity which being held in certain period of time allocated. This functionality is very useful as students can get the results of the tests or quizzes anytime anywhere once they completed the tasks.

	First name / Surname	Email address	Started on	Completed	Time taken	Q. 1 /5.00	Q. 2 /5.00	Q. 3 /5.00	Q. 4 /5.00	Q. 5 /5.00	Q. 6 /5.00	Q. 7 /5.00	Q. 8 /5.00	Q. 9 /5.00	Q. 10 /5.00	Q. 11 /5.00
	Sariyanti Nazri Review attempt	student13@yahoo.com	26 July 2012 07:12 PM	26 July 2012 07:15 PM	2 mins 52 secs	0.00 ✗	5.00 ✓	5.00 ✓	- ✗	- ✗	- ✗	- ✗	- ✗	- ✗	- ✗	- ✗
	Michael Carrick Review attempt	student01@yahoo.com	26 July 2012 08:45 PM	26 July 2012 08:48 PM	3 mins 42 secs	5.00 ✓	0.00 ✗	0.00 ✗	5.00 ✓	0.00 ✗	5.00 ✓	5.00 ✓	0.00 ✗	0.00 ✗	5.00 ✓	5.00
	Wayne Rooney Review attempt	student02@yahoo.com	26 July 2012 11:09 PM	26 July 2012 11:13 PM	4 mins 2 secs	5.00 ✓	5.00 ✓	0.00 ✗	5.00 ✓	0.00 ✗	0.00 ✗	5.00 ✓	0.00 ✗	0.00 ✗	5.00 ✓	5.00
	Steven Gerrard Review attempt	student03@yahoo.com	26 July 2012 11:23 PM	26 July 2012 11:24 PM	1 min 16 secs	5.00 ✓	0.00 ✗	0.00 ✗	5.00 ✓	5.00 ✓	0.00 ✗	- ✗	- ✗	- ✗	- ✗	- ✗
	Keisuke Honda Review attempt	student04@yahoo.com	26 July 2012 11:26 PM	26 July 2012 11:58 PM	31 mins 46 secs	5.00 ✓	5.00 ✓	0.00 ✗	5.00 ✓	0.00 ✗	- ✗	- ✗	- ✗	- ✗	- ✗	- ✗
	Javier Hernandez Review attempt	student05@yahoo.com	27 July 2012 12:42 AM	27 July 2012 12:48 AM	5 mins 8 secs	5.00 ✓	0.00 ✗	5.00 ✓	5.00 ✓	0.00 ✗	0.00 ✗	5.00 ✓	5.00 ✓	5.00 ✓	5.00 ✓	0.00
	Christiano Ronaldo Review attempt	student06@yahoo.com	27 July 2012 12:51 AM	27 July 2012 01:11 AM	19 mins 35 secs	5.00 ✓	5.00 ✓	0.00 ✗	5.00 ✓	0.00 ✗	0.00 ✗	5.00 ✓	5.00 ✓	5.00 ✓	5.00 ✓	5.00
	Overall average					4.29 (7)	2.86 (7)	1.43 (7)	4.29 (7)	0.71 (7)	0.71 (7)	2.86 (7)	1.43 (7)	1.43 (7)	2.86 (7)	2.14

Figure 11: Statistical Table for Test 01

Figure above shown the statistics for each of the questions of the test based on every student who enrolled in the course did the activity. This analysis feature is very useful to teachers as they are able to identify the areas of weaknesses for the students as they can plan for few approaches in emphasizing on the particular topics and theories related to the areas. In addition to that, the students also can gain the idea of the areas to be improved based on the statistical results in order to accelerate their academic performance prior to the real UPSR examination. Among the information provided is the time taken to complete the questions which the teachers can identify whether the

students are cheating or receive assistance in the tests or quizzes should the time taken to answer the question is too short.

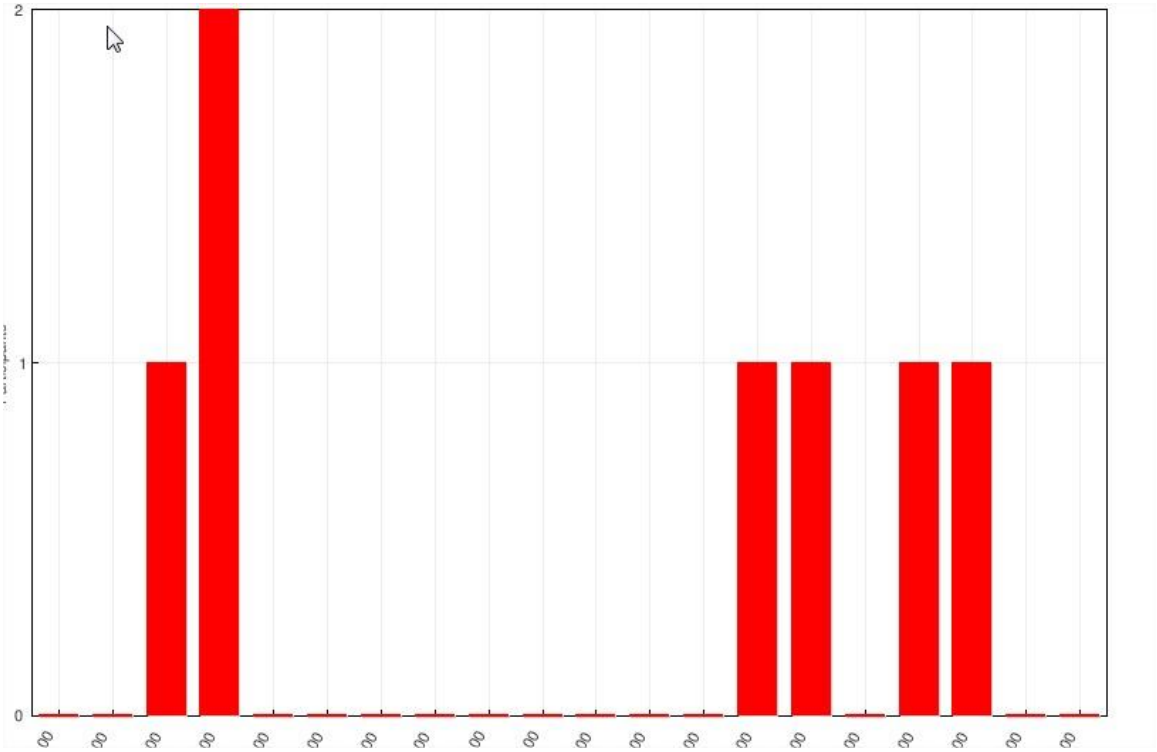

Figure 12: Statistical Graph of Test 01

Figure above shown the marks attained by the students in the test conducted. This statistical graph will provide information in general on the number of students who performed excellently, averagely and badly in the tests. Teachers can make future projections based on the trending of the graphs thus allowing them to plan strategies in accelerating the academic performance of the students.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The web portal consists of five main features which are time-based online questions which can be used as examination or test questions, question bank, revision notes, e-report card, and also discussion forums which is also consists of real-time video conversation.

In online questions module, the portal provides sets of questions for UPSR, PMR and SPM students where they can answer them via online and their achievement will be recorded by the system. At the end of the class or monthly, e-record card will be sent to their parents. The second section of the portal is question bank where the students can download softcopy of past year's examination papers. In revision notes section, the students will be provided online notes taken from text books. Hence, this method will increase their willingness to study and refer to notes if they have difficulties to answer particular questions.

As for question banks, SAPAS provide archived past examinations paper in PDF format which can be used by the students and teachers. These sets of questions can be printed out as the additional exercises besides giving the exposure the pattern of the past year questions. Past examinations such as past year PMR and UPSR paper can help the students and teachers to analyze and spot target what kind of question will be asked in that particular year.

Discussion forum is a feature that serves as a communication medium which can be used by the students to discuss among themselves with the involvement of teachers to further improve the level of understanding on a subject or topic. By sharing opinions and

idea, students can eliminate the uncertainties that might confuse themselves of a subject that been taught during the class hours. This tool also can be used by parents and teachers to discuss on the strategy to improve the performance and progress of the students as source of the problems can be identified.

The electronic report card or E-Report Card system then will provide the parents or the guardians on the current progress of their children academic performance in class. This feature is could be very helpful as most of the parents are committed to rigid office hours which become an obstacle as they were asked to attend a meeting with teacher in school. Schools in city area such as Kuala Lumpur and Selangor, many students brought back home the report card instead of their parents came to school, discuss with the teachers on the steps can be taken to accelerate the performance of the students in class and examinations especially.

5.2 Recommendations for Future Works

There are wide areas and scopes in improving Students' Academic Performance Accelerator System as the primary drive of this project is to help students in accelerating the academic performance. The constant changes in technology encourage the evolution in education as IT and Internet will play a dominant role in teaching and learning activities.

Students' Academic Performance Accelerator System: an Online Tutoring System for Accelerating Students Academic Performance Using Moodle project was conducted in two semesters (8 months) which is not enough as obstacles and challenges halt and limit the progress of the project. One of the recommendations to further improve the project is to provide manual guide and conduct training for SAPAS's users. This manual guide is very useful for the first-timer users who do not have any experience or familiarity with Moodle or any e-learning platforms. Manual guide then will describe every single step needed in using the SAPAS ranged from the teachers as the course administrator with the brief instructions in managing the course materials (uploading, deleting and

updating) and also to students such as enrolling in the course, posting an entry in discussion forum. To increase the effectiveness of the manual, users training sessions should be conducted so that the users can have hands-on experience with the system.

Another idea for improvement of the project is to implement SAPAS at other examination level such as PMR and SPM which requires more course materials. Currently SAPAS only supports for UPSR examination level with the scope on six subjects namely BM Pemahaman, BM Penulisan, Bahasa Inggeris, Science, Mathematics, and Aptitude Test. In addition to that, the implementation of SAPAS can be applied to other non-examination classes as SAPAS can be used as a very reliable platform in practicing School-Based Examination program introduced by the Ministry of Education. The burdens among the teachers are greatly reduced as proper actions can be taken in helping students with issues in learning.

Apart from that, other idea for future work is the integration of SAPAS with the school portals to act as in-house resource center for students and teachers. SAPAS can be customized at for each specific school as logo and any identity-related can be put at the portal. The top banner can be customized by putting the school's colours, logo and other information. Linkage to other pages can be provided at the system as a quick way to other related-websites. The integration will help the school and teachers to properly maintain the information and resources in systematic manner as any updated announcement can be made through SAPAS.

Other improvement that can be made on SAPAS is enriching the content by putting more materials into the system. Other than revision notes and question banks, new approach of uploading interactive videos and games into SAPAS will make the system more attractive to the users especially the students. By having the videos, students can get better understanding as the contents of the videos provide understanding that understandable for schools' children. Contents of other unrelated academic subjects also can be uploaded into SAPAS such as Thinking Skill subjects which will provide the students of additional knowledge which is useful in human capital development.

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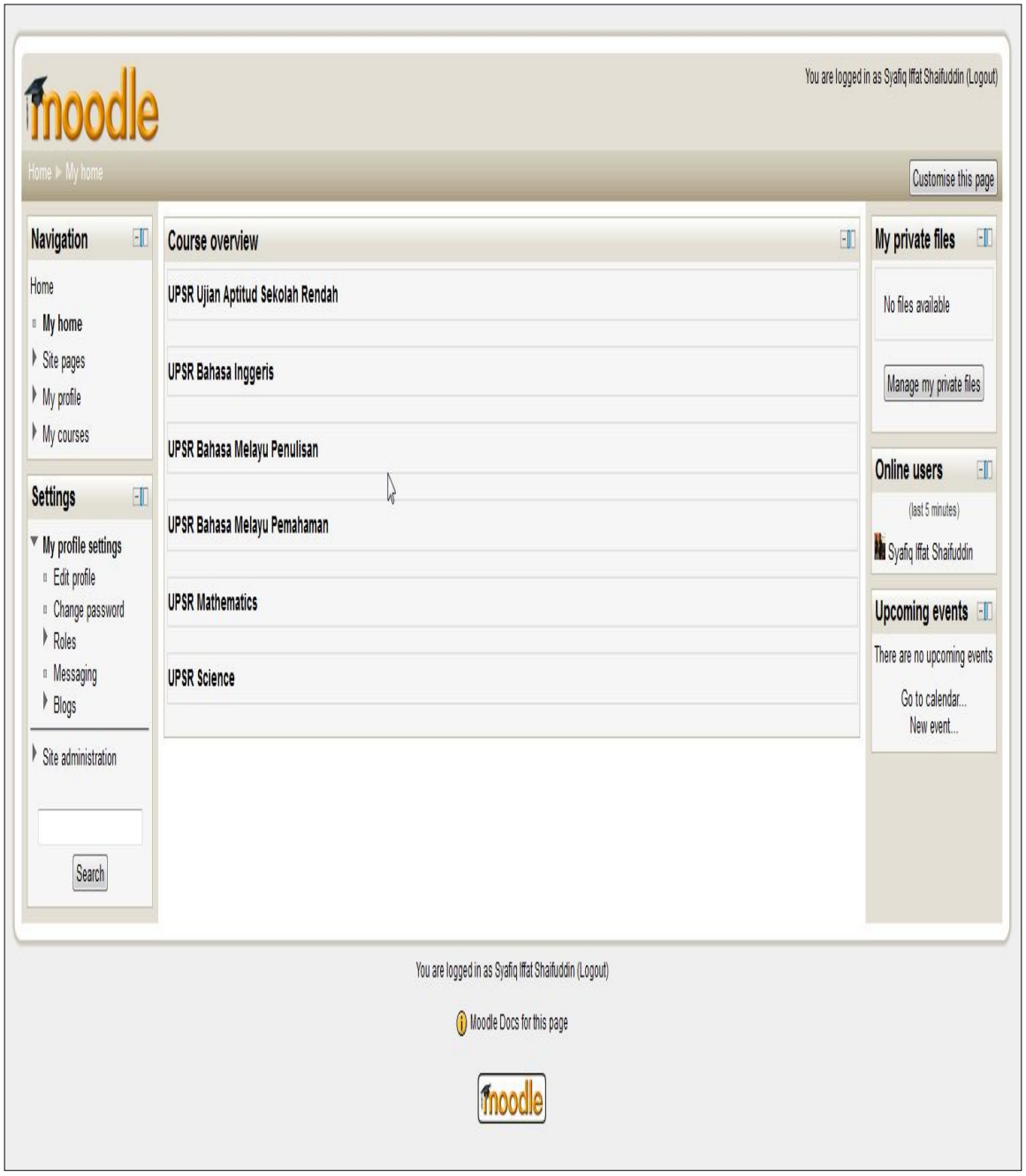
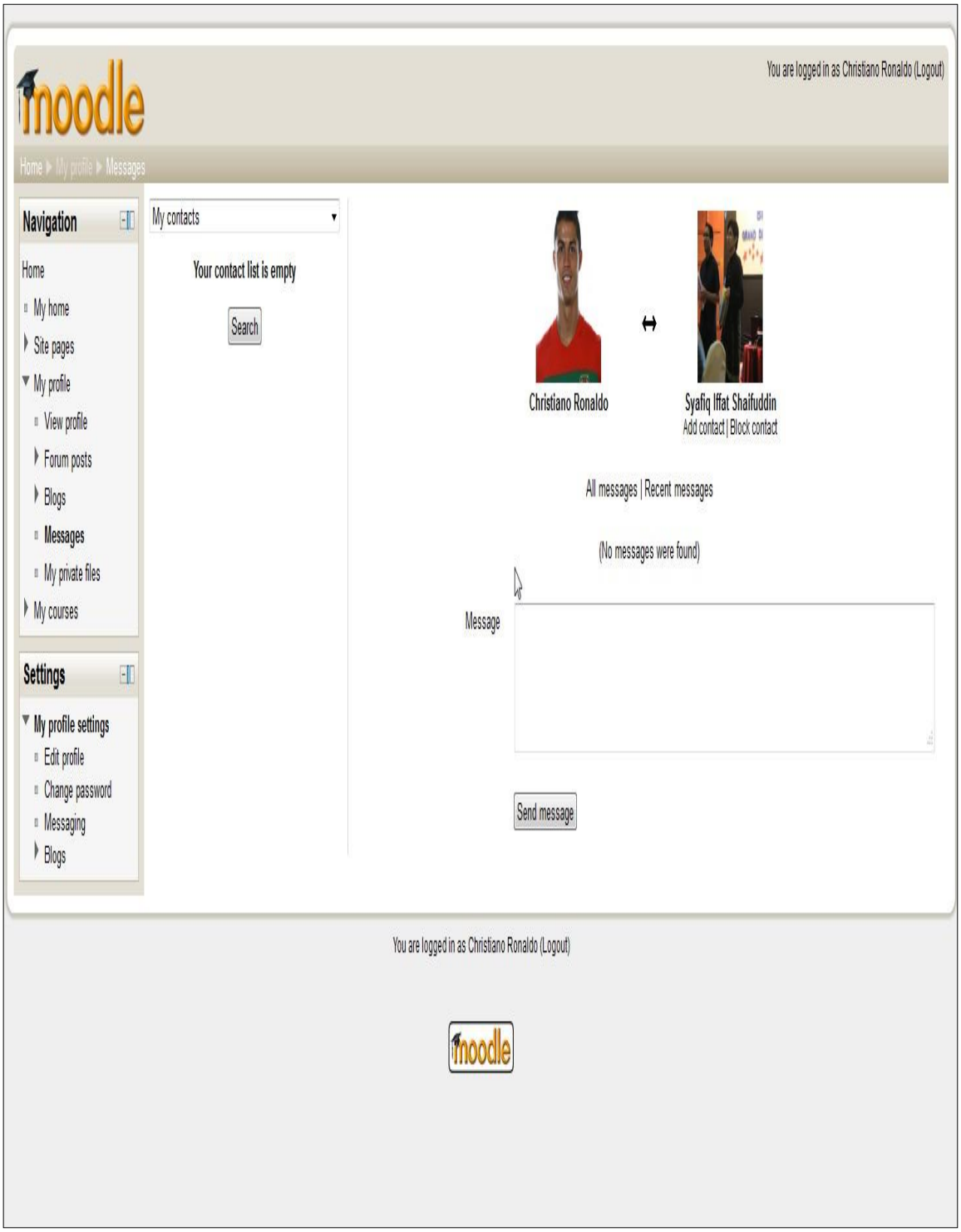
A P P E N D I C E S

Screenshots of Student Academic Performance Accelerator System

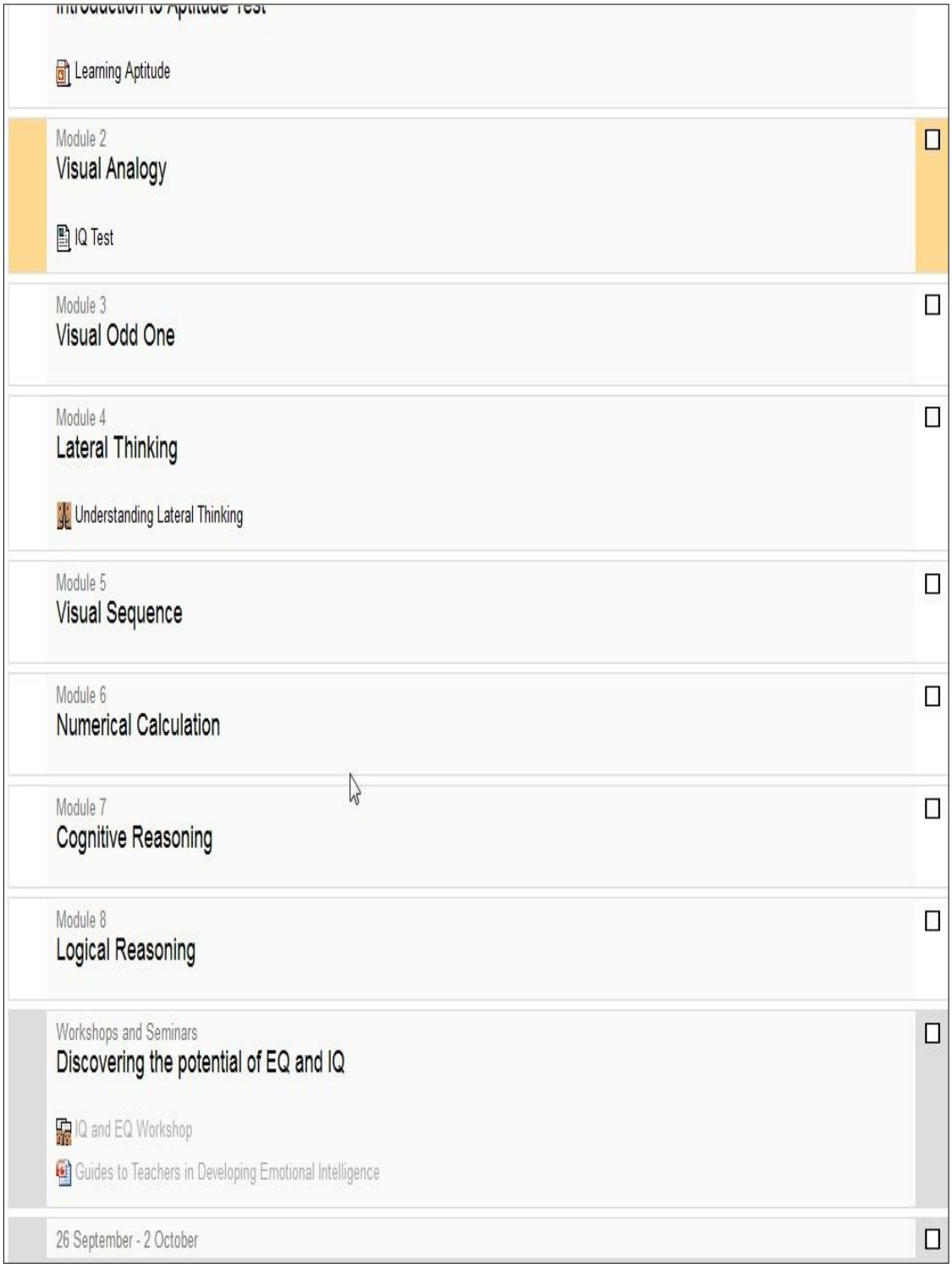
1) Homepage



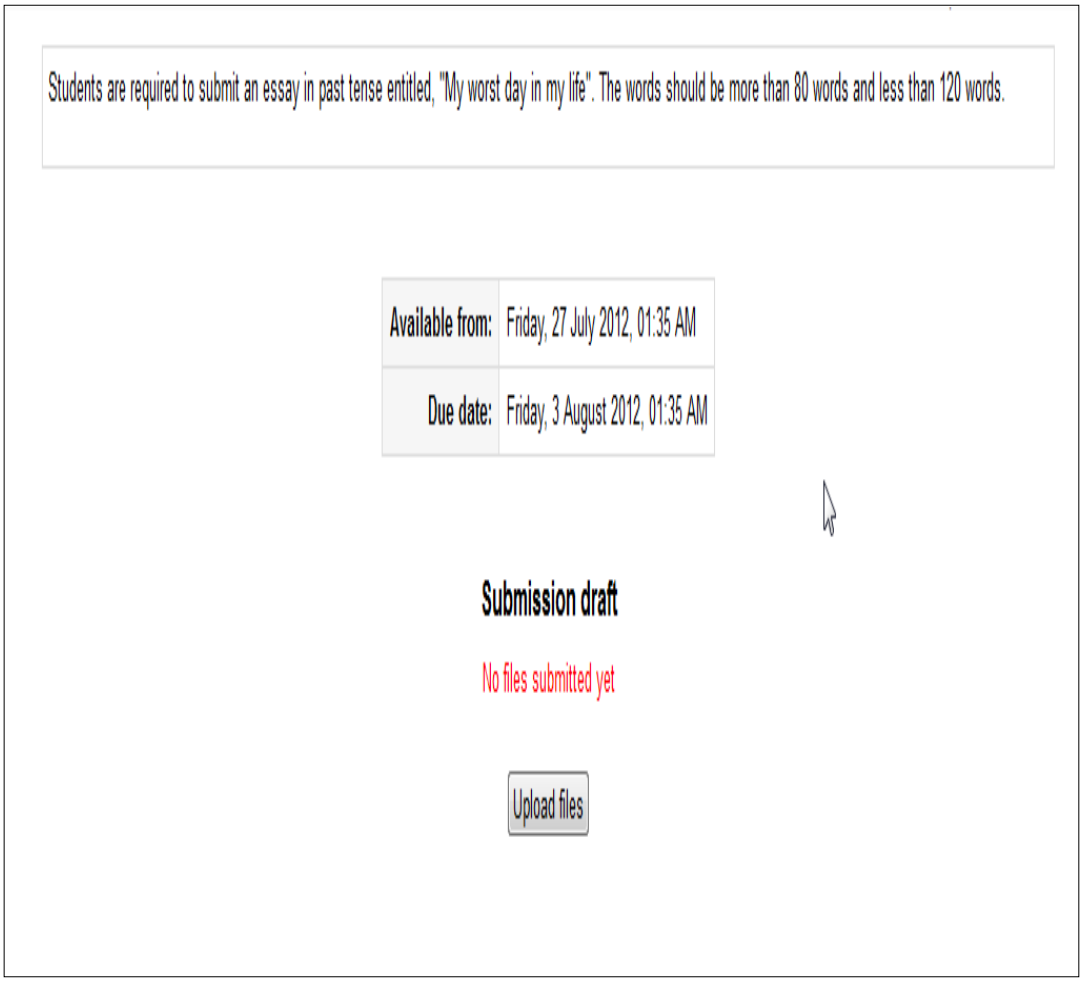
2) Messaging feature



3) Courseware content



4) Assignment submission



5) Discussion Forum