BORANG PENGESAHAN STATUS TESIS*

JUDUL : SEJARAH INTELLIGENT TUTORING SYSTEM (SEJARAH ITS)

SESI PENGAJIAN : 2011 / 2012

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SEJARAH INTELLIGENT TUTORING SYSTEM (SEJARAH ITS)

SITI NUR AZRREEN BINTI RUSLAN

This report is submitted in partial fulfillment of the requirements for the
Bachelor of Computer Science (Artificial Intelligence)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA
2012

DECLARATION

I hereby declare that this project report entitled

SEJARAH INTELLIGENT TUTORING SYSTEM
(SEJARAH ITS)

is written by me and is my own effort and that no part has been plagiarized without citations.

STUDENT	: SITI NUR AZRREEN RUSLAN (STUDENT'S NAME HERE)	Date: 13-AUG-2012
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DEDICATION

This project is lovingly dedicated to my respective parents who have been my inspiration. Without their love and support this project would not have been made possible.

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ABSTRACT

Nowadays, it is important for students to learn and know about history. This is because the Ministry of Educations has put history subject as one of the condition of entry to university. However, this subject is not a favorite subject. This is due to some reasons which make the students do not like the subject. Hence, the Sejarah Intelligent Tutoring System (Sejarah ITS) is a standalone application of history subject which applies knowledge-based system techniques. This system focus on the first three chapters in Sejarah form 4. However, in order to learn all the three chapters, the students need to pass a chapter before they can proceed with the next chapter. The purpose of this system is to assist students to learn history and have a better learning environment at home. The mind mapping technique is one of the best techniques to help the student in memorizing. Hence, in this system, the mind mapping technique is introduced to the student to help them memorizing the facts. For future enhancement, the system can include all the chapters in the Sejarah form 4.

ABSTRAK

Pada masa kini, adalah penting bagi pelajar untuk belajar dan mengetahui tentang sejarah negara. Ini adalah kerana Kementerian Pendidikan telah meletakkan matapelajaran sejarah sebagai salah satu syarat kemasukan ke universiti. Walaubagaimanapun, matapelajaran ini tidak menjadi pilihan atau kesukaan ramai pelajar. Hal ini disebabkan oleh beberapa perkara yang menyebabkan pelajar kurang menggemari matapelajaran ini. Oleh itu, Sistem Tutor Sejarah Pintar (Sejarah ITS) merupakan sebuah aplikasi yang tidak memerlukan internet yang menggunakan teknik sistem berasaskan pengetahuan. Sistem ini fokus pada tiga bab pertama dalam subjek Sejarah Tingkatan 4. Walau bagaimanapun, untuk mempelajari ketiga-tiga bab ini, pelajar perlu lulus dalam ujian dahulu sebelum mereka boleh meneruskan pembelajaran ke bab berikutnya. Tujuan sistem ini adalah untuk membantu pelajar untuk belajar sejarah dan mempunyai persekitaran pembelajaran yang lebih baik di rumah. Teknik petaminda merupakan salah satu teknik terbaik untuk membantu pelajar dalam menghafal fakta-fakta penting. Oleh itu, dalam sistem ini, teknik petaminda diperkenalkan kepada pelajar untuk membantu mereka menghafal fakta-fakta tersebut. Untuk peningkatan masa depan, sistem dapat memasukkan semua bab dalam subjek Sejarah Tingkatan 4.

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LIST OF ABBREVIATIONS

PSM	-	Projek Sarjana Muda
ITS	-	Intelligent Tutoring System
SPM	-	Sijil Pelajaran Malaysia
IA	-	Intelligent Agent
ODBC	-	Open Database Connectivity

CHAPTER 1

INTRODUCTION

Based on the analysis carried out in a secondary school, students are less interested to learn about our country's history. This is due to the main problem in which the students have to understand the facts concerning the history of the country and at the same time they have to memorize all the facts they learned. Hence, the students made a conclusion that history is a boring subject to be learned. Because of that, most of the students (about 65%) do not pass this subject. (See Appendix A)

Besides that, most of the students prefer and enjoy subjects that are more to practical or calculation such as mathematics than theoretical subject like history. This is because non-theoretical subjects such as mathematics required them to memorize only the formula and the steps to do the calculation. And in order to pass the exam, they need to do lots of exercise with different type of questions.

Unlike non-theoretical subjects, history is mainly about facts that need to memorize by all students that studying the subject. Wrong facts lead to a wrong understanding of our country's history. Students have to struggle hard in order to score the subject. Due to this problem, some publishers introduced comic approaches history books to help the student in learning history. However, not all students can accept this approach as they have set their minds that history is a boring subject as well as the history comic book.

Intelligent Tutoring System (ITS) has been introduced almost 50 years back. Research in ITS organizes the problem in;

1. Knowledge about a domain
2. Knowledge about the learner
3. Pedagogy (knowledge of teaching strategies).

The major components of a typical ITS are therefore an expert (or domain) model, student model and learning model. The expert model should be able to solve the problems the tutoring module submits to the students. The learning module controls the interaction with the student by using interface, based on its teaching knowledge and comparisons between the student model and the domain knowledge. The student model reflects what the system can infer about the student's cognitive state.

Therefore, the Sejarah Intelligent Tutoring System (Sejarah ITS) is introduced to assist students to learn history. In Sejarah ITS, the mind mapping technique is introduced to the student. The mind mapping technique is one of the best techniques to help the student in memorizing. Besides that, this Sejarah ITS system will test the students' understanding of one chapter before proceeding to the next chapter. Hence, the student need to be an "expert" in all chapters in the Sejarah ITS.

1.1 Problem Statements

Problem statements of this project are:

a. Attitudes of students who are not interested and concerned with the subject, assuming that the subject is not important and has no impact on their future.
b. Most of the students who were weak less practice as they did not have the courage and guidelines on the things they do.

1.2 Objectives

The aims of this project are:

a. Provide a user-friendly tutoring system which can foster the student interest towards history's subject.
b. To design a tutoring system in which can help the students in self-learning time at home especially in history's subject.

1.3 Scopes

Sejarah ITS is specialized on the history's subject for form four syllabus. The domain of Sejarah ITS is known as knowledge-based systems in which is a subset field of Artificial Intelligent Expert System.

Sejarah ITS focuses on ways to minimize the percentage of students who failed the history's subject. This Sejarah ITS system is limited to upper secondary school students (form four only) and it focuses only first three chapters in history's subject. Besides that, the test questions to be faced by the students are limited to multiple choice questions. Essay questions cannot be asked because different people have different level of understanding.

Sejarah ITS is targeting on students who have problems in history's subject. In this system, the students (user) will be divided on three levels based on their pretest score that they did before using the system. The tutorial for each level of student will be different. However, in this system, there will be no much different between the tutoring presentations for different student's level as the materials used are very limited. In addition, there is no ITS on history's subject especially in Malaysia to be compared with Sejarah ITS.

1.4 Project Significance

Now, Ministry of Education Malaysia has prescribed the conditions of admission to local university is the students are required to pass history subject or else they have to repeat the paper. Hence, this project has significance in educations. Besides that, exercises provide by this project are much related to Sijil Pelajaran Malaysia (SPM) questions which help students to get familiar with the questions and make them ready for the exam.

In addition, hopefully, this system could be a starting point for researchers to do some research on the history-based ITS. This is because, most of the ITS systems focus on mathematics and science subject. By having this system, the percentages of students who are failed in history's subject can be decreased.

1.5 Expected Output

Sejarah ITS is expected to have an easy installation process and becoming one of the favorite ways to learn history. Hoped that by using a mind mapping technique, students are easier to remember the important facts in history and relationships between those facts.

By having this project, students will have their own score report to keep track on their performance in the study. Hence, they will know either they have a better understanding on the subjects or not, besides helps them to improve their performance in the study. In addition, this project can help the student's to have a better self-study quality by giving them guidelines while doing the exercises.

1.6 Conclusion

The Sejarah ITS system can play an important role in the education field. This project is believed can help the students to have a good quality of self-study at home. Besides that, the percentages of students that passed history subject can be increased. As a result, the average grade of history subject at school can be increased.

CHAPTER 2

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

In this chapter, fact and findings will be discussed further. Apart from that, project methodology, requirements and schedule of the project will be discussed. Hence, this chapter will provide a strong foundation for Sejarah ITS. Several numbers of papers that are related to ITS application are referred to provide a sufficient reference for this chapter.

2.2 Facts and Findings

Intelligent Agent (IA) is a computer system based on software and hardware, which has some features such as reactivity, socialism and proactiveness. IA also should consist of the features of human such as knowledge, faith, obligations and intentions [1].

Intelligent Tutoring Systems (ITS) are computer-based educational tools used for adaptive learning. ITS can be used as a platform for adaptive learning and produce one-to-one learning ambience for students [3]. In other hand, ITS is a computer system based on artificial intelligent designed to deliver the content (knowledge) and provide feedback to its users.

The concept of ITS has been studied for more than 30 years starting from 50's of last century until now [1]. The combination of agent and the tutoring system in ITS is said to be a hotspot. In this case, the agent will play a role in tutoring analysis, information filtering, collaborative learning and intelligent reasoning.

The main purpose of ITS is to help students to learn by providing an interactive learning environment based on one-to-one interaction. The ITS will act as a virtual tutor and guide the students in their learning. ITS also will evaluate the students' weaknesses and try to help them to improve themselves on that particular area by providing extra tips or suggestions. ITS will provide a report on every progress made by the students.

ITS models typically have four components, namely the domain, student, teaching models and a learning environment (user interface).

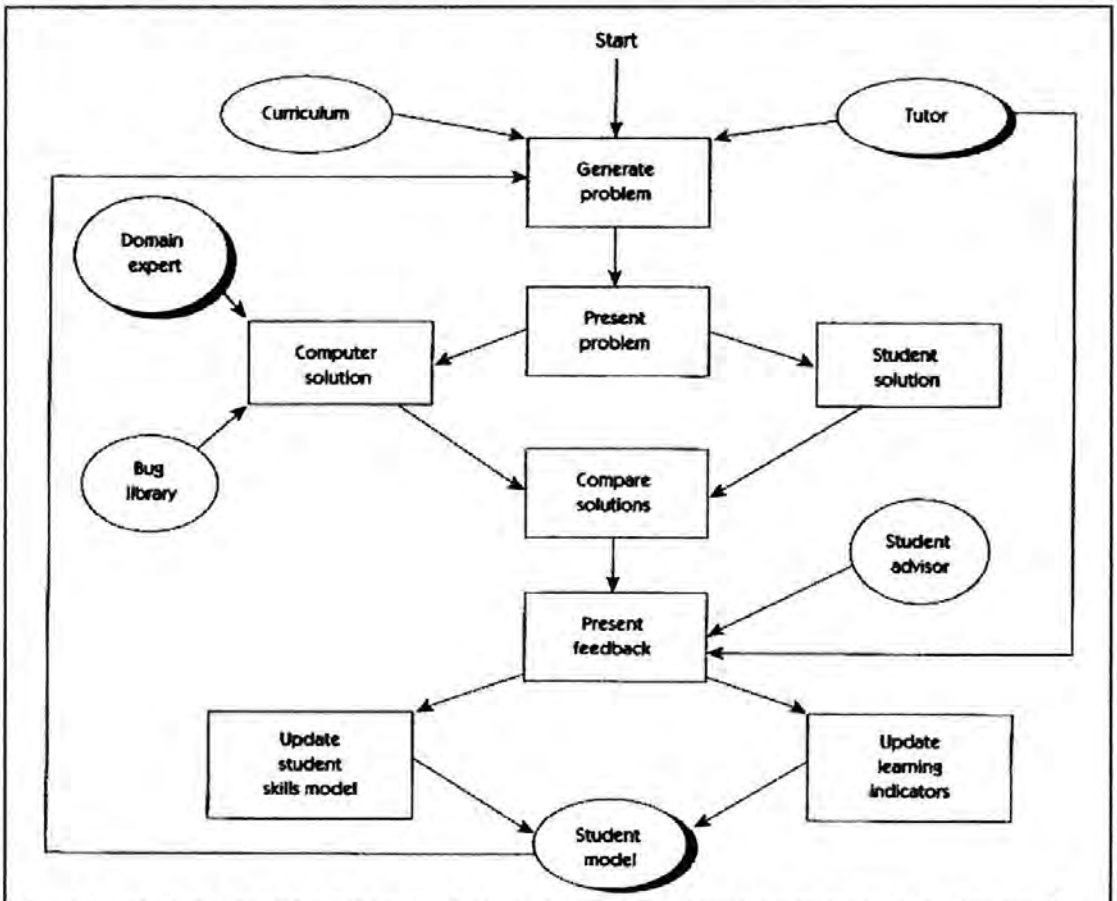

Figure 19-2. Intelligent tutoring system: boxes program decisions & actions; ellipses program knowledge bases; shaded ellipses core ITS components.

Figure 1: Intelligent Tutoring System (ITS) model (http://www.aect.org/edtech/ed1/19/19-03.html)

The domain model is where the expert knowledge and behavior is located. The student model will assess the student's level of knowledge. The teaching model (tutor) is an area where the lessons and activities for completion. The user interface is the learning environment.

For example, in a tutoring system to teach elementary physics, such as mechanics, the system may present the theory and work-out examples. The system can ask the student questions and it must be able to understand the student's answers, as well as determine the student's knowledge based on what answers were given. This should then affect what is presented and what other questions are asked of the student. The student can ask questions to the system, and so the system should be able to solve problems in the physics domain. The output of the tutoring system is the information presented to the student, tests the students should take, answers to questions, and reports to parents and teachers [2].

In Sejarah ITS, the tutoring interaction implements the Gagne's 9 Events of Learning in e-Learning. The first event is how to gain attention from the user (student). This event helps in designing the most suitable interface for the user. Do not just get the learners' attention, but get them curious and motivated to learn about the subject/skill your course addresses.

The second event is to tell the users about the objectives that they are going to learn and what to expect from the learning process. The third event is to stimulate recall of prior learning. The event will ensure that the users have pay an attention towards the learning process. The fourth event is to present the content as interactive as possible so that the users have interest to learn the topic. For fifth event, the system will provide learning guidance to the users. By having guidelines, the users can learn in an effective way and know what they are up to.

The sixth and seventh events are elicited performance and provide feedback to the user. By providing feedback, the user will learn something from mistake that they have done during exercises. The eighth event is the assess performance. The system will provide some additional information on the correct and incorrect answers

to the user which making them understand the topic they learned. The last event is to provide a conclusion and review on important elements of the content.

2.3 Project Methodology

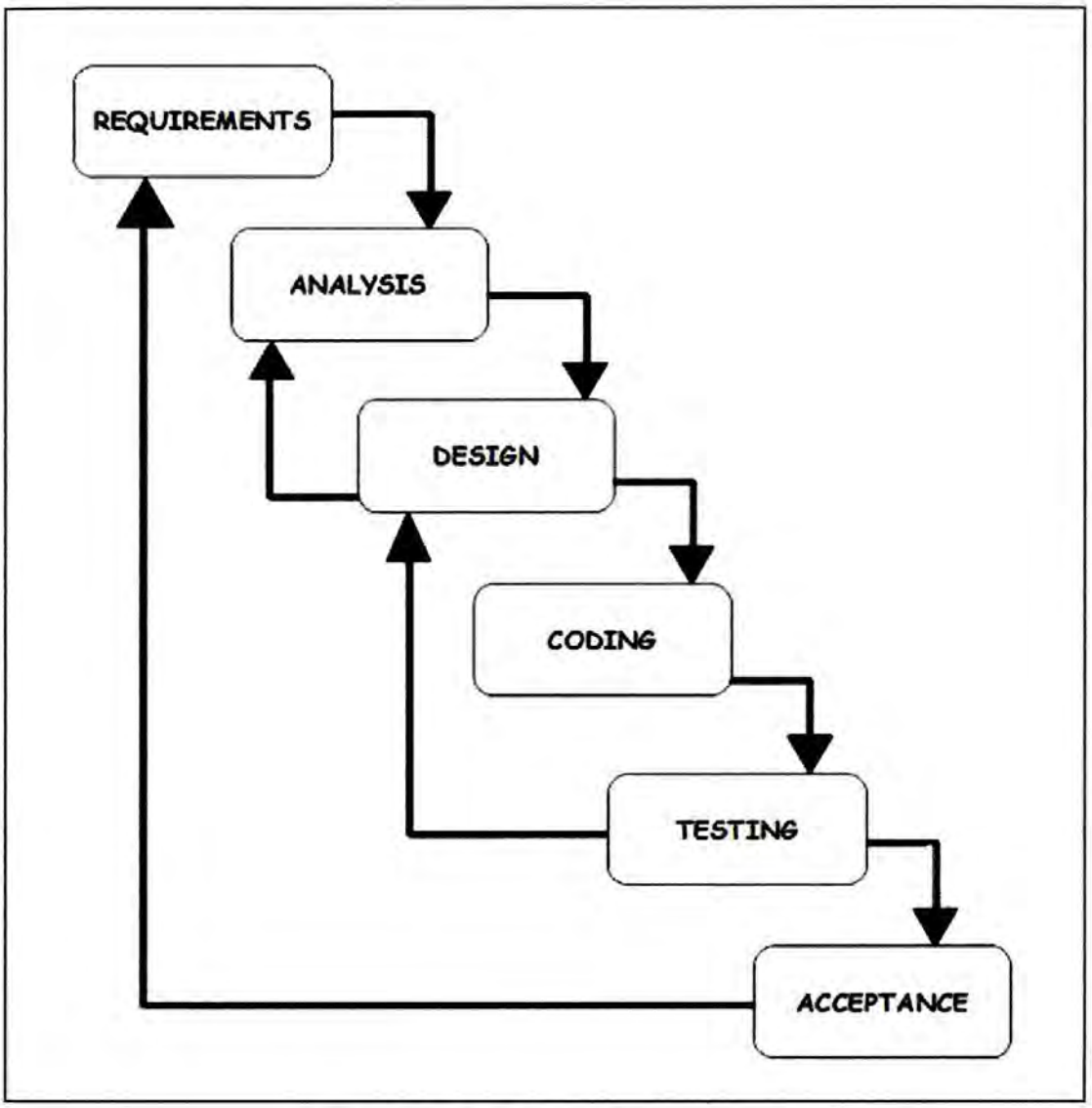

Figure 2: Waterfall model diagram
(http://www.buzzle.com/articles/waterfall-model-diagram.html)

Methodology plays an important role and act as guidelines in developing a new system. In the software development process cycle, programming models are used to plan the various stages of developing an application. There are several models that can be used as development process cycle. The waterfall model is use in Sejarah ITS development process as shown in above figure.

There are six phases in waterfall model named requirements, analysis, design, coding, testing and acceptance. The requirements phase is the understanding on the design and what is its function and purpose. In this stage, the requirements of the systems are listed and detailed. Here, better understanding on what should be design and how the system will act can be achieved. Besides that, this phase ensures a smooth working on the remaining phases.

In the analysis phase, deciding which computer language should be used for designing the system, to the database that can be used for the smooth functioning of the system, such features are decided. Besides that, the pedagogical method of the system is determined.

The design phase is a very important phase, which depends on the previous two phases, requirements and analysis phases, for its proper implementation. The analysis phase is revisited and the design phase is carried out according to the new set of resources if it is noticed that there are some more requirements for designing the code or systems in this phase. Besides that, all the algorithms or flowcharts of the system that needs to be written in the next phase, is created in this phase.

In the coding phase, the actual coding of the system is carried out based on the algorithm or flowcharts in previous phase. Hence, a proper design of the previous phase ensures a smooth and easier implementation of coding phase.

The testing phase checks if there are any errors or flaws in the designed system. This phase also checks either the system has been designed as the listed specification or not. If there are any errors or flaws in the system, the process of system development must step back to the design phase. In design phase, any changes are implemented. The coding and testing phases are again carried out.

The acceptance phase (also known as maintenance phase) is the last stage of the development processes. In this phase, some support regarding the system may need to be provided to the end user of the system. If the end user demands further