USING ADAPTIVE NAVIGATION SUPPORT METHOD FOR INTELLIGENT WEB-BASED LEARNING SYSTEMS

Technical Report for the
Project Number PJP/2012/FTMK(48D)/S01055

By
HALIZAH BINTI BASIRON
GEDE PRAMUDYA ANANTA
TAJUL ARIFIN

UNIVERSITI TEKNIKAL MALAYSIA MELAKA
2014
A. PROJECT DETAILS

Project Leader: Dr. Halizah binti Basiron

Faculty/Centre: Fakulti Teknologi Maklumat dan Komunikasi

Project Title: Using Adaptive Navigation Support Method for Intelligent Web-based Learning Systems

Project Ref. No.: PJ/2012/FTMK(48D)/S01055

Project Focus Area: a) Green Technology b) Emerging Technology
c) System Engineering d) Human Technology Interaction

Project Duration: Starts Date: 1 June 2012 Expected End Date: 30 November 2013

Budget Approved: RM 13000 Amount Spent Up to this period: RM 5870

Project Members: Multidisciplinary? ✓ Multifaculty? ✓

B. PROJECT PERFORMANCE

<table>
<thead>
<tr>
<th>Date of Progress Report:</th>
<th>No. of Progress Report Cycle:</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERALL (Up to this Period)</td>
<td>0 – 50%</td>
</tr>
<tr>
<td>Financial Utilization (please state # %)</td>
<td>45%</td>
</tr>
<tr>
<td>Project Progress According to milestones achieved up to this period (please state # %)</td>
<td>90%</td>
</tr>
</tbody>
</table>

MILESTONES ACHIEVEMENT (State all milestones and status of achievement up to this period)

1. Completion of

   Achieved or Not Achieved

2. Completion of Research Preparation (Preliminary study and Literature Review)

   Achieved

3. Completion of Analysis and Design

   Achieved

4. Completion of Implementation

   Achieved

5. Completion of Testing and Evaluation

   Partly

   Achieved
HUMAN CAPITAL DEVELOPMENT

<table>
<thead>
<tr>
<th>Number of Human Capital</th>
<th>On-Going</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Malaysian</td>
</tr>
<tr>
<td>1 No. of Master student</td>
<td></td>
</tr>
<tr>
<td>2 No. of PhD Student</td>
<td></td>
</tr>
<tr>
<td>3 No. of Undergraduate Student (PSM/SRA)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

Project progress report must be submitted to CRIM every six (6) months using the UTeM/CRIM/RND/006 form

Achievement (Please provide status within this progress report cycle:)

1. Number of Related Research Conference/Training/Workshop attended: FOUR

2. Publication status

   i) Bayasut, Bilal, Pramudya Ananta, Gede and Basiron, Halizah, The Application of Multi Layer Feed Forward Artificial Neural Network for Learning Style Identification, to be published in Advanced Science Letters (ISSN: 1936-6812 (Print); EI ISSN: 1936-7317 (Online)).

   ii) Bayasut, Bilal, Pramudya Ananta, Gede and Basiron, Halizah, ULUL-ILM: 'The Design of Web-Based Adaptive Educational Hypermedia System Based on Learning Style'. Proceedings of the 13th International Conference on Intelligent Systems Design and Applications (ISDA 2013), 08-10 December 2013, UPM, Malaysia. (published)


3. Intellectual Property Rights related activity (IP search / IP talk attended etc)

   -

4. Number of Commercialization activity (exhibition/competition/business effort etc.)

   -

Research Constraint, if any

   i) The software that was planned to be used to develop the web-based system is no longer sold. Instead, we use Moodle, another tool to develop web-based adaptive system.

   ii) There was a student who did the research for her PSM. Besides, we have a Master student that is working on slightly similar topic with our research.

   iii) The simple evaluation phase is done but cooperative evaluation is preferred.
DECLARATION OF PROJECT LEADER

I acknowledged UTeM in providing the fund for this research work.

I certify that the information given in this project progress report is true to the best of my knowledge.

Project Leader's Signature:

Official stamp: DR. HALIZAH BINTI BASIRON
Name: Fakulti Teknologi Maklumat dan Komunikasi
Designation: Universiti Teknikal Malaysia Melaka (UTeM)
Date: 7/5/2014

ENDORSEMENT BY DEAN or DEPUTY DEAN (RESEARCH), FACULTY/CENTRE
(Please state /comment on the performance of the project)

Research on...

Signature & Official Stamp

PROF. MADAHI BINTI MOHAMAD
Timbalan Dekan (Penyelidikan & Pascasarjana)
Fakulti Teknologi Maklumat dan Komunikasi
Universiti Teknikal Malaysia Melaka (UTeM)

Date: 7/5/2014

CRIM Revised date: 4Mac2014
DEDICATION

We would like to give a token of appreciation to our families who had given us full support and motivation to me in the completion of the project. Our source of inspiration had come indefinitely from the exchange of ideas with our colleges and the faculty as well as our beloved students. For that, we would like to share our gratitude and thankfulness to all.
First of all, we would like to voice our supreme gratitude and praises to Allah who protect us with His unlimited grace so that we are able to accomplish the project successfully. It is His unlimited promises gave us support and power to move forward.

Secondly, a million thanks to the UTeM and the CRIM, particularly, that financially and academically support us consistently in order to achieve our targets and objectives of this project.

Last but not least, our great thanks to the participating students, member of the faculty and the CRIM for sharing ideas and opinions through the completion of the project.
Students’ need to attend the lessons at a single location, at a fixed time or at fixed amount of time for educational interaction is a challenge of traditional teaching. As the teaching in classroom is used to be conducted by lecturers using a single teaching method, students may not be able to adapt to the teaching method. Moreover, because of the size of classes, lectures have been unable to provide more individualized learning environments. Intelligent Tutoring Systems (ITS) have been introduced to cater individual learning for some decades. This project is to design and develop a CLIPS tutoring system with the implementation of adaptive link hiding technologies for catering students’ needs, learning styles, or learning pace. The prototype of the system was trialled on 20 (twenty) undergraduate students in order to find out its efficacy. The results showed that the system enabled to improve students’ knowledge as well as their comprehension to the CLIPS.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>SUBJECT</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TITLE</td>
<td></td>
<td>i</td>
</tr>
<tr>
<td>DEDICATION</td>
<td></td>
<td>iii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENT</td>
<td></td>
<td>iv</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td></td>
<td>v</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td></td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td></td>
<td>xi</td>
</tr>
<tr>
<td>LIST OF ABBREVIATIONS</td>
<td></td>
<td>xii</td>
</tr>
<tr>
<td>LIST OF ATTACHMENTS</td>
<td></td>
<td>xiii</td>
</tr>
</tbody>
</table>

### CHAPTER I  INTRODUCTION

1.1. Project Background 
1.2. Problem Statements 
1.3. Objectives 
1.4. Scopes 
1.5. Project Significance 
1.6. Expected Output 
1.7. Conclusion
CHAPTER II  LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1. Introduction  5
2.2. Review on Learning style  5
2.3. The Computer as a Tool for Learning  7
2.4. Intelligent Tutoring System (ITS)  8
2.5. Method and Technique for Adaptive Navigation Support  10
2.6. Robert Gagne's Nine Step of Instruction  13
2.7. Project Methodology  15
2.8. Project Requirements  17
  2.8.1. Software Requirement  17
  2.8.2. Hardware Requirement  18
  2.8.3. Content Requirement  18
2.9. Conclusion  18

CHAPTER III  ANALYSIS

3.1. Introduction  19
3.2. Problem Analysis  19
  3.2.1. Moodle  21
    3.2.1.1. Features of Moodle  21
  3.2.2. Atutor  22
    3.2.2.1. Features of Atutor  22
  3.2.3. Comparison of Moodle and Atutor  23
3.3. Requirement Analysis  25
  3.3.1. Learning Material  26
  3.3.2. Exercise  26
  3.3.3. Test  26
3.3.4. Evaluation Report 27
3.4. Conclusion 27

CHAPTER IV DESIGN

4.1. Introduction 28
4.2. High Level Design 29
  4.2.1. System Architecture 29
  4.2.2. User Interface Design 36
    4.2.2.1. Navigation Design 37
    4.2.2.2. Content Design 38
    4.2.2.3. Question Design 40
    4.2.2.4. Nine Event Design 40
4.3. Detailed Design 44
4.4. Conclusion 46

CHAPTER V IMPLEMENTATION

5.1. Introduction 47
5.2. Software and Hardware Development Environment Setup 47
5.3. Software Configuration Management 49
  5.3.1. Configuration Environment Setup 49
  5.3.2. Version Control Procedure 52
5.4. Implementation Status 53
5.5. Conclusion 53

CHAPTER VI TESTING AND RESULTS

6.1. Introduction 55
6.2. Test Plan 55
  6.2.1. Test Organisation 56
  6.2.2. Test Environment 56
  6.2.3. Test Schedule 57
6.3. Test Strategy 57
   6.3.1. Classes of Test 58
6.4. Test Design 58
   6.4.1. Test Description 59
   6.4.2. Test Data 59
6.5. Test Results and Analysis 60
   6.5.1. Average and Standard Deviation of Each Student 60
   6.5.2. Analysis Student’s Result from Test 1 to Test 3 62
   6.5.3. Analysis on Times Used by Students for 3 Topics and Test with the Result 64
   6.5.4. Analysis on Question Affect Student Result 66
6.6. Conclusion 70

CHAPTER VII CONCLUSION AND SUGGESTION
7.1. Introduction 71
   7.1.1. Strength 71
   7.1.2. Weaknesses 72
7.2. Suggestion for Improvement 72
7.3. Contribution 73
7.4. Conclusion 73

REFERENCES 74
BIBLIOGRAPHY 79
APPENDICES 80
LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>Version Numbering</td>
<td>52</td>
</tr>
<tr>
<td>5.2</td>
<td>Implementation Status</td>
<td>53</td>
</tr>
<tr>
<td>6.1</td>
<td>Hardware Detail</td>
<td>56</td>
</tr>
<tr>
<td>6.2</td>
<td>Software Detail</td>
<td>56</td>
</tr>
<tr>
<td>6.3</td>
<td>Test Schedule of CLIPS Tutoring System</td>
<td>57</td>
</tr>
<tr>
<td>6.4</td>
<td>Categories of Knowledge Level</td>
<td>60</td>
</tr>
<tr>
<td>6.5</td>
<td>Average and Standard Deviation of Each Student Result</td>
<td>61</td>
</tr>
<tr>
<td>6.6</td>
<td>The of Question for Students in Test 1</td>
<td>67</td>
</tr>
<tr>
<td>6.7</td>
<td>The Difficulty of Question for Students in Test 2</td>
<td>68</td>
</tr>
<tr>
<td>6.8</td>
<td>Difficulty Question for Students in Test 3</td>
<td>69</td>
</tr>
</tbody>
</table>
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURES</th>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Taxonomy of adaptive method</td>
<td>10</td>
</tr>
<tr>
<td>2.2</td>
<td>Concept index page of ISIS-Tutor with annotated links.</td>
<td>12</td>
</tr>
<tr>
<td>2.3</td>
<td>The same index page as on figure 2 with hidden links to not-ready-to-be-learned nodes</td>
<td>13</td>
</tr>
<tr>
<td>2.4</td>
<td>Sequence of events</td>
<td>14</td>
</tr>
<tr>
<td>2.5</td>
<td>Software development life cycle phase (SDLC)</td>
<td>16</td>
</tr>
<tr>
<td>3.1</td>
<td>Moodle Prerequisite Lesson Setting</td>
<td>23</td>
</tr>
<tr>
<td>3.2</td>
<td>Moodle Restrict Access Setting</td>
<td>24</td>
</tr>
<tr>
<td>3.3</td>
<td>Atutor Arrange Content Menu</td>
<td>24</td>
</tr>
<tr>
<td>3.4</td>
<td>Moodle Arrange Content Menu</td>
<td>25</td>
</tr>
<tr>
<td>4.1</td>
<td>The Architecture of CLIPS Tutoring System</td>
<td>29</td>
</tr>
<tr>
<td>4.2</td>
<td>Overview for CLIPS Tutoring System Function</td>
<td>31</td>
</tr>
<tr>
<td>4.3</td>
<td>Flow Chart For Existing User</td>
<td>32</td>
</tr>
<tr>
<td>4.4</td>
<td>Flow Chart for the Content Presentation that Includes Exercise</td>
<td>33</td>
</tr>
<tr>
<td>4.5</td>
<td>Flow Chart for New User</td>
<td>34</td>
</tr>
<tr>
<td>4.6</td>
<td>Flow Chart for Test</td>
<td>35</td>
</tr>
<tr>
<td>4.7</td>
<td>List of Topics for New User Using Moodle</td>
<td>36</td>
</tr>
</tbody>
</table>
4.8 List of Topics with Instruction Using Moodle
4.9 Navigation Design of CLIPS Tutoring System
4.10 Example of Gain Attention Event
4.11 Example of Inform Student of the Objectives Event
4.12 Example of Recall of the Prior Learning Event
4.13 Example of Present the Content Event
4.14 Example of Provide Learning Guidance Event
4.15 Example of Elicit Performance Event
4.16 Example of Provide Feedback Event
4.17 Example of Assess Performance Event
4.18 Example of Enhance Retention and Transfer to the Job Event
5.1 Software and Hardware Development Setup Architecture
5.2 Window to Choose a Language in Moodle
5.3 Confirm Paths in Moodle
5.4 Choose Database Driver
5.5 Database Settings
6.1 Result of Student in Test 1
6.2 Result of Student in Test 2
6.3 Result of Student in Test 3
6.4 Result of Student in 3 Test
6.5 The Times Used by Students for 1st Topic and Test Result
6.6 The Times Used by Students for 2nd Topic and Test Result
6.7 The Times Used by Students for 3rd Topic and Test with the Result
# LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVG</td>
<td>Average</td>
</tr>
<tr>
<td>CLIPS</td>
<td>C Language Integrated Production System</td>
</tr>
<tr>
<td>FTMK</td>
<td>Fakulti Teknologi Maklumat dan Komunikasi</td>
</tr>
<tr>
<td>GPL</td>
<td>General Public License</td>
</tr>
<tr>
<td>ITS</td>
<td>Intelligent Tutoring System</td>
</tr>
<tr>
<td>KBS</td>
<td>Knowledge Base System</td>
</tr>
<tr>
<td>LMS</td>
<td>Learning Management System</td>
</tr>
<tr>
<td>MCQ</td>
<td>Multiple Choices Question</td>
</tr>
<tr>
<td>Moodle</td>
<td>Modular Object-Oriented Dynamic Learning Environment</td>
</tr>
<tr>
<td>S.D</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>SDLC</td>
<td>Software Development Life Cycle</td>
</tr>
<tr>
<td>UTeM</td>
<td>Universiti Teknikal Malaysia Melaka</td>
</tr>
<tr>
<td>VLE</td>
<td>Virtual Learning Environments</td>
</tr>
<tr>
<td>PD</td>
<td>Professional Development</td>
</tr>
</tbody>
</table>
# LIST OF ATTACHMENTS

<table>
<thead>
<tr>
<th>ATTACHMENT</th>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Formative Evaluation Questionnaires</td>
<td>81</td>
</tr>
<tr>
<td>B</td>
<td>Test Questions</td>
<td>88</td>
</tr>
<tr>
<td>C</td>
<td>Using CLIPS Tutoring System with Adaptive Link Hiding Technique Interface</td>
<td>93</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

1.1. Project Background

Knowledge Base System (KBS) is a core subject for Bachelor of Computer Science (Artificial Intelligence) course in Universiti Teknikal Malaysia Melaka (UTeM). This subject will be taken by second year students of Bachelor of Computer Science (Artificial Intelligence) course. C Language Integrated Production System (CLIPS) is a forward-chaining, pattern-matching knowledge-based system shell. Using CLIPS is one of important topics in KBS course.

Every single human have their own learning path and the ability to learn a new knowledge is different. So, this project will design and develop an adaptive tutoring system. Adaptive tutoring system is one way to analyse user characteristics by the way they answer the test and try to give the suitable learning material (Ananta, Basiron, and Arifin, 2012).

For an example, a teacher will use only one method to teach in class. For those who unable to catch up some part of content then will miss. We cannot expect all teachers to teach according the level of each student because this is time consuming. Therefore, how to help students in learning that matches their individual
goal, study path, and current knowledge will be a new challenge in this era. Adaptive presentation and adaptive navigation support are two main methods for implementing adaptivity in adaptive tutoring systems (Ananta et al. 2012). Link hiding technique is one of the subdivided from adaptive navigation support and will implement into adaptive tutoring system. Adaptive link hiding also have three branches which are hiding, disabling and removal.

Adaptive link hiding is use to hide the additional learning material. The system will predict whether the user was likely to access the link to additional material (Oboko and Wagacha, 2012). Learning path will be optimizing by using link hiding technique. Unrelated or unnecessary link will hide and this means that they will study only necessary topics. Hiding technique is easy to understand and implement. Besides, it is more effective to restrict navigation space (Mekpiroon, Tummarattananont, Pravalpruk, Neetiwit and Apitiwongmanit, 2008).

1.2. Problem Statements

i. As the teaching in classroom is conducted by one lecturer using a single teaching method, some undergraduate students may not be able to adapt to the teaching method. Hence, the students will get confuse and difficult to continue learning.

ii. Lecturers are unable to give full attention to every student in the class as there are too many student ratios to one lecturer.
1.3. Objectives

i. To design a CLIPS tutoring system with adaptive link hiding technique.

ii. To develop a CLIPS tutoring system with adaptive link hiding technique for the usage of both lecturer and student.

iii. To evaluate a CLIPS tutoring system with adaptive link hiding technique from trial.

1.4. Scope

In this project, adaptive link hiding technique is division of adaptive navigation support will be implemented in CLIPS tutoring system. The CLIPS tutoring system will include three topics which is introduction of CLIPS, fact and rule. The users of this system are both the lecturer and student.

1.5. Project Significance

The project is to design a CLIPS tutoring system with adaptive link hiding technique. This system is developed to hide link that are not ready to be learned for the purpose of limit the navigation space. Link hiding that limits the number of navigation opportunities will reduce the user’s cognitive overload and prevent the user disorientation to ensure effective learning.
1.6. Expected Output

i. Design and develop a CLIPS tutoring system with adaptive link hiding technique that will contribute to UTeM as second year second semester students of Bachelor of computer Science (Artificial Intelligence) course learning assistance.

ii. Help users to learn CLIPS by using this system. User level of understanding can be known from the test result.

1.7. Conclusion

In conclusion, this project will design and develop CLIPS tutoring system with adaptive hiding link technique. This is due to inability of lecturers to cater all the student needs. The next chapter will discuss about literature review and project methodology at depth.
CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1. Introduction

Fact and finding, methodology, project requirements and project schedule will discuss in this chapter. The purpose of this chapter is to do more research on the adaptive link hiding technique. To support and get some ideas for continue this project by browse some journals as references.

2.2. Review on Learning Styles

People are different. Different people tend to have different learning styles, in other words there are various types of learner. For example, personal style will influence human thinking either in working, playing or making a decision (Stahl,
According to researchers in their pedagogy view, the learning process must be dynamic and intelligent to meet the need of different users. However, an applicant and trustful system or models are seldom very expensive and hard to be developed.

Tarver and Dawson (1978) reviewed studies that matched visual learners to sight word approaches while auditory learners to phonic approaches. However, this technique is not efficient (Arter & Jenkins, 1979). Besides that, Kampwirth and Bates (1980) also concluded that it is not an effective way to match student’s modality strengths to reading materials. Kavale and Forness (1987) and Snider (1992) using a more advanced technique which is meta-analysis to review on the technique of preparing studying material according to matching strategy. The result shows that neither modality testing nor modality teaching are effective (Stahl, 1999). In addition, a more recent study of David (2009), by just matching study material accordingly is not enough.

According to Stahl (1999), there are various ways of learning styles. Students can be two-dimensional or three-dimensional, simultaneous or sequential, reflective or impulsive or others. Learning preference, cognitive style and personality types can take into account in learning. However, it is almost impossible to meet all the preferences of different learning. Besides learning style, students also varied in term of the amount of exposure to written text with different skill and abilities and the exposure to languages. Rather than different methods appropriately being applied to different people, it is more appropriate to consider having different methods being appropriately applied to different people with different level or stages in their development. Although the human expert tutor can be flexible where he or she can adapt a proper sequence of lessons and training speed accordingly, but the expert tutor is infrequent due to attendance and expensive (Ghadirli and Rastgarpour, 2012).
2.3. The Computer as a Tool for Learning

In 1970s, the computer was being introduced into education. Nowadays, almost every school has computers and computers-related technologies. As technology improves day by day, the computer has been slowly becoming the tutor or virtual teacher replacing teacher. Due to the growth of the computer software, an online course are getting more and indirectly causes the learning opportunities in a different of subject area increased. With the advancement of technology, an existing and interesting learning environment can be created for the sake of students. However, implementation of a successful and interesting learning system with technology is not easy and has been widely discussed. Question like how would one improve to a higher level of technology are arising. According to studies, the majority human believes that the main purpose of expansion of technology should be as a learning tool instead of to enhance student in technological knowledge. It is believed that technology will enhance student learning and achievement.

Much research has been done by researchers in order to understand the role of technology in education toward children. The usage of computer in the classroom was at first being used to teach basic skills and traditional curriculum by acting as a supplement of teacher to deliver instruction. Computer and related technologies have expanded from an instructional delivery medium to a transformational tool and an integral part of the learning environment since the last decade.

According to Means and Olson (1995), fundamental changes in classrooms and schools can support by technology with the benefits in terms of student motivation, self-direction and accomplishment. Another emerging body in their research stated computers and technology play an important role for reforming education. In addition, Fouts and Stuen (1999), student motivation and enthusiasm has influenced by technology.

These findings propose that technology can help students to gain experience education, to understand content, become active student, and learning is connected to the “real-world”. Besides that, Solmon (1998) also report that majority of teacher
believed that student learning will improve by technology which is a powerful tool. Other than that, Birenbaum and Kornblum (1998) has concluded a positive role of computer mediated learning communities is helping teachers, students and families to find the educational resources.

In short, when using computer in learning, student tend to learn fast and better memorization. Besides that, computer has positively affected student’s attitudes toward learning and school. Students result does not guarantee with the computer and computers-related technology but also included many other factors that play important roles such as instructional design and software complex. Besides that, an intelligent tutoring system with the add-on of advanced planning and natural language will become the focus of the new generation (Fouts, 2000).

2.4. Intelligent Tutoring System (ITS)

Nowadays, people live in a world that is full with technological advancement where web-based learning and intelligent learning often been discussed. Artificial intelligence is one of the techniques that have been applied in education over the past 25 years with the noticeable result.

Intelligent Tutoring System (ITS) was origin from the Artificial Intelligence (AI) movement of the 1950’s and early 1960’s (Ghaoui and Janvier, 2001). Tutoring systems that adapt artificial intelligence techniques into computer programs to facilitate instruction is name ITS (Gharehchopogh et al, 2011). Provide one-on-one lessons is the goal of ITS. According to Benjamin Bloom 1984, students who undergo one-to-one lessons perform better than students who undergo traditional classroom lessons by two standard deviations. ITS let participate to form their skill by perform tasks just like training simulations. ITS will adapt instructional strategies, in term of content and style. Besides, ITS will also provide explanations, examples, demonstrations, and practice problem as required (Ong and Ramachandran, 2000).