

**EDUCATIONAL WEB BASED HYPERMEDIA SYSTEM FOR
KADAZANDUSUN LANGUAGE IN UNIVERSITI MALAYSIA
SABAH**

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PERPUSTAKAAN
UNIVERSITI MALAYSIA SABAH

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DECLARATION

I hereby declare that this thesis, submitted to Universiti Malaysia Sabah as partial fulfillment of the requirements for the degree of Bachelor of Computer Science (Software Engineering), has not been submitted to any other university for any degree. I also certify that the work described herein is entirely my own, except for quotations and summaries sources of which have been duly acknowledge.

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I would like to express my deepest appreciate to all those who provided me with the possibility to complete this final year project report.

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ABSTRACT

The Kadazandusun language is one of the courses offered at the Centre for the Promotion of Knowledge and Language Learning, Universiti Malaysia Sabah (UMS). It is a language spoken by the Kadazan and Dusun people of Sabah. As a foreign language offered in UMS it is not to be taken by the Dusunic students. The Web-based Kadazandusun learning system was developed to support and enhance the students learning experience. The system is able to track and monitor student performance and results. This learning system adapted the quiz questions based on the student academic level. It is able to provide different difficulty level of quiz questions to different type of learner based on their academic level. As a first time user, student needs to answer evaluation test in order to know their academic level. Students can then view the learning materials available in the system. On the other hand, lecturer can upload files and also check student performances. The language used to develop this system is PHP, HTML, CSS, MySQL, and JavaScript. HeidiSql is used to store the database of the system.

ABSTRAK

Universiti Malaysia Sabah telah menawarkan kursus Bahasa Kadazandusun sebagai kursus elektif kepada pelajar di bawah Pusat Penataran Ilmu dan Bahasa (PPIB). Bahasa Kadazandusun adalah Bahasa pribumi Kadazandusun di Sabah, Malaysia dan digunakan dalam perbualan dan interaksi harian masyarakat Kadazandusun. Sistem adaptif berasaskan web untuk pembelajaran telah dibangunkan untuk membantu pelajar meningkatkan tahap pengetahuan dalam pembelajaran Bahasa Kadazandusun. Sistem ini juga membantu pensyarah memantau prestasi pelajar. Sistem ini mengadaptasikan soalan kuiz berdasarkan tahap pengetahuan Kadazandusun. Ia membekalkan soalan yang berlainan mengikut tahap pelajar. Bagi pelajar baru, mereka dikehendaki menjawab satu ujian untuk menguji tahap mereka. Selain itu, pelajar boleh dapatkan bahan bacaan melalui sistem ini. Bagi pensyarah, mereka dapat memuat naik bahan bacaan dan semak keputusan pelajar. PHP, HTML, CSS, MySQL dan JavaScript telah digunakan untuk membangunkan sistem ini. HeidiSql digunakan untuk simpan pangkalan data.

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LIST OF SYMBOLS

Use Case Diagram



Student and lecturer



Association

<<include>>

Include relationship



System



Use Case

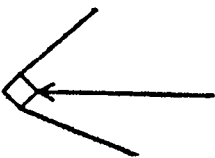
Activity Diagram



Initial node



Activity

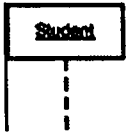


Decision node



Final-flow node

Sequence Diagram



Object



Execution occurrence



A

messag



CHAPTER 1

INTRODUCTION

1.1 Introduction

In this chapter, the first part is to discuss on the problem background of the project. Then the second part of this chapter is the problem statements which discusses on the main issue to be solved in this project. The objectives of the project will be the third part of this chapter. The fourth part of this chapter is project scope. The last part of this chapter is the organization of the report.

1.2 Problem Background

Nowadays, Information and Communication Technology is used all around the world. Web based system is created and used in many field which including Educational, Businesses and Information Services. Web-based educational system is one of the most popular systems. Most of the Universities use this type of system to store their lecturer notes, exercises, announcements and so on. For example, Learning Management System (LMS) is used by the lecturers in Universiti Malaysia Sabah (UMS) to upload notes, exercises and assignments. Then they can download the assignments or exercises that submitted by the students. They can also make announcement through the forum. Lecturer can check the results of the students through Smartums. Students can upload their assignments and exercises and also download the notes from the system. They can give responses to the forum and answer the quizzes.

Kadazandusun is the largest ethnic category in Sabah. Kadazandusun language is one of the languages widely used in Sabah. Kadazandusun Language is one of the language subjects that is offered in Universiti Malaysia Sabah (UMS) under Centre for the Promotion of Knowledge and Language Learning UMS or (PPIB-



Pusat Penataran Ilmu dan Bahasa) as a foreign language for learners of other ethnic than non-Kadazandusun. Currently, the lecturer is using LMS to upload the learning materials, tutorial exercises and assignment. There is no any other Kadazandusun E-learning system for the students and lecturers.

1.3 Problem Statement

Based on the problem background, even though students and lecturers in UMS can use LMS to store and obtain information, there are still some limitations and problems to the students and lecturers. Here are some of the problem statements.

- Does not offer personalized services.
LMS does not offer personalized services such as checking own result. Even though the student can log in to own account, but he or she can get the same information and announcements. The user can views the courses that he had enrolled before from the first semester until the last semester. They cannot monitor their own result for each quizzes and tests. They can only check their result if the lecturer upload the marks in the file.
- Present same resources to different learners.
It offers same educational material such as notes, assignments, exercises, quizzes, and learning materials to all the users. Same resources are presented to different type of learner. The same learning materials are provided to all the level of the students. The user can enter into the same set of quizzes.
- Difficult to track the learning performance of the students.
Learning Management System in UMS is only a system that allows students to download the learning material and do quizzes. A lecturer would have difficulty in tracking the student's performance.

1.4 Objectives

The objectives for this project are as listed below.

- Design an adaptive educational system for Kadazandusun Learning in Universiti Malaysia Sabah.

An adaptive Kadazandusun learning system is design in Universiti Malaysia Sabah for the students taking this Kadazandusun course.

- Develop and implement dynamic quiz questions for each learner.

The system should be able to provide dynamic quiz questions for different level of learner. A system with dynamic quiz questions should be developed so that it able to adapt to the preferences of the learner.

- Track and monitor the performance of the students.

The system should be able to allow the students and lecturers to check the performance of the students. Student should able to check their own quiz and final test result. Lecturer should be able to check performance of the students.

1.5 Project Scope

The users of this project would be the learners who are taking Kadazandusun as foreign language in Universiti Malaysia Sabah. The materials are based on the module of KadazanDusun in UMS from Level one until three. Users taking Kadazandusun Language Level one will enroll into the module for Level one which consists of Lesson one until ten. Those taking level one will enroll into the module for Level two and they can view the lesson they had learned in Level one. Level three students will enroll into Level three module and they can view all the lessons from Level one until Level three. They can only answer the quiz based on their Kadazandusun Level. Table 1.1 shows two types of users for this system which are student and lecturer.

Table 1.1: Modules of the System

| User | Description | Activities/ Functions |
|------|---|---|
| | First time user has to register to access to the system. The user will register as a student. After register, student needs to undergo Evaluation test to determine | Login Module It is system login that allow the registered users to login to the system. User authentication is built in this system to only allow registered user to access to the |

| | | |
|----------------|--|--|
| <p>Student</p> | <p>their academic level.</p> <p>Then the student can access to the main content which contains the learning material according to the syllabus. There are quizzes for each level. Student has to answer the quiz and can check the result. Apart from that, student also needs to answer a final test. If the student failed the test, he or she has to retake the test.</p> | <p>system</p> <p>Registration and Evaluation Test Module</p> <p>Registration module – allow the first time user to fill in the registration form.</p> <p>Academic Progress Evaluation Test -</p> <p>- A series of questions from the subject will be asked to evaluate user's current performance on the Kadazan Dusun Language. The question will be provided by the lecturer and is based on the level of the Kadazandusun. The result derived from the test will be used as a guideline for selecting the questions.</p> <p>Content</p> <p>Allow the student to view the learning material such as learning notes, and quizzes for each lessons and tests.</p> <p>Take quiz</p> <p>Allow the student to take the quiz based on their level.</p> <p>Check result</p> |
|----------------|--|--|

| | | |
|----------|--|--|
| | | Allow the student to check the result. |
| Lecturer | The lecturers have to register in order to login to the system. Lecturers can upload the learning materials such as notes, exercises and assignment to the system. Lecturers also can check the performance of the learners. | <p>Login It is system login that allow the registered users to login to the system. User authentication is built in this system to only allow registered user to access to the system</p> <p>Register Allow the lecturer to fill in the registration form.</p> <p>Create quiz and extra information Allows the lecturer to add the learning materials. For example, extra lecture notes and quiz.</p> <p>Check performance and result Lecturer can check the performance and result of the students.</p> |

1.6 Organization of the Report

This is a short description for each chapter:

- Chapter 1 : Introduction

This chapter gave an overview of the problem background, problem statements of the project. Then the objectives of the project and the project scope of this project are also mentioned here.

- Chapter 2 : Literature Review

Literature review that explained the study that has been made regarding to the topic. This chapter reviewed researches done and existing system, concepts and methods that are related to the project and the comparison between those existing systems also included in this chapter.

- Chapter 3 : Methodology

This chapter described the methodology that used to develop the system. It contains techniques or approaches that will be applied in the design and implementation of the project. This chapter also contains justification regarding the methods or approaches used and software and hardware requirements.

- Chapter 4 : System Analysis and Design

This chapter explained the system design of the project which included user interface design, database design, techniques and related algorithms that are related to the system. It also contains the flowchart, DFD, class diagram, structure chart, use case diagram and others depending on the system development model used.

- Chapter 5 : Implementation

This chapter explained the implementation part of the system. It described how the functions and modules were implemented to complete this project.

- Chapter 6: Testing

This chapter described the testing process through the whole system. Testing such as unit testing, integration testing, system testing and user acceptance testing had been done.

- Chapter 7: Conclusion and Future Work

This chapter summarized the project and results obtained. Apart from that, project limitations, advantages and recommendations for the future work are also explained in this chapter.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter describes the literature review that relates to this research. It discusses the adaptive and techniques that can be applied to implement in the Adaptive Web-based Hypermedia system for learning Kadazandusun Language. It also discusses the existing systems that are related to the project. The result of this literature review becomes the baseline to develop the Adaptive Web-based system for learning Kadazandusun language. This literature review is used as a guideline to conduct a comparative analysis among the existing system.

2.2 Hypermedia

Hypermedia is something similar to hypertext and it supports linking graphics, video and sound. An example of hyperlink images are images in Google can linked to other pages. Traditional hypermedia system is static. They provide the same page content and same set of links to all the users (Brusilovsky, 2001).

2.3 Adaptive Hypermedia

Adaptive hypermedia is the invention of hypermedia applications. According to K. A. Papanikolaou *et al.* (2003), adaptation is the concept of making adjustments in an educational environment to accommodate the needs and abilities of a learner, maintain the suitable context for interaction, and increase the functionality of hypermedia by make it personalized. Adaptive hypermedia system is a system that builds a model of the individual user and applies it for the user to adapt the content of a hypermedia



page to the user's knowledge and goals (Brusilovsky *et al*, 1996). It improves the functionality of hypermedia by making it personalized. Adaptive hypermedia increases the usability of hypermedia by building a model of goals, preferences and knowledge of each individual user to adapt to the needs of that user.

In 1996, there are six types of adaptive hypermedia systems. There are educational hypermedia, on-line information systems, on-line help systems, information retrieval hypermedia, institutional hypermedia and systems for managing personalized views in information spaces (Brusilovsky *et al*, 1996).

2.4 Adaptive Educational Hypermedia

Adaptive educational hypermedia is one of the most popular fields for adaptive hypermedia. Adaptive educational hypermedia system is a dynamic web-based educational system. After tracking and analyzing the behavior of the users, the system will update dynamically. Traditional textbooks were transformed into static Web-based textbooks that can read by user in anywhere and anyplace. It builds a model of the goals, preferences and knowledge of every student that is using the system. To adapt to the needs of that particular student, this model is used throughout the interaction with that student (Brusilovsky *et al*, 1996).

2.5 Adaptation Technologies

Based on the review from Brusilovsky (2004), all the adaptation technologies that applied in Web-based Adaptive Educational System are adopted from either the Intelligent Tutoring System area or the adaptive hypermedia area.

There are few major technologies for Adaptive Educational Hypermedia System such as adaptive presentation, adaptive navigation, curriculum sequencing technology, intelligent analysis of student solutions, interactive problem solving support, example-based problem solving support and collaboration support.

2.5.1 Adaptive Presentation

Adaptive presentation adapts the content that presented in each hypermedia node according to the information of learner (Alexandros *et al.*, 2009). For adaptive presentation, the content displayed in each page is adapted to the goals, knowledge and information is stored in the user model. It is content level adaptation.

2.5.2 Adaptive Navigation

Adaptive navigation helps the user in hyperspace orientation and navigation by changing the appearance of visible links by using different methods as direct guidance, adaptive ordering, link hiding and removal and adaptive link annotation (Brusilovsky, 2004). It is link level adaptation. For example, MATHEMA (Alexandros *et al.*, 2009) is a system that using adaptive navigation support to helps students by giving them some of the techniques such as direct guidance, link annotation, link hiding and link sorting.

2.5.3 Curriculum Sequencing Technology

Curriculum sequencing provided most appropriate individually planned sequence of knowledge units to learn and sequencing of learning tasks such as questions to the students. There are high-level sequencing and low-level sequencing. High-level sequencing can determines the next content or topic to be taught whereas low-level sequencing is uses to determine next learning task within current topic (Brusilovsky, 2004).

2.5.4 Intelligent Analysis of Student Solutions

Intelligent analyzers can find out what exactly is wrong or incomplete and which missing or incorrect knowledge may be responsible for the error (Brusilovsky, 2004). Apart from that, it can provide the student with error feedback and can update the student model (Brusilovsky, Peylo, 2003). This technique only needs one interaction between browser and server (Brusilovsky, 1996). Basically, it is deals with final

answers that given by the students. For example, ELM-ART implemented this intelligent analysis of student solutions on World Wide Web (WWW).

2.5.5 Interactive Problem Solving Support

With the implementation of Interactive problem solving support, the system can watch the actions of the student to update the student model. This technology provides the student with intelligent help on each step of problem solving. This supports gives a hint to the learner for the user to execute to the next step (Alexandros *et al.*, 2009).

2.5.6 Example-based Problem Solving Support

For this technique, it helps students solve new problems using as help examples from their earlier experience. Then the user can solves the new problems by refer to the examples given. As an example, ELM-ART is using the mentioned technology (Brusilovsky, 2004).

2.5.7 Adaptive Collaboration Support

Adaptive collaboration support is use to form a matching collaborating by using system's knowledge about different users that stored in user models. This technique supports the collaboration process just like the interactive problem solving support systems (Brusilovsky, 2004).

2.5.8 Summary

Based on the review on the different types of adaptive technologies, adaptive navigation, adaptive presentation and curriculum sequencing technologies are the technologies that suitable for developing the Adaptive Web-based system for learning Kadazandusun language. Curriculum sequencing technology is used to determine the next learning task such as different level of question and exercises will be given to

different types of learners. This is because this technology can use to lead the student and it is the most popular. Adaptive presentation and adaptive navigation will be important in content level adaptation.

2.6 Architecture of Adaptive Educational Hypermedia System

There are three main components of adaptive. They are user model, domain model and adaptation model. User model represents who is being taught (students, learners). The user model also contains learner's information such as the learning styles of the user (*Paul de bra et al., 2004*). Domain model represents the domain being taught (the subject matter); Adaptation model represents how to teach the user.

2.7 Technique for Measuring Learner's Knowledge

In this part, test is the main technique to measure knowledge of the learner. Multiple-choice tests are most popular (*Paul de bra et al., 2004*). It is useful to determine the entry-level of the learner and also determine the level of them at different points in time.

Pre-test and post-test can be used to assess the level of knowledge of the subject domain before and after using the system (Freddy Mampadi, 2011). Pre-test used to assess the prior knowledge of the subject domain. Post-test is used to evaluate the academic level of the student after using the system. Preliminary test will be used at the beginning of the system whereas final test will be used after student has used the system.

2.8 Learning Styles

Learning style is referred as how an individual use owns abilities to gain knowledge or information. There are seven types of learning styles. Basically there are visual, aural, verbal, physical, logical, social and solitary. There is an influence on performance and achievement of learning outcomes based on the learning style of an individual. (Simon

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