ONLINE ASSESSMENT FOR SMART LEARNING

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Abstrak

Aplikasi web menjadi semakin penting dalam bidang pembangunan perisian memandangkan perkembangan pesat Internet sebagai rangkaian komputer yang paling banyak digunakan di seluruh dunia.

Sistem Pentaksiran Online Untuk Pembelajaran Bijak yang dibangun dalam projek ini merupakan satu contoh aplikasi web yang akan digunakan di Sekolah Menengah Tun Abang Haji Openg. Projek ini akan mewujudkan persekitaran ujian tanpa kertas, melalui aplikasi web yang mempunyai kandungan yang padat, interaksi yang lebih menarik, dan dinamik. Sistem ini mengaplikasikan pentaksiran berasaskan kriteria seperti digariskan oleh Kementerian Pendidikan Malaysia. Sistem ini juga dibenek untuk pentaksiran subjek Teknologi Maklumat yang diajar kepada pelajar Tingkatan Empat dan Tingkatan Lima. Dalam proses itu, Sistem Pentaksiran untuk Pembelajaran Bijak dapat membantu guru yang mengajar subjek Teknologi Maklumat untuk menghasilkan pentaksiran berasaskan komputer. Para pelajar dapat memantau diri sendiri dan ini membantu mereka lebih arif dengan bahan yang dipelajari.

Projek ini dibangunkan dengan mengaplikasikan teknologi web, yang menggabungkan dokumen Hypertext Markup Language (HTML) dengan Active Server Pages (ASP). Kedua bahasa pengaturcaraan ini menggabungkan pemprosesan skrip ASP oleh Microsoft Personal Web Server (PWS) melalui sistem pengoperasi Windows 98.

Web-based application of rapid growth

Online Assessment implemented in a paperless assessment platform.

In this project, the Active Server Pages server platform.
ABSTRACT

Web-based application becomes more significant in the software development area because of rapid growth of Internet as the largest computer network in the world. The

Online Assessment For Smart Learning project is a web-based application that will be implemented in Sekolah Menengah Tun Abang Haji Openg. The project will benefit creating a paperless assessment environment through a web site that is content-rich, interactive, easy navigation and dynamic application. The system is using assessment based on criteria as highlighted by the Ministry of Education. The targeted user of the system is Form Four and Form Five students for Information Technology subject. Besides that, the system provides functionality for the teacher to create computer-based assessment. Students learn comprehensively because they are able to assess themselves and it helps them understand better.

In this project, the web technology combines HTML documents and the embedded Active Server Pages scripts (ASP) by Microsoft Personal Web Server (PWS) on Windows 98 platform.
CHAPTER 1: 
An Overview

1.1 INTRODUCTION

Information for Malaysians Malaysia has

The MSC working to realise Vision of Smart Schools organization.

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[23])

The system Kebangsaan targeted for subject.

applies Smart School subject.
1.1 INTRODUCTION

Information Technology (IT) is becoming more important this era. It is necessary for Malaysians to be IT literate as it helps them to use computers effectively. Now, Malaysia has developed the Multimedia Super Corridor (MSC).

The MSC will accelerate Malaysia's entry into the Information Age and this helps to realise Vision 2020. One of the MSC flagship applications is the implementation of Smart Schools. As the MSC flagship application increased, a number of organizations are assigned to ensure its success. The lead agency is the Malaysian Ministry of Education [20]. The Ministry of Education is revising its teaching and learning models to shape Malaysian students into information technology literate.

"An exciting development of our education system is the creation of Smart Schools. Smart Schools are being planned in stages nationally, not only to meet the requirement of the Multimedia Super Corridor, but also to create a new generation of Malaysian-Malaysian who are more creative and innovative in their thinking, adapt with new technologies and able to access and manage completely the information explosion."

(Dato' Sri Mohd Najib Tun Haji Abdul Razak, The Minister of Education, Malaysia [21])

Smart Schools are established to ensure a dynamic and lively learning environment. The roles of teachers have changed to facilitators. Smart School's concept is not only introduced in high schools but also in rural schools in order to achieve Vision 2020. All schools would be upgraded with facilities which is according to smart learning environment.

"...the existing schools will be upgraded with facilities to accommodate the smart learning environment. The schools will serve as a prototype in the Ministry's effort to introduce the smart concept of teaching and learning."

(Dato' Sri Mohd Najib Tun Haji Abdul Razak, The Minister of Education, Malaysia [23])

The system is an Online Assessment for Smart Learning for Sekolah Menengah Kebangsaan Tun Abang Haji Openg (SMKTAHO). The Online Assessment is targeted for Form 4 and Form 5 students that are learning IT subject. This school applies Smart Learning concept, particularly in Information Technology (IT) subject.
1.2 DEFINITION OF SMART LEARNING

As mentioned earlier, the existing schools will be accommodated with the smart learning environment. Smart Learning in the Malaysian Smart School means holistic involvement of the mind, spirit and the physical self of the students [22]. Smart Learning also allows students' opportunity to practice lifelong learning, in which students can develop self-directed, self-accessed, self-assessed and self-paced learning. Students learn how to access, analyze, synthesis and apply information when doing the assessment. Students also learn to be charge of his learning process by mastering the tools and techniques of effective learning.

In Malaysia, there are a number of schools, which have implemented the Smart Learning concept in the IT subject. Students will be provided with IT knowledge and basic skills as well as the opportunity to use IT effectively in problem-solving. Students would be assessed based on three elements in the Smart Learning method, as discussed in Section 1.2.1.

1.2.1 Learning Methods

Malaysian Ministry of Education has established the contents of IT curriculum. It is based on The Integrated Curriculum for Secondary Schools (Kurikulum Bersepadu Sekolah Menengah). The curriculum emphasizes on three elements [3]. For details of the elements, refer to Section 2.3.3.

The first element is the Knowledge, which is based on the facts, concepts, terminologies, functionalities, processes and procedures.

The second element is the Skills. Student’s skills on application, communication, information handling, computer system handling, problem-solving and computer programming would be assessed.

The third element, which is Values, would assess student based on their responsibilities, cooperation, attentiveness, contribution and appreciation.

The Smart Learning concept concerns on four types of self-learning or in short known as SeDAAP. The self-learning comprises Self-directed, Self-accessed, Self-assessed and Self-paced. Through these four self-learning, students allow planning the activities that need to be done and decide tools needed for learning. Besides, students can learn based on their abilities and assess themselves.

The learning method is divided into six different fields. There are Computer System, Application Software, Multimedia, Programming, Communication and Networking and Information System. All the fields provided are according to the IT syllabus. Each of the field has its aspect. Each of the field would also be identified by a code.

Each field has its own criteria. Criteria is the smallest thing in the field. Students would be assessed according to the criteria.

1.2.2 Criteria

Currently, the exam-based. In the Smart Learning, According to alternative to Manual exam, creates an exam that are not tested effectively.

For example, in OBAT score, A student’s achievement is evaluated according to a score.

<table>
<thead>
<tr>
<th>Score</th>
<th>O</th>
<th>B</th>
<th>A</th>
<th>T</th>
</tr>
</thead>
</table>

A student’s achievement is evaluated according to a score.
For example, one of the criteria in the Computer System is *Menjelaskan dengan betul makna komputer*. Based on the criteria, student is expected to give answers according to the criteria.

In the Smart Learning method, a student can be assessed by their peers or teachers. According to the IT teacher of SMK TAHO, Mrs Lim Pek Choo, this method is an alternative to effective learning [32].

### 1.2.2 Criteria-based Assessment

Currently, the Education Ministry has employed manual examination which is exam-based. In manual examination, students take the written form examination. For example, in a classroom, students write their answers on a piece of paper [10].

Manual examination however, has its disadvantages. The education ministry creates an exam-oriented learning whereby the education system concerns more on areas that are to be assessed. This has narrowed the scope of education. Besides that, many important aspects in teaching and learning are overlooked because they are not tested [10]. One of these aspects includes interaction among students and teachers. A teacher may not be able to monitor individual’s performance effectively.

Since the implementation of Smart Schools, students are assessed on given criteria. The main objective of criteria-based assessments is to test student’s ability to master some knowledge or skills required. Students’ achievement is assessed according to a standard scoring system, OBAT. Table 1.1 shows a brief description of OBAT scores. The OBAT scoring system is based on Criterion-Reference Testing (CRT). The description of the score is as below:

<table>
<thead>
<tr>
<th>Score</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>Candidates gives no answer (evidence), answer (evidence) is not relevant to the criteria and qualities stated in the criteria statement.</td>
</tr>
<tr>
<td>B</td>
<td>Candidate answer, but answer does not satisfy the criteria/quality.</td>
</tr>
<tr>
<td>A</td>
<td>Answer given satisfies criteria and quality stated in the criteria statement.</td>
</tr>
<tr>
<td>T</td>
<td>Answer given is more or better than what is stated in the criteria statement.</td>
</tr>
</tbody>
</table>

Table 1.1: Description of the scoring system

A student’s achievement is not compared with another student. In this concept, students have the flexibility to choose the criteria according to their ability. By doing so, students will concentrate more on the chosen criteria, and this leads to a good performance result [10]. Moreover, criteria-based assessment helps the teacher and students to identify unsettled criteria [10].
A criteria-based assessment is applied in Information Technology (IT) subject as it is taught to Form 4 and Form 5 students of SMKTAHO. In IT syllabus there are six fields:

<table>
<thead>
<tr>
<th>CODE</th>
<th>FIELDS</th>
<th>DESCRIPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Computer System</td>
<td>Based on system's basic concepts</td>
</tr>
<tr>
<td>02</td>
<td>Application Software</td>
<td>Based on the application software such as</td>
</tr>
<tr>
<td></td>
<td></td>
<td>word processor</td>
</tr>
<tr>
<td>03</td>
<td>Multimedia</td>
<td>Based on the multimedia concepts and using</td>
</tr>
<tr>
<td></td>
<td></td>
<td>multimedia components</td>
</tr>
<tr>
<td>04</td>
<td>Programming</td>
<td>Based on the programming skills and concepts</td>
</tr>
<tr>
<td>05</td>
<td>Communication and Networking</td>
<td>Based on the basic concepts of communication software</td>
</tr>
<tr>
<td>06</td>
<td>Information System</td>
<td>Based on the knowledge of databases</td>
</tr>
</tbody>
</table>

Table 1.2: Description of the fields

Students can choose which fields they want to be assessed on. Each field has many criteria. Students will be assessed on each field based on these three elements; knowledge, skills and values. Students’ answers will be evaluated using OBAT scoring system [10].

The Smart Learning assessment can be conducted using a few instruments such as oral, essay, interview, discussion, portfolio, checklist, learning contract, scrapbook, project, holistic writing and report. Students will be assessed either by their teacher, friends or even themselves.

1.2.3 Application of the Smart Learning in the SMKTAHO

Currently, SMKTAHO is implementing the concept of Smart Learning in IT subject particularly for Form 4 and Form 5 students. The implementation of the Smart Learning concept is based on the SeDAAP concept. SMKTAHO produces disciplined and dedicated students [32]. The Smart Learning concept proves to challenge both teachers and students. Teacher’s roles and responsibilities are more toward facilitating the students. Teachers will provide sufficient resources required by students. However, students will have to gather needed information without the teacher’s guidance.

1.2.4 Why Implement Smart Learning?

According to The (Unofficial) Malaysian Smart School FAQ, “The philosophy of the Smart School is that the students can only be a learner when the learning challenges his mind, motivates his spirit and involves his entire physical self in the learning process” [22].

With the imp...
With the implementation of the Smart Learning, students can be more involved in Smart Learning processes. The processes are as such; looking for information, conducting group discussions and assessments. As a result, students will not totally depend on their teachers but on their own initiatives. These learning methods are constituted in SeDAAP. For example, through self-directed learning, students plan the criteria they will be assessed on. Simultaneously, students search for their own materials regarding the chosen criteria. Students can develop their learning strengths to a level of excellence and this will produce a smart generation of inventors and innovators [21].

1.3 PROBLEM STATEMENTS

There is one problem encountered in the development of Online Assessment for Smart Learning in SMKT AHO. The problem is listed below.

- Presently, all the assessments for IT subject in SMKT AHO are done manually. There is no computerized system to assess students and at the same time stores their results.

As a result, an online assessment prototype system will be the only online system to be developed locally.

1.4 OBJECTIVES OF THE PROJECT

Below are the objectives of the project.

- One of the objectives of the project is to develop a criteria-based online assessment system for the SMKT AHO. Through observation, one portion of this learning system can be computerized.

- The IT syllabus is used as a reference in creating the system. Components such as fields and criteria are used in the assessment. Students are able to choose the field and criteria they preferred.

- Teacher will be able to create three types of questions. They are of multiple-choice, fill in the blank and true or false questions. Students will be able to choose from these questions.

- Questions posted will be in Bahasa Melayu. However, the system will be in English and Malay languages.

- With the Online Assessment, friends and teacher can give feedbacks to students' answers through the online discussion.

- The proposed system will make learning more flexible, easier and fun through various ways of assessment to suit the Smart Learning environment.
• The system uses both English and Malay language. This is to provide flexibility for students to learn both languages.

• The system must be able to work in a Local Area Network environment because the IT lab in SMKTAHO has an intranet work. All students will be able to assess the system simultaneously.

1.5 THE PURPOSES OF DEVELOPING AN ONLINE ASSESSMENT

The proposed system will enable SMKTAHO an online assessment for IT subject. This subject is chosen because the school has a computer lab equipped with an intranet work setup used specifically for IT subject.

The online assessment enables students to access their own assessment at their convenience. Students can take assessment whenever they are prepared.

Once a student has been assessed, they will know in which criteria they are weak. This enhances their understanding and clarification of questions on particular criteria.

As mentioned earlier, teachers and students can assess their peers’ answers. The teacher however, is the main assessor in providing them with the correct answers. This is to prevent confusion among students with their peers’ answers.

1.6 SCOPE OF PROJECT

The scope of the project listed below.

• The online assessment is implemented for IT subject that is currently taught in Sekolah Menengah Tun Abang Haji Openg (SMKTAHO).

• The targeted users are the Form 4 and Form 5 students of SMKTAHO, Petra Jaya, Kuching

• A web-based application will be implemented to enable students the access to the online assessment in the computer lab of SMKTAHO.

• The system calculates students’ result. A is displayed for a correct answer while O indicates a wrong answer.

• Questions are based on 43 criteria for IT subject as listed by the Ministry of Education (Refer to Appendix A).

• The assessment is based on three types of questions, which are multiple choices, fill in the blank and TRUE/FALSE.

• Every criterion consists of six questions, two for each type.

1.7 SIGNIFICANCE OF THE PROJECT

Smart Learning is a self-paced learning and smarter way to learn. By becoming hardworking, this concept will be. By creating a smart learning program, deliveries primarily to the students, students are able to gain access to their peers’ answers. This is to prevent confusion among students with their peers’ answers.

Multiple-choice This is because students can assess their peers’ answers, which assists them to gain access to other types of questions.

There will be four types of questions using English and Malay language.

1.8 EXPECTATION

The following are the expected outcomes of the project.

• The implementation of the online assessment at SMKTAHO.

• The criteria and assessment are developed.

• Three types of questions are developed: multiple choices, fill in the blank and TRUE/FALSE.
• Questions will be posted in Bahasa Melayu and grouped according to the field, as shown in Table 1.2.

• There are functions to enable the teacher to add, delete and modify questions.

• The teacher will also be able to create, delete and modify students’ accounts.

• Teacher and students will be able to take part in the online discussion.

1.7 SIGNIFICANCE OF THE RESEARCH

Smart Learning Concept introduced by the Ministry of Education reveals a better and smarter way of learning [21]. It encourages students to be independent learners and gain additional understanding of various fields. Moral values such as hardworking, independency and human interactivity are also embedded through this concept [10].

By creating an online assessment system, it provides multiple deliveries. Multiple deliveries provide ongoing assessment that assesses students’ skill. Besides, students are allowed to three times chances of the same assessment. Furthermore, it assists them to their weak points in specific criteria [32].

Multiple-choice questions are most effective in testing students’ understanding. This is because one criterion can be manipulated in many different ways [32]. Students might get confused of some terms and are able to make reference to clear their doubts. Teachers can concentrate fully in providing reference materials and other types of assessment such as lab practices.

There will be no language barriers as IT can also be in Bahasa Melayu despite using English internationally.

1.8 EXPECTED OUTCOME

The followings are the expected outcome of this system:

• The targeted user of this system is a Form 4 and Form 5 students of SMKTAHO.

• The Online Assessment is very flexible as students can access their Online Assessment everywhere and at their own time.

• Three types of questions are as below:
  o Multiple choice questions
  o Fill in the blank questions
  o TRUE/FALSE questions
• Students will be able to repeat the assessment upon unsatisfying result.

• Teacher and other students will be able to give feedbacks on peers’ questions or comments through online discussion.

• The proposed Online Assessment is expected to improve students in SMKTAHO the understanding of IT subject. The Online Assessment is based on Smart Learning concepts.

• OBAT scoring system is adopted to display students’ result. An A indicates a correct answer whereas 0 shows a wrong answer. This method is chosen because students are very familiar with OBAT scoring system. It will help them to understand the assessment better.

1.9 OUTLINE OF PROJECT REPORT

Chapter 2 discusses the survey of the project. In this chapter, students will list their researches from resources such as web sites, articles, books and also through conversations with lecturers, tutors and teachers. Students then will analyze the techniques and approaches used in developing the project.

Chapter 3 is concerned with details of requirement specification for the project. Besides, the modeling of the project will be described in detailed. It also includes description of the System Development Life Cycle (SDLC).

Chapter 4 is explained the system architecture in which it includes Context Diagram, Entity Relationship Diagram (ERD), Data Flow Diagram (DFD), Data Dictionary (DD) and Data Normalization.

Chapter 5 focuses on the realization of the design through an implementation. It shows each of the interface in the system.

Chapter 6 describes the testing and evaluation of the newly system. This system will be evaluated and tested by user. User can give their comments or suggestions of the system.

Chapter 7 presents the conclusions of the project and outlines further works.
Chapter 2:
Background Study
And
Literature Review
2.1 INTRODUCTION

Smart Learning is a concept enabling students' to be independent learners as constituted in the SeDAPP concept. It also changes teachers role as facilitators, contrasting to traditional based teaching where teachers provide guidance when needed and play significant role in monitoring students' performance.

Students' performance is assessed based on the Criterion Referenced Testing (CRT) by using the OBAT scale. OBAT is used to scale student's assessment. O, B, A, and T represent the 4 scores to scale student's assessment.

This chapter discusses details on smart learning concept and assessments using OBAT scale. It also describes Information Technology (IT) syllabus, which is consisting of six different fields: Computer System, Application Software, Multimedia, Programming, Communication and Networking and Information System.

There are many systems similar to the proposed assessment system. These systems are Computer Aided Multimedia Self-Assessment System, CAMSAS and the IT Placement Test. Both systems are exam based.

There are also two online assessment systems conducted in foreign universities. i.e. the University of Maryland and the University of Kentucky. These two universities conduct an online-based assessment.

2.2 SMART LEARNING CONCEPT

Smart Learning is defined as a learning culture that is informative. The process of Smart Learning encourages Self-directed learning where students learn according to individual pace. Students will access resources and be assessed [7]. Thus, students acquire analytical skills through this thoughtful learning. Classrooms will be equipped with instructional media such as computers and the Internet facilities.

2.2.1 SeDAAP Concept

This section describes the SeDAAP concept used by the students in learning the IT subject. Table below explains the SeDAAP concept.

<table>
<thead>
<tr>
<th>Self-Directed</th>
<th>Self-directed learning allows students to plan the activities that are needed to be done. Self-directed is also known as student-centered.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Accessed</td>
<td>Self-accessed learning allows students in deciding tools and equipments used for learning and not according to teacher's instructions.</td>
</tr>
<tr>
<td>Self-Assessed</td>
<td>Self-assessed learning allows students to assess themselves. Through self-assessed, students know their level of understanding and ability in certain aspects or elements based on stated criteria.</td>
</tr>
</tbody>
</table>