

**FRENCH LANGUAGE ADAPTIVE LEARNING
SYSTEM FOR BEGINNERS**

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**FACULTY OF COMPUTING AND INFORMATICS
UNIVERSITI MALAYSIA SABAH**

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SYSTEM FOR BEGINNERS**

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**SUBMITTED IN PARTIAL FULFILLMENT FOR
THE REQUIREMENTS FOR THE DEGREE OF
BACHELOR OF COMPUTER SCIENCE
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**FACULTY OF COMPUTING AND INFORMATICS
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 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. This thesis may be available within the university library and may be photocopied or loaned to other libraries for the purpose of consultation.

22 JUNE 2015

LIOW CHERN JUNG

CERTIFIED BY

Asnie Tahir
SUPERVISOR

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ABSTRACT

French language adaptive learning system for beginners is a system for users to learn French language using the approach of user individual learning progress adaptation. Adaptive approach provides a new perspective on learning French language. French language is not Malaysia's mainly spoken languages, therefore an adaptive system is developed to adapt to different users by capturing their knowledge level to cater the knowledge diversity of different users. The system mainly integrates the *Adaptive Presentation* and *Adaptive Navigation Support* as the adaptive components. UMS provides French courses for students and it is taught in three separate levels. French language adaptive learning system is built based on the requirements given by the lecturers and students of French language course. The system will consist of the two modules which are the student module to help student in their studies of French language and lecturer module for the lecturers to invigilate the progress of the students. Prototyping methodology is applied to develop the system as it a rapid development that allows early feedback from users. Few functions will be included into the system such as Dictionary, French Culture, Slides and Quizzes to help students to further enhance their knowledge of French language and promotes individual learning using a web-based system.

ABSTRAK

SISTEM PEMBELAJARAN ADAPTIF BAHASA PERANCIS UNTUK PELAJAR PEMULA

Sistem pembelajaran adaptif bahasa perancis untuk pelajar pemula ialah satu sistem yang digunakan untuk belajar bahasa Perancis dengan mengaplikasikan pendekatan adaptasi individu untuk menilai kemajuan pembelajaran. Pendekatan adaptasi individu memberikan perspektif baru kepada pembelajaran bahasa Perancis. Bahasa perancis bukan bahasa utama di Malaysia, oleh itu sistem adaptif diciptakan untuk menyesuaikan sistem dengan pengguna yang berbeza melalui ujian untuk menentukan tahap pengetahuan mereka demi memenuhi pengguna yang berbeza tahap pengetahuan. Sistem ini mengintegrasikan pendekatan adaptasi terutamanya "Adaptive Presentation" dan "Adaptive Navigation Support". UMS menawarkan kursus Perancis untuk pelajar dan ia diajar dalam tiga tahap yang berasingan. "Sistem pembelajaran adaptif bahasa perancis untuk pelajar pemula dibina berdasarkan keperluan yang diberikan oleh pensyarah dan pelajar kursus bahasa Perancis. Sistem ini terdiri daripada dua modul iaitu modul pelajar yang membantu pelajar dalam pelajaran bahasa Perancis dan modul pensyarah bagi pensyarah untuk mengawas kemajuan pelajar. Metodologi prototaip digunakan untuk membangunkan sistem ini kerana ia merupakan kaedah perkembangan yang pesat dan cepat dan ia juga boleh memperolehi maklum balas awal daripada pengguna. Selain itu, beberapa fungsi akan dimasukkan ke dalam sistem juga seperti kamus, Kebudayaan Perancis, slides dan Kuiz untuk membantu pelajar untuk meningkatkan lagi pengetahuan mereka mengenai bahasa Perancis dan juga menggalakkan pembelajaran individu menggunakan sistem berasaskan web.

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CHAPTER 1

INTRODUCTION

1.1 Language

Language is the core of communication. A language can be spoken, written and read from one to another, so people can understand the message that is conveyed. Besides that, language also consists and reflects the culture of the origin of the person as it carries rich traditional background. The estimation of the number of languages around the world is about 6000 to 7000. Since ancient times, languages are written in the form of symbols. For example, the Egyptians use Heliography as their symbols. However, languages and representative symbols of the languages also undergo transformation and evolve. As it evolves, the changes diversify overtime and history of the language enriches. Through comparison between modern language and ancestral language can determine the development stages of the language.

Besides conveying and transmission of literal message through language, intonation of the language may bring forth emotions and feelings of a person. Language has the effect of social grooming and it is open ended. Human language allows a vast range of expression compared to animal communication. Different languages have different identities in terms of grammar, pronunciation or grammar, but meaning and semantics of the language remains the same if understood. Language is a brand of culture shared by a group of people who uses the same language. Some of the language has a signature to it as men uses more masculine terms and women uses feminine terms, the difference are easily determined once spoken or written. Thus, language is very vast and rich in cultures which allow groups of people to communicate and understand.

1.2 French Language

French language is originated and belonged to the Indo-European family. Among many other languages such as Italian, Portuguese, Spanish, Romanian, Catalan and French included are descended from the spoken language of Roman Empire (German, Herschensohn, Frenck-Mestre, 2014). French is known as the second-most widely spoken and written language worldwide after English. In 29 countries, French is the official language used. It is also the mother tongue and first language spoken and use in few countries including France, southern Belgium, western Switzerland, Monaco, province of Québec, new Brunswick and parts of Ontario in Canada, also consists of parts of U.S. state of Louisiana, Maine and Vermont . It is also the third-most widely understood language in the European Union. French language was introduced to countries like America, Africa and Asia during the 17th and 20th centuries due to the French and Belgian colonialism. Many international organisations including the United Nations, the European Union, North Atlantic Treaty Organization (NATO), the World Trade Organization (WTO), International Committee of the Red Cross (ICRC) uses French as the official language of the organisation. Bloomberg Businessweek deemed French to be one of the top three most useful languages, in accordance English, Chinese and French. The language proves to be useful in terms of communication for business. French language is taught in University Malaysia Sabah (UMS). The course is offered to students in three levels of difficulty. Students are able to register and learn the course for three levels, one level for one semester. Therefore, learning French language in UMS requires duration of three years.

1.3 Learning Process

Knowledge is wide and infinite, pursue of knowledge is an on-going process for human beings. Therefore, the learning process of human is unlimited. Learning is the act of acquiring new and reinforce existing knowledge and skills with different and various types of information. Learning will cause positive changes to the person and the changes produced are relatively permanent. Education is referred to human learning to enhance knowledge. It is goal-oriented and aided with

motivation to progress further. Research from Schacter, Gilbert and Wegner (2011) shows that human behavioural learning prenatally, as an infant of 32 weeks where the central nervous system is sufficiently developed and primed for learning and memory to occur on in early development. The learning process can varies in many forms, the common way is the passing down of knowledge from a more experienced adult or teacher. Teachers are people with deeper and more insight of a particular domain of knowledge. They are able to clearly explain and hand down knowledge in conventional ways for future generations to learn from it. Self-learning is also an alternative of learning. However, self-learning requires pre-existing knowledge on certain fields such as strong language to enable understanding of meaning and semantics of the topic referred. Often, self-learning knowledge is gathered and obtained from books, encyclopaedias and other written materials. On top of that, due to the advancement of technology and cyberspace, self-learning can also be carried out through E-Learning, which is the learning through reference using the Internet materials and information.

1.4 Problem background

French is not one of the main languages to be taught in Malaysia. Therefore, French language is mostly exposed to people later on such as language courses offered in Universities. Since it is a new language needed to be learned and understand in a limited period of time, it is difficult for lecturers or tutors to teach and assess each student individually in class based on their learning progress and learning ability. Different people have different advancement in learning progress and each also have different preferences of learning method. Thus, an adaptive learning system is able to help the students to progress and improve accordingly.

Besides, conventional way of learning with books and dictionaries are good but at times inconvenient. Each module requires students or learners to buy and obtain new exercise books, textbooks, and other study aids. Revision and study is difficult when many books and notes are required to be flipped through and study. With the advancement of technology and internet, modules assessments and lecture notes can be uploaded online and students or learners can access the

learning materials in the comfort of their home or library via internet. Thus, a system is required to ease the learning process and further advancement in a constant, steady but rapid pace.

Nowadays, job requirements prefer multi-lingual individuals. As a Malaysian, although we have the upper hand of being a multi-lingual and multi-cultural country, we are encouraged to learn more language to be able to communicate with tourist or have wider job opportunity at foreign countries by knowing extra language knowledge. It is beneficial to be able to communicate and understand various languages. It does not only enhance oneself but it also ease communication and break down barriers between people. French Language is the second most used language worldwide, it is encouraged to learn and explore the language for self enrichment and enhancement.

In this tech-savvy era, Internet and online systems are easily available. Since students spend most time on the computers, it is also more convenient for them to carry out their revisions and studies on a computer. Long hours of lecture in class are often boring and dull if the lecturer does not provide enough interactive materials in class. It will just be a static memory of data and information that does not stimulate problem solving thinking skills. Web-based systems can be equipped with multimedia which will attract attention of the student and short quizzes and test given to the student to stimulate thinking skills. Therefore, promotes independent study and revision for the student.

1.5 Description of the project

This project mainly target student users as it is an adaptive learning website designed for students to use in e-learning. Besides, the learning model will then determine the suitability of learning materials based on the student's progress. Learning model (Phobun and Vicheanpanya, 2010) evaluates the student's performance while interacting with the system. Adaptive Navigation provides a new and interesting user-system interaction. Lecturers or tutors provides the learning syllabus and study materials. System admin gathers the syllabus and materials and

configure the system accordingly with suitable learning materials added. They can also upload new materials for the students. The system will assess learners' behaviour and progress and it will provide suitable hints and clues as well as more suitable learning materials for the learners.

The system is designed to have course difficulty levels in accordance to UMS French language course. There are three levels, level I, level II and level III. As the level increases, the difficulty on the topics also increases. Dependencies are set on the topics available to be accessed is based on the prerequisite knowledge. For example, stage III is unavailable to novice users if stage II is not completed. Inside each stage there are few topics and at the end of the topic, there is an evaluation test to determine if student is able to proceed to next topic or not. Suitable navigation and hints are provided to the student to proceed accordingly. Lecturers can evaluate student progress based on their scores in the tests.

1.6 Objective

This project has 3 objectives to achieve:

1. To create an interactive adaptive learning system to learn French Language.

The objective 1 is aimed to create a system that allows interactions between members of the system. Incorporating effective interactions among members of students and lecturers enhances the learning process.

2. To design learning strategy to cater people diversity.

Objective 2 is to design a learning strategy or approach that will allow the system to auto determine the different users based on their knowledge level and then group them into different groups of users to customized different contents available for view for the users.

3. To help student in independent learning using web-based system.

This system is aimed to help student in independent learning as the web learning system acts as a virtual lecturer. However, students have to be independent in learning the system and fully utilize the system to their own needs in their studies.

1.7 Project Scope

The French Language Adaptive Learning System for beginners is build for students of UMS. The students who took French language can further enhance their knowledge and skills via the adaptive learning system as it provides guided learning process. Lecturers are also a part of the targeted user. They can upload related assessment and materials for students. It is a complete website with learning materials. It has proper French language materials that are presented in the interface of the adaptive system for the learner. System provide different and various learning materials for learner and their preferred learning style after system calculate and tabulate result of most effective learning style for learner. Assessment is prepared for students to evaluate individual progress to adapt system for different users accordingly. The system is planned to be used within UMS just for the benefit and privilege of UMS students. There will be three modules in the adaptive system which is level I, level II and level III with increasing difficulty and complexity of topics. Table 1.1 shows the users, function available and duties of each user.

Table 1.1 Users, Function Available and Duties

	Functions Available in the System	Duties
Students	<ol style="list-style-type: none">1. Learning topics – Slides for learning and able to download.2. Exercise – Exercise of the particular chapter to allow students to understand the topic better.3. Quiz – Evaluation of the Chapter learnt.4. Forum – Allow discussion between students.5. Dictionary – French word and meaning of the word.6. French Culture – French words and cultures to allow students to learn.	Carry out individual studies according to the adaptation from the system.
Lecturer	<ol style="list-style-type: none">1. Quiz Results – Able to view student's quiz results.2. Edit Questions – Able to edit existing questions and insert new questions into the test and quiz.3. Upload File – Able to upload file to download.	Monitor achievement of students and learning progress.

CHAPTER 2

LITERATURE REVIEW

2.1 E-Learning

E-learning is vastly popular nowadays as the technology is exponentially advancing. It is very convenient for academic communities as the learning process can be carried out anywhere, anytime, and anyplace. E-learning eliminates the barrier between the distance of instructor or tutor and students. Henceforth, communication and learning efficiency is strengthened as the e-learning materials are accessible through properly equipped computer terminals and complete web-surfing devices, online courses via the Internet. Content of study is delivered through the internet, it is efficient and saves time, but it has some shortcomings. Shortcomings of web-based learning systems lack the motivation, supervision, and training needed for the student from the tutor or instructor. E-learning is more interactive compared to in-class learning, but if just by placing lecture notes does not provide the required training. Therefore, one of the possible solutions is using training software with a built-in artificial intelligence, such as Intelligent Tutoring System (ITS).

E-learning is essentially the network-enabled transfer of skills and knowledge. E-learning refers to using electronic applications and processes to learn. There are few examples in E-learning applications and processes, which include web-based learning, computer-based learning, virtual and digital collaboration. Content or learning materials are mainly distributed and delivered via the Internet, intranet/extranet. It may also come in the form of audio or video tape and CD-ROM. E-learning simulations close to the real world are the answer to constructivist learning theories, demanding situated learning with a high degree of engagement of the learner.

2.2 Intelligent Tutoring System

Before the creation and existence of Intelligent Tutoring System(ITS), computer based system such as Computer Aided Learning (CAL) or Computer Based Training (CBT) is used. These systems provide instruction and learning materials to learners without concerning with the learner's knowledge model. The lack in the adaptive ability of the training systems cannot assist learners' progress individually. Intelligent Tutoring System (ITS) assess learner's action and result with the interactive environments and it will then develop and evolve accordingly with the learner. It is tailored to the learners' progress and assistance is provided on weaker fields and topics. Instructional strategies in terms of relevant examples, hints and demonstrations are then provided to the learner.

Intelligent tutoring systems are designed computer software to stimulate a virtual human tutor consisting human behavior and guidance. It has various functions to aid in student learning, it will assist by posing relevant questions, parsing responses and offer customized instruction and feedback. The system is able to distinguish and interpret complex and difficult student responses and conduct machine learning during operation. From the students' behavior towards the program, it will build a profile to keep track of students' progress and choices to estimate the preferences and mastery of students in the subject using which specific module or method will gradually improve understanding of student. These intelligent tutoring systems are beneficial to students as it can alter and adjust its tutoring behavior in real time to suit and following different individuals to advance in further tutoring the students with application of effective interaction by adjusting its knowledge base according to students' profile.

In the real world, learning and knowledge absorption of student is often more efficient and effective when one-on-one, tutor and student. More attention is given to the student and student study behavior is obviously observed by tutor. More guidance and explanation is given to students on the weaker topics. This theory applies to the intelligent tutoring systems. The system attempts to capture the best methods from the human behavioral theory and try to discover conventional and applicable new strategies for the teaching and learning process.

However, virtual systems such as intelligent tutoring systems are unable to provide exact human guidance and explanation. Hence, the systems evaluate weakness then provide hints and more time given to complete task and space to finish questions. Through this method, system will approach to more real time and human behavior response. Figure 2.1 indicates the components of Intelligent Tutoring System according to Phobun and Vicheanpanya, 2010.

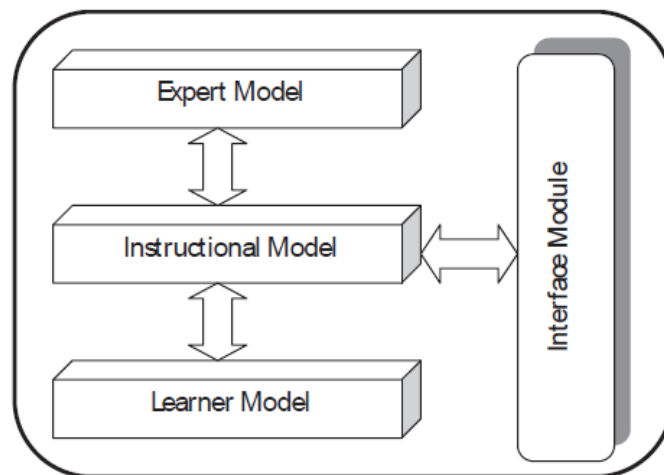


Figure 2.1 The components of Intelligent Tutoring Systems

2.2.1 Expert Model

Expert Model is a computer representation of a domain expert's subject matter knowledge (declarative knowledge) and problem-solving ability (procedural knowledge). This knowledge enables the ITS to compare the learner's actions and selections with those of an expert in order to evaluate what he or she does and does not know (Phobun and Vicheanpanya, 2010: 3).

2.2.2 Learner Model

Learner Model is a level of learner's knowledge while interacting with the tutoring system. Performance of each learner is evaluated from his or her performance while interacting with the system. Learner's knowledge, perceptual abilities and reasoning skills are determined through evaluation. The system will generate

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